Introduction

This section provides guidance on meeting the performance requirements for the following cladding types:

- Curtain walling systems
- Rainscreen cladding systems
- Timber cladding boards
- Mock Tudor cladding
- Vertical tiling and slating
- Brick slip cladding systems
- External Wall Insulation systems

The following definitions apply to curtain walling and rainscreen cladding systems:

- Curtain wall - A curtain wall cladding system consists of a prefabricated or site assembled frame with infill panels and glazing. Curtain walling systems supports no loads other than its own weight and the environmental and imposed forces which act upon it.
- A rainscreen cladding system consists of a multi-layer construction of materials which is designed to provide a barrier to the weather. The typical build-up would consist of:
  - An outer skin of panels (i.e. the rainscreen).
  - A drained and vented cavity.
  - A backing wall.

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  - A drained and vented cavity.
  - A backing wall.

The above cladding systems should be fixed back to a suitable substrate/backing wall and as such, the guidance within this section should be read in conjunction with the following sections:

- External Walls – External Masonry Walls
- External Walls – Timber Frame
- External Walls – Light Gauge Steel Frame
- MMC Systems

6.5.1 Compliance

The design, specification and installation of external wall claddings shall meet the performance requirements of this section.

6.5.2 Information to be provided

The Designer shall provide sufficient design details to demonstrate it meets the requirements of this section.

A full set of design drawings and specifications should be made available to the Warranty provider and all other interested parties prior to the associated works starting on site. This may include:

For all cladding systems

1. Full set of drawings including locations of cladding applications for each elevation and section details showing the external wall makeup.
2. Façade specification and/or full manufacturer's specification.
3. Bracket and fixing specification for the cladding system including the fixing type, size, spacing and method of fixing to the substrate. Site specific structural calculations of the brackets and fixings for the project are to be provided for the cladding system. Details of corrosion protection and how bi-metallic corrosion is to be mitigated should also be provided.
4. Details of any technical assessment (third party product conformity certificates) and/or test data.
5. Evidence the cladding system satisfies the Building Regulations in relation to their fire resistance.
6. Details of proposed cavity barriers to be used including materials, period of fire resistance (in compliance with the project fire strategy), test data for the system including any test data of penetrations through a barrier (e.g. brick shelf support angle brackets), plans and elevations detailing the locations of the barriers in the façade and vertical and horizontal section details at all interfaces.

In addition, the following should also be provided for the following cladding types:

Curtain walling and rain screen cladding systems

1. Details of proposed on site testing regimes

Timber cladding boards

1. Where timber cladding/boarding is proposed, a specification of the timber to be used should be provided to confirm it has a minimum service life of at least 25 years. Details of preservative treatment used (if any) to BS8417 should also be provided.

Brickslip cladding systems

1. Detailed specification of all materials to be used within the brickslip system build-up.
2. Details of material specification for the brick slips with evidence the brick slips satisfy the requirements of BS EN 771.
3. Third party product conformity certificates for brickslip systems.

External wall insulation systems

1. Details of any technical assessment (third party product conformity certificate) for the entire EWI system including the cladding or render to be used on the external face. The certificate must clarify which type of wall substrate the EWI system has been assessed.
    a. For coastal environments and areas of severe and very severe wind driven rain exposures, the technical assessment for the EWI system must explicitly confirm the system is suitable for use in a coastal environment or severe/very severe wind driven rain exposure.
2. A full manufacturer's specification for the installation of the system to the substrate must be provided.
3. The manufacturer or Engineer should provide a fixing specification for the insulation boards. This should be site specific and must detail type, spacing and method of fixing to the substrate. On-site pull out testing and a report confirming fixing type and length to satisfy the design loads including safety will be required in accordance with the Construction Fixings Association.
4. Where adhesive is used to fix insulation boards back to the substrate, a technical assessment (third party product conformity certificate) must be provided for the adhesive.
5. Specification and detailing of:
    a. How external fixtures (such as downpipes, satellite dishes and other ancillary fittings) are to be fixed back to the substrate (not just the EWI system).
    b. Materials to be used for sleeving of service penetrations where required.
    c. Interface detailing for window and door reveals to avoid interstitial condensation.
    d. DPCs, cavity trays, flashings etc.
6. A condensation risk analysis should be provided for the external wall makeup.

The Warranty surveyor, at their discretion, may also request supporting information that demonstrates suitability for use of any materials or systems contained within the above.

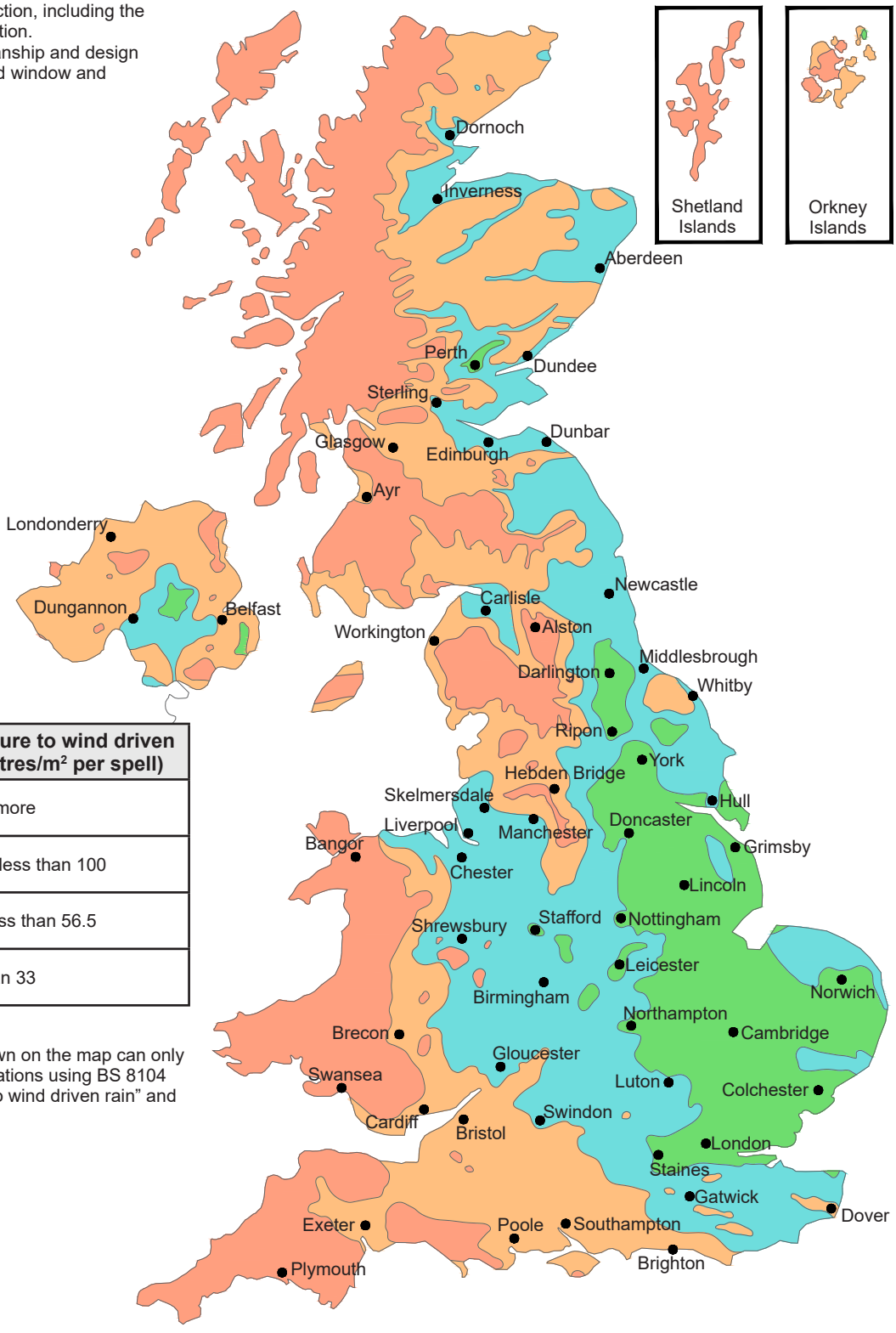
6.5.3 Wind driven rain exposure requirements for all cladding types

External wall and cladding systems shall be suitable for the wind driven rain exposure rating specific to the project.

In all situations, external walls and cladding systems must be suitable for the wind driven rain rating specific to the project.

To ascertain the risk relating to wind-driven rain, the following should be determined:

- The exposure to wind-driven rain, using the wind driven rain exposure map.
- The correct type of construction, including the correct application of insulation.
- The correct level of workmanship and design detailing, particularly around window and door openings.



Exposure zones	Exposure to wind driven rain (litres/m² per spell)
Very severe	100 or more
Severe	56.5 to less than 100
Moderate	33 to less than 56.5
Sheltered	less than 33

Note:
Variations to the exposure shown on the map can only be made by site-specific calculations using BS 8104 “Assessing exposure of walls to wind driven rain” and the table above.

For further information on determining the exposure for the site location please see BS 8104 and BR 262 for further guidance.

6.5.4 Fire resistance

All cladding systems shall have adequate fire resistance in accordance with the relevant Building Regulations. Supporting test evidence to an appropriate standard shall be made available upon request.

6.5.5 Cavity barriers

All cladding systems shall incorporate cavity barriers where required by regional Building Regulations. Cavity barriers shall be durable and must not adversely affect the structure of the external wall or the performance weatherproof envelope.

Where required by statutory regulations, cavity barriers shall:

- Be of a suitable material.
- Specified and installed within the scope of the test certification and/or the third party product conformity certificate.
- Be installed in accordance with the manufacturer's recommendations.
- Be suitable for the location they are installed.

The completed system should incorporate cavity barriers and firestops and resist the spread of fire in accordance with the relevant Building Regulations and project fire strategy requirements. Their specification, positioning and installation should also satisfy the requirements of the Building Regulations.

Cavity barriers should be mechanically fixed to rigid construction (for both vertical and horizontal positions) in accordance with the manufacturer's recommendations. Open state barriers are not suitable for vertical arrangements.

Curtain walling systems

Where curtain wall members run uninterrupted past floor slabs and partition walls, consideration must be given to the chimney effect allowing hot smoke or fire bypassing the slab edge fire barrier in a fire situation. Any fire stopping product should be tested to BS EN 1364-4 for fire stop testing in curtain walls and CWCT TN 98.

Rainscreen cladding systems

The cavity behind a rainscreen is deemed to be a moist zone and materials selected must not corrode, deteriorate or affect the performance of the cavity barrier during its design life. Horizontal cavity barriers must allow for drainage and ventilation in the rainscreen cavity and a gap of 50% of the cavity width must be retained in front of the open state cavity barrier.

Decorative cladding on external cavity masonry walls

Cavity barriers are required behind decorative cladding such as timber boarding which is constructed on the outside of an external cavity masonry wall.

6.5.6 Certification and testing for curtain walling and rainscreen cladding systems

Curtain walling and rainscreen cladding systems shall have adequate testing and certification to satisfy our Warranty requirements.

Certification

Curtain walling and rainscreen cladding systems should have a third party product conformity certificate confirming satisfactory assessment and comply with the requirements of the CWCT Standard for Systemised Building Envelopes, including parts 1-8.

The collation of individual testing of components does not provide an overall performance of the cladding system or backing wall.

The CWCT Standard provides detailed guidance on performance and testing which should be adhered to.

Testing requirements

Off site testing requirements for curtain walling systems
In addition curtain wall system will have either been:

- Tested and provided with a classification given in BS EN 13830, **or**
- If the curtain walling is of a custom design, it should be tested to an appropriate standard of CWCT sequence A or B testing when tested at a test pressure of at least 600 pascals by an independent UKAS accredited test facility to ensure that the system meets or exceeds the weather performance classification for the building taking into account the design parameters and project location.

At a test pressure of 600 pascals, an air infiltration rate no higher than 1.5m^3/hr/m^2 for fixed glazed panels is permissible.

Pull out testing for curtain walling systems

Pull-out or destructive testing of anchors should be carried out in accordance with BS 5080 and the Construction Fixings Association Guidance Note, Procedure for Site Testing Construction Fixings.

The number of fixings to be assessed must be agreed on a project by project basis. In addition, if there are varying types of fixings then each type should be tested. If the fixing is the same but the structure varies, then each type of structure should be tested.

BS 5080 requires 5 tests per type, however if a very large project is proposed, this could be increased to give more assurance of installation, e.g. every floor, one per side (e.g. North / East/ South/West). The scope and number of tests must be agreed with the Warranty surveyor at the commencement of the project, to allow sufficient time for testing to be planned in advance and made available to the Warranty surveyor when completed.

Site water testing for rainscreen and curtain walling systems

Site water testing of penetrations to critical joints should be carried out by a UKAS accredited testing company in accordance with CWCT test methods. This is required to check to site workmanship of the building envelope as constructed. Areas and method of testing is to be agreed prior to construction. See CWCT Technical Note 41 and 102 for guidance.

Where testing fails, the cause and remedial action should be implemented and advised to the Warranty surveyor and additional checks to be carried out to determine whether the failure is local or a system issue in accordance with CWCT TN 101. If it is a system issue, remedial work to the façade must be carried out prior to further testing is carried out, to demonstrate the remedial solution is effective.

Additional testing may be required for developments over 6 storeys. For further information, our Major Projects Team should be consulted.

6.5.7 Durability of all cladding systems

All cladding systems shall have an adequate durability as outlined within our guidance.

Primary components (those that are not easily replaceable) should have a service life not less than 60 years.

Secondary components e.g. those that are easily replaced / accessible and do not require substantial dismantling of the system should have a service life of not less than 25 years. For secondary components, repairs can be easily undertaken as part of planned maintenance programme in place during the service life of the cladding.

6.5.8 Load transfer for curtain walling and rainscreen cladding systems

Curtain walling and rainscreen cladding systems and their associated ancillary components shall safely transfer loads back to the building structure and shall allow for movement without causing damage to the cladding system or building fabric.

Dead and live loads should be transferred safely to the building structure without undue permanent deformation or deflection of any component.

Imposed loads should be calculated in accordance with BS EN 1991. Movement should be accommodated without any reduction in performance.

Fixings and supports should be designed to accommodate specified loads. This must consider the structure it is being fixed to and the product manufacturer’s recommendations.

6.5.9 Resistance of water penetration for curtain walling & rainscreen cladding systems

Curtain walling and rainscreen cladding systems shall be designed and constructed to resist the passage of moisture to the inside of the home and be appropriate for the exposure.

Curtain walling systems

The completed curtain wall system should resist the passage of water to the inside of the building allowing free drainage, not trapping water and should have:

- External and internal air and water seals.
- Drained and ventilated glazing rebates.

Rainscreen cladding systems

Rainscreen systems require adequate drainage and ventilation in accordance with CWCT standards for systemised building envelopes. At the head and base of a rainscreen cavity, a minimum of 5000mm^2/m of ventilation must be provided. Ventilation gap must not be less than 10mm high (a continuous 10mm gap will provide 10,000mm^2 ventilation). Drainage must be provided at the base of the rainscreen system. The functional drainage gap must not be less than 10mm.

Cavity trays are required at the base of rainscreen façades to direct water away from the building to prevent the risk of water ingress.

Minimum cavity widths
Cavity widths are determined by the joint type:

- Sealed / closed = 25mm
- Open = 50mm
- Baffled = 38mm
- Labyrinth = 38mm

Sealants
Sealants should be specified in accordance with BS 6213 or BS EN 15651 and the performance determined by BS EN 11600 and the manufacturer's recommendations.

6.5.10 Bimetallic corrosion for curtain walling and rainscreen cladding systems

The risk of bimetallic corrosion shall be checked as early as possible and avoided by the isolation of dissimilar metals.

6.5.11 Specific requirements for curtain walling systems

Curtain walling systems shall be design and installed to ensure an adequate service life is achieved.

CE/UKCA marking is to be provided for all curtain walling covered by EN 13830.

Surface and interstitial condensation

The system should be designed to minimise the risk of surface and interstitial condensation by the use of thermal breaks and a continuous vapour control layer.

Sound transfer

The system should be designed to resist the passage of airborne and impact sound within the building with particular attention given to through wall, vertical and horizontal flanking transmission at:

- The edges of separating floors and the interface with the facade.
- The outer edges of separating walls and the interface with the facade.
- The outer edges of partition walls and the interface with the facade.
- The junctions with roof constructions and parapets and the interface with the facade.

Where curtain wall members run uninterrupted past floor slabs and partition walls, consideration must be given to structure-borne sound (impact sound) through the system.

Electrical installations and lightning protection

The system should comply with BS 7671 requirements for electrical installations for electrical continuity and earth bonding, where it is required to form part of a lightning protection system it must be designed to comply with the requirements of BS 6651.

Fixings

Fixings should be specified in accordance with the manufacturer's recommendations and be installed to the correct torque setting. Fixings should be of a suitable material and have an adequate durability for the environmental condition.

Fixings and finishes to curtain walling must consider the location and corrosion category to ensure corrosion is avoided. Aluminium components must be robustly isolated from cementitious products to mitigate corrosion.

Other considerations

The curtain wall system should not include materials liable to infestation attack by micro-organisms, fungi, insects or vermin.

Packing of brackets to achieve surface tolerance is only permitted in accordance with the manufacturer's recommendations, and shall not exceed the maximum depth stated in the designer's calculations.

All packers for brackets supporting or restraining the curtain wall must be metal. All dead load packers to windows and doors must be suitable to transfer the load.

6.5.12 Specific requirements for rainscreen cladding systems

Rainscreen cladding systems shall be design and installed to ensure an adequate service life is achieved.

Pressure moderation

Cavities should be closed within 300mm of corners to reduce the effect of wind pressure in line with clause 2.2.6.1 of the CWCT Standard for Systemised Building Envelopes.

Insulation fixing - combustible fixing

Where insulation is fixed to a backing wall, a minimum of one non-combustible fixing per $1m^2$ or per insulation batt (whichever is the lesser) should be provided in addition to the other fixings.

Impact damage

Rainscreen panels are generally lightweight and vulnerable to impact damage. The rainscreen must be able to resist impacts without causing safety hazards. Testing and classification to CWCT Technical Note 75 and 76 may be required to demonstrate the rainscreen's material impact performance.

Tolerances

Design should allow for the line, level, plumb and plane of the completed rainscreen cladding to be within the acceptable tolerances of:

- Line: +/-2mm in any one storey height or structural bay width, and +/-5mm overall.
- Level: +/-2mm of horizontal in any one structural bay width, and +/-5mm overall.
- Plumb: +/-2mm of vertical in any one structural bay width, and +/-5mm overall.
- Plane: +/-2mm of the principle plane in any one storey height or structural bay width, and +/-5mm overall.

Sheathing boards

Where sheathing boards are specified, they should satisfy the requirements as set out in the 'External Walls ' Timber Frame' and External Walls – Light Gauge Steel Frame' sections.

Seals

All penetrations in the façade including windows, doors, ductwork etc. must be sealed to the structure and external sheathing board with EPDM or suitable alternative. The sealing membrane must have adequate test data suitable for the project specific wind load and proposed substrate compatibility.

6.5.13 Timber cladding boards - durability and specification

Timber cladding boards have an adequate durability.

Timber and boards for exterior use should be of a durable species, with sapwood excluded, or preservative treated by pressure impregnation using preservatives suitable for use in hazard Class 3 in compliance with BS 8417, or equivalent.

Timber cladding boards should have a minimum service life of at least 25 years. Further guidance on the durability of timber is provided in 'Appendix C - Materials, Products, and Building Systems'.

Where finishes are applied to timber boarding, they should be a translucent or opaque penetrating vapour permeable stain or paint, rather than a film coating type e.g., oil-based paint or varnish.

Timber boarding should be at least 16mm thick, and allowance for moisture movement in boarding should be achieved by making tongues, joints or overlaps at 10% of the board width or 20mm, whichever is greater.

6.5.14 Timber cladding boards - cavity requirements

A cavity shall be present between the timber cladding and substrate which resists the passage of moisture to the inside of the home.

Timber boarding should be battened off the supporting background to provide a minimum 19mm cavity for draining and venting board.

Battens should be a minimum of 38mm wide, preservative treated and at maximum 600mm centres. Battens on timber frame should be fixed to each stud (and not to the sheathing) with annular ring nails of length at least twice the batten thickness plus the sheathing thickness (or plain shank nails of length 2.5 times the batten thickness plus the sheathing thickness).

6.5.15 Timber cladding boards - fixings requirements

Timber cladding boards shall be securely fixed back to the substrate with fixings which are appropriate for the environment and site specific conditions.

Boards should be fixed to battens by face or secret nailing with annular ring nails at least 2.5 times the board thickness. In addition, all of the following conditions should be satisfied:

- Use double battens to support abutting boards. Batten should extend the full width of the boards either side.
- Pre-drill fixing points at board ends to prevent splitting.
- For boards 100mm and wider, use two fixings per board at every batten.
- On boards under 100mm in width, use one centrally placed fixing.
- Use two fixing points per board where they cross a support batten.
- Position fixing 25% in from each side and a minimum of 20mm in at board ends and pre-drill to avoid splitting where necessary.
- All fixings should finish flush with the surface and should not be punched or countersunk.

All metal fixings must be from corrosion resistant materials such as stainless steel (austenitic grade), hot dipped galvanised (BS7371:6 min) copper, silicon bronze or high performance coated steel. The following should not be used for any metal fixings: aluminium, electro plated steel or brass. Galvanised nails should not be used with Western Red Cedar.

The use of dissimilar materials in the same fixing point should be avoided to minimise the risk of galvanic corrosion.

When using timber species with high tannin or corrosive oil content such as Western Red Cedar, Douglas Fir and some hardwoods, stainless steel fixings should be used.

6.5.16 Timber cladding boards – differential movement

Where timber cladding boards are specified for timber frame construction, differential movement should be taken into account.

Where timber boarding or plywood spans across an intermediate floor zone in a timber frame construction, allow for differential movement caused through timber shrinkage by incorporating a movement joint.

For further information on differential movement with timber frame, please refer to the ‘External Walls – Timber Frame’ section.

6.5.17 Timber cladding boards – abutment details

Timber cladding boards shall be detailed to resist the passage of moisture to the inside of the home.

Abutments between cladding and other weather-resisting elements should be neatly made, weather tight and allow for differential movement. Workmanship should comply with BS 8000:5.

6.5.18 Mock Tudor cladding

Mock Tudor cladding shall be specified and installed:

- To ensure the service life and durability of the render is maintained.
- To ensure the timber achieves an adequate service life and is durable.
- To ensure the detailing resists the passage of moisture to the inside of the home.

Where mock Tudor cladding is proposed over a rendered substrate, the wall should be rendered in its entirety and the timber planted onto the render.

Where mock Tudor cladding is proposed the following recommendations should be followed:

- To minimise movement all timber, used for mock tudor cladding, regardless of species should be kiln dried.
- Timber should not be sealed against the render as this may trap moisture.
- To reduce the effects of warping it is better to fix the timber ‘Pith out’ which means any warping across the width of the timber the edges will be in the direction of the backing wall. Using only Quarter sawn timber will also help reduce this.
- Depending on the desired visual effect, timber thickness can range from 19-40mm max. 40mm is generally the maximum, as thicker timbers can exert higher forces when warping which can pull the fixings out.
- Due to the limited access, the back of the timber should be decorated/stained before it is fixed to the wall.
- When jointing mock Tudor cladding a butt joint is sufficient. Halved joints should be avoided, due to the potential to trap moisture and biscuit joints also avoided, as often the biscuit is also not durable enough.

Specific to Oak

Where oak is specified, the fixings should not react with the timber or timber treatment, therefore stainless steel fixings are recommended.

With oak, there is a risk of extractive staining, where moisture will remove tannings from the oak and stain the render (particularly where light renders are used).

Please refer to 'Appendix C' for further guidance on the use of oak.

6.5.19 Vertical tiling and slating

Vertical tiling and slating shall be specified and installed:

- To ensure service life and durability of the cladding is achieved.
- To ensure the detailing resists the passage of moisture to the inside of the home.

Plain tiles and, natural and fibre cement slates should satisfy the material specifications outlined in 'Roofs – Pitched roof coverings (tiles and slates)'.

Vertical tiling and slating should be fixed back to horizontal tiling battens (38mm x 25mm minimum). Special masonry fixings may be required.

Detailing should not interfere with window and door openings.

Cavity barriers are required behind decorative cladding such as vertical tiling and slating which is constructed on the outside of an external cavity masonry wall and where counter battens are used. Cavity barriers should not impeded on the ability of the cavity to be drained.

Vertical natural slate or fibre cement slates

- Slate-and-a-half should be used in alternate courses at internal and external corners and adjacent to openings.
- Use Code 3 lead soakers to weather internal and external corners.
- Fix slates by two nails and one rivet, and slate-and-a-half by three nails and two rivets.
- Code 4 lead cover flashings should be used above and below openings, in accordance with Lead Sheet Training Academy recommendations.

Vertical tiling with plain tiles

- Lead flashings and soakers should be used around openings, in accordance with Lead Sheet Association details.
- Use double course of tiles at eaves, by laying first course of eaves/tops tiles with course of full tiles laid over.
- At the top of a wall or under a sill, use a course of eaves/tops tile laid over a course of full tiles. Dress a Code 4 lead cover flashing over by 100mm.
- Use internal and external angle tiles at all 90° corners. Purpose-made 135° angle tiles are also available. For other angles, close mitre tiles and use Code 3 lead soakers.
- All tiles should be twice nailed.

Further guidance on tiles and slates can be found in the 'Roofs' section.

6.5.20 Brickslip cladding systems

Brickslip cladding systems shall hold a valid third party product conformity certificate and be specified and installed:

- To ensure service life and durability of the cladding system and external wall makeup is achieved as outlined in the service life table within 'Appendix C'.
- To ensure the detailing resists the passage of moisture to the inside of the home.

Requirements for all brickslip cladding systems

The complete brickslip cladding system e.g. the slips, adhesive, backing boards and associated ancillary products such as clips and fixings must hold a valid third party product conformity certificate.

Where adhesive is used the brickslip must have a full bond that covers the entire surface area of the brickslip. Spot bonding should be avoided.

The substrate must be appropriately prepared as per the system manufacturer's instructions.

The design and fixing of the slip system must be in strict accordance with the third party product conformity certificate with any adhesion tests, pull out tests and saturation / freeze / thaw testing completed satisfactorily as per the requirements of the certificate.

Where cavity barriers are required behind the brick slip system, they must be appropriately selected, suitable for use and be aligned with the compartment wall and floor and be provided around openings.

Pointing mortars should be chosen and installed as per the system manufacturer's instructions. Traditional sand and cement mortar should be avoided. Lime based mortars should be used instead to aid in thermal expansion and settlement.

Any systems utilising clips, strapping, screws, etc. must used in a coastal location within 500m of the shoreline must be Grade A4 stainless steel.

Any fixings of ancillary rainwater goods, satellite dishes, clothes lines, hanging baskets and similar items must go through the slips and into the substrate to ensure adequate fixing.

Brick slip material specification

Brickslips facings can be adhered to a variety of materials and substrates, the brick slips should meet the following requirements:

- Masonry units (such as clay, calcium silicate, concrete and natural stone) should must confirm to BS EN 771 and have UKCA markings.
- Agglomerated stone - slabs and tiles for wall finishes to BS EN 15286 and have UKCA Marking (Artificial stone).
- Accelerated weathering test data for the specific brick proposed must be provided. The full brick (prior to cutting to 25-28mm) must be tested by UKAS test laboratory for Hygrothermal testing, conditioning to ETAG 034, Freeze/thaw to EN 772-22 and tensile testing to BS EN 1015-12.

In all circumstances, we can only accept F2/S2 bricks complying with EN 771.

Masonry cavity walls

Where slips are to be bonded onto masonry walls, the following must be also be considered:

- The substrate which the slip is to be attached to must achieve the desired weather resistance from the wind driven rain exposure map as if the slip was not to be installed and in strict accordance with the weather resistance requirements of the Building Regulations.
- The cavity width must satisfy the requirements of PD6697 and the ‘External Walls – External Masonry Walls’ section.
- Slips must not bridge the damp proof course. The damp proof course must extend through the slip to the outside face of the slip cladding.
- Movement joints in the substrate must be installed in strict accordance with the Technical Manual and extend through the decorative slip cladding.
- Cavity trays must be present, as per the requirements of the Technical Manual.
- Weep holes must be installed, as per the requirements of the Technical Manual and extend through the decorative slip cladding.
- Where checked reveals are required (very severe exposure zone), the design must be assessed and deemed compliant. The check must be formed by the masonry substrate not slips or render. Windows must be sealed prior to the slip installation.

Brickslip cladding on framed construction with a backing board or as a rainscreen cladding system

Where a brickslip cladding system is specified for either a timber framed or light gauge steel framed building, the timber and light gauge steel frame construction should satisfy the requirements of either:

- External Walls – Timber Frame
- External Walls – Light Gauge Steel Frame

In addition, the following must also be considered for the brickslip cladding system:

- The framed structure (backing wall) must be water tight and protected with a suitable breather membrane.
- The brick slip cladding system should be able to resist impacts without causing safety hazards. Testing and classification to CWCT Technical Note 75 and 76 may be required to demonstrate the impact performance.
- The third party product conformity certificate must confirm the cladding system can provide the necessary weather resistance.
- A drained cavity, which is ventilated where required, must be provided in accordance with the ‘External Walls – Timber Frame’ and ‘External Walls – Light Gauge Steel Frame’ sections.
- Where the brickslip cladding system spans across an intermediate floor zone in a timber frame construction, allow for differential movement caused through timber shrinkage by incorporating a movement joint.
- MgO boards are not acceptable for Warranty use.

Insulated Concrete Formwork (ICF)

Where a brickslip cladding system is specified for ICF, ICF construction should satisfy the requirements of the ‘Modern Method of Construction’ section. The following must also be satisfied:

- The third party product conformity certificate must confirm the cladding system can provide the necessary weather resistance.
- There must be a drained and vented cavity between the ICF and cladding system.
- The brick slip system must be secured back to the concrete core of the ICF.

If the project location is situated in a wind driven rain exposure zone exceeding that stated in the third party product conformity certificate, the certificate holder must seek agreement with the Warranty provider prior to any installation.

Brickslips on external wall insulation (EWI)

Where Brickslips are specified as a part of an EWI system, the guidance for both brickslip cladding systems and external wall insulation systems within this section should be followed.

Brickslips on lintels

Brick slips used in conjunction with either concrete, steel or lightweight (SIP) lintels, must hold a valid third party product conformity certificate covering the lintels, adhesive and slip system as a whole.

Brickslips on chimneys

All GRP chimneys must either:

- Hold a valid third party product conformity certificate confirming a minimum service life of 25 years and be deemed acceptable to the Warranty provider, **or**
- The GRP chimney manufacturer must be a current 'Accredited Member for the Production of GRP Brick Slip Chimneys' from the 'Construction Glass fibre Manufacturers Association'. Please refer to the 'Chimneys and Flues' section for further guidance.

6.5.21 External wall insulation systems

External Wall insulation systems shall be specified and installed to ensure service life and durability of the external wall makeup is achieved whilst ensuring the detailing resists the passage of moisture to the inside of the home.

In addition to the following guidance, EWI systems should satisfy the relevant Building Regulations in relation to fire resistance and fire spread.

Background substrate suitability

Masonry wall

The masonry wall should be designed and constructed to provide adequate resistance to water penetration without the EWI system being present. This can be identified by reference to either BS 5628-3 or PPD 6697, depending on the wall thickness and site exposure.

Framed structures

The following should be satisfied for where EWI systems are specified on framed structures such as timber frame and light gauge steel frame:

- A 15mm cavity must be provided. The cavity should be drained and vented for timber frame structures and be drained for LGSF structures.
- For the purposes of Warranty, cavities should be located between the outermost insulation and cladding system proposed as a part of the third party product conformity certificate.
- A breather membrane must be specified to protect the structural frame.
- Breather membranes and AVCL's must be appropriately lapped at reveals.

For further guidance on framed structures, please refer to the 'External Walls – Timber frame' and 'External Walls – Light Gauge Steel Frame' sections.

Specification

Third party product conformity certificate

A valid third party product conformity certificate is required for the entire EWI build up including the cladding or render on the external face. Components outlined within the certificate should not be replaced on site.

The third party product conformity certificate may state the EWI system will only 'contribute towards' the weather resistance of the wall i.e. not give full weather resistance. Therefore the guidance for background substrate suitability should be followed.

The third party product conformity certificate may also state the EWI provides a means to 'improve' the thermal performance of the external wall construction. Therefore any proposed installation must account for the overall thermal performance of the wall construction and the provision of a cavity to meet our Warranty requirements.

Loads

The dead and live loads should be transferred safely to the building structure without deformation or deflection of any component.

Fixing requirements

Insulation boards should be fixed in accordance with the manufacturers requirements. The density of proprietary fixings should designed on a site specific basis by an Engineer. This generally consists of a minimum of 5 fixings per full insulation board / 8m² with additional fixings to corners and reveals.

On-site pull out testing and a report confirming fixing type and length will be required in accordance with the Construction Fixings Association and made available to the Warranty surveyor.

Where the support of the system is via a horizontal rail system, calculations to demonstrate the system can withstand the design load are required.

If the fixing for the insulation boards are to pierce a breather membrane, a site specific installation guide must be provided from either the EWI manufacturer, breather membrane manufacturer or frame manufacturer (timber or light gauge steel frame) detailing how this should be completed without comprising the effectiveness of the breather membrane.

A minimum of one non-combustible fixing per $1m^2$ or per insulation batt, whichever provides the greater number should be provided in addition to the other fixings.

Dot and dab method of fixing using adhesives is not acceptable on masonry substrates. A full coat of approved adhesive (often the manufacturer's adhesive base coat) must be applied across the full face of the substrate with a tooted finish as per the manufacturer's specifications.

For coastal environments and areas of severe and very severe wind driven rain exposures the third party product conformity certificate for the

EWI system must explicitly confirm the complete the system is suitable for use in a coastal environment or severe/very severe wind driven rain exposure. Furthermore, all external metals must have suitable corrosion protection for the intended environment. Further guidance can be found in 'Appendix C - Materials, Products, and Building Systems'. For further information please see 'Appendix B' of our Technical Manual which provides further guidance on additional requirements for developments within coastal locations.

Suitability of insulation and condensation risk analysis

The insulation type for the structure and application should be suitable for the intended purpose and, when required, should be keyed to receive the desired base coat and reinforcement.

The insulated render system should be designed to minimise the risk of interstitial condensation and the effects of thermal bridging.

A condensation risk analysis should be carried out in accordance with BS 5250 to ensure the building fabric meets the relevant Performance Requirement. If a vapour control layer is required then this must be installed to the warm side of the insulation and the type must be approved and suitable for the application.

Providing a condensation risk analysis doesn't negate the need for thorough and robust checks on the design, workmanship and materials by the site management team and installers.

Particular attention should also be given to detailing around DPC level to ensure that there are no thermal breaks between the wall and floor construction and that any products used below DPC are suitable and accredited for use in that location.

Window and door openings

Insulation boards should be present around the window and door reveals and care should be taken to ensure there are no breaks in the insulation line.

A continuation of the breather membrane and Vapour Control Layer (VCL) must be catered for around the window and door reveals where the EWI is applied to a framed substrate.

Allowance must also be made to ensure window cills adequately project beyond the finished surface of the EWI system to ensure any throating is correctly positioned clear of the finish.

Drainage deflection beads should be incorporated into the system to deflect water present in the drainage cavity around openings, other penetrations or items that block the drainage cavity.

DPC, flashings, cavity trays and weep holes

- The EWI system must not bridge any horizontal damp proof course.
- Where cavity trays are installed e.g. over openings or roof abutments, provision for draining the cavity tray will be required through the system as well as the correct construction of any flashing.
- Weep holes should be clear and functioning correctly (i.e. not blocked by the EWI system).

Movement joints

Movement within the EWI system should be accommodated without any reduction in performance and should be constructed in accordance with the manufacturer's details. Movement joints in the backing substrate should be mirrored through the EWI system and formed in accordance with the EWI manufacturer's recommendations.

External fixtures

All fixings, down pipes, rainwater pipes, cables, fence posts, external light fittings, satellite dishes and other ancillary fittings and fixtures should be temporarily removed to enable the easy application of the insulated render system. Once the EWI system has been installed, the external fixtures can installed into the substrate construction (not solely fixed to the EWI).

In addition the following should be observed:

- Temporary downpipes should be provided. Avoid allowing the temporary downpipes to spill water over the substrate or EWI system.
- If required reset all drainage gulley's to accommodate the insulation system thickness.
- Flues, ventilation pipes, water pipes etc should be appropriately sleeved and fully sealed in accordance with the system manufacturer's recommendations.
- If required ensure that any gap around the window and door frames is correctly sealed against rain penetration before application of the insulated render system.

Impact resistance

EWI systems should be able to resist impacts without causing safety hazards. Testing and classification to CWCT Technical Note 75 and 76 may be required to demonstrate impact performance.

Installation

The EWI system must be installed by an approved installer from the EWI manufacturer. Evidence of the installer being approved should be provided to the Warranty surveyor before works start on site. When installing the EWI system, the following should be observed:

- Protection must be provided when applying the insulation boards in rain or other inclement weather; to avoid trapping moisture in the system.
- Vented cavities should not be blocked, nor should any weep holes.
- Timber supports or blocks should not be used within the EWI system.
- Detailing at window and door reveals should be checked to ensure appropriate trims are provided.
- Ensure the cavity barriers at compartment wall, floor locations and around openings are correctly installed and effective in a fire situation.