

FUNCTIONAL REQUIREMENTS

7.7 CLADDING

Workmanship

- i. All workmanship must be within the tolerances defined in Chapter 1 of this Manual.
- ii. All work is to be carried out by a technically competent person in a workmanlike manner.
- iii. Certification is required for any work completed by an approved installer.

Materials

- i. All materials should be handled and stored correctly in a manner that will not cause damage or deterioration of the product.
- ii. All materials, products and building systems shall be appropriate and suitable for their intended purpose.
- iii. The structure shall, unless specifically agreed otherwise with the Warranty provider, have a life of not less than 60 years. Individual components and assemblies that can be inspected and replaced and which are not integral to the structure may have a lesser durability, but not in any circumstances less than 15 years.
- iv. 'Decorative Claddings': Whilst there is and can be no Policy responsibility and/ or liability for a performance life of 60 years or less for a 'cladding' which has a 'decorative function only' (i.e. with the main substrate wall construction providing the main weather proof barrier); a 'decorative' type cladding shall be designed and constructed so they have an intended life of not less than 15 years.

Design

- i. The design and specifications shall provide a clear indication of the design intent and demonstrate a satisfactory level of performance.
- ii. The cladding materials, design and construction must meet the relevant regional building regulations.
- iii. The backing materials must be confirmed as suitable for the proposed render mix and/or system.

- iv. The design of primary framing members (e.g. mullions and transoms, backing wall framing sections, etc.) and the connections of these members/panels to the structure must be supported by structural calculations provided by a suitably qualified professional.

Limitations of Functional Requirements

- i. The Functional Requirements are limited by the recommendations applied to the specific areas covered in this chapter.
- ii. These Functional Requirements do not and will not apply to create any policy liability for any remedial works carried out by the contractor or otherwise, nor to any materials used in those remedial works.

CHAPTER 7: Superstructure

7.7.1 Render

Rendering should be in accordance with BS EN 13914-1:2005 and workmanship in accordance with BS 8000. In particular the following should be considered:

With traditional renders the quality of the sands used and design mix is as critical as is the reliance on good mixing techniques by the applicator. Poor mixing ratios and low quality materials is often the reason traditional renders fail. For the purposes of this chapter, traditional hand mix using standard sand and cement is not accepted. Only a pre-blended bagged render system will be accepted as a suitable render system that has a third party accreditation such as a BBA or ETA certification and backed up with a manufacturer's specification.

Where a specialist render system is being used the following conditions must be met:

1. The product approval is based on the details and limitations of use described in a 'current' approved ETA, BBA, BRE etc. or other UKAS certified system specific to the relevant substrate being applied too. A copy of the certificate documents are to be supplied.
2. For masonry substrates (e.g. solid brickwork, blockwork, concrete, terracotta, stone etc.) the masonry should be adequately prepared and be of a thickness which would resist damp ingress to the internal finishes based on the recommendations of BS 5628 Part 3 2005 for the given exposure zone.

Please note: Where the thickness of the masonry is less than that recommended in BS 5268, is a single skin construction or is in a high exposure zone or coastal location, then the requirements of condition 6 (below) must also be met.

3. For timber or steel framed supporting structures, a drained cavity is required as detailed in Sections 7.2 Steel frame & 7.3 Timber frame of chapter 7 of this Technical Manual. A manufacturer's fully detailed project specific render system specification must be provided, which should include;
 - Details of a suitable third party product approved external grade render board.
 - Details of preventing water penetration to the frame and internal finishes at all junctions, openings etc.
 - Other project specific requirements including specification of fixings suitable for the environment, breather membranes, allowance for movement due to shrinkage, appropriate weather seals at movement joints, adequate protection to rendering at cills, parapets etc.
 - The installation should be completed by a competent, registered and carded installer that has been approved and accredited by the render system manufacturer before work commences.
 - Where the specification is in a high exposure zone or coastal location, then the requirements of condition 6 (below) must also be met.

Note: Non drained cavity cladding constructions for timber frame and steel frame external walls would not meet the requirements of sections 7.2 & 7.3 of Chapter 7 of the Technical Manual.

4. For ICF structures that have a joint UKAS or ETA third party approval between the ICF manufacturer and a specialist render system:
 - The approved specification may be acceptable to this warranty, providing the conditions of the joint approval certificate are met. In addition:
 - Details for all junctions, openings and project specific requirements for the window and door systems installed within the ICF system must be provided.
 - The render installation on ICF structures should be completed by a competent, registered and carded installer that has been approved and accredited by the render system manufacturer before work commences.
 - Where the specification is in a high exposure zone or coastal location, then the requirements of condition 6 (below) must also be met.

Note: Where the specification exceeds or differs from the joint third party approval, then a manufacturer's fully detailed project specific render system specification must be provided

CHAPTER 7: Superstructure

5. For all other ICF substrate structures regardless of the location, the ICF company and render manufacturer must provide evidence of a third party product approval for the specialist render system, to confirm that it is compatible with the ICF system and proven to provide a weather resistance for 15 years. And:
- A project specific specification will be required and for the render system that demonstrates that it suits the site location, desired finish etc.
 - Provide details for all junctions, openings and project specific requirements for the window and door systems installed within the ICF system.
 - The installation should be completed by a competent, registered and carded installer that has been approved and accredited by the render system manufacturer before work commences.
 - Where the specification is in a high exposure zone or coastal location, then the requirements of condition 6 (below) must also be met

Alternatively, a render carrier system with a drained cavity will be required, or an alternative independent cladding system adopted.

6. For all render installations (including brick slip system applications) on all substrates types located in an exposure zone where the wind driven rain is expected to be more than 75litres per m²: A 10 year 'insurance backed' manufacturer's system guarantee is required, together with a full project specific specification that has also been accepted and approved

by the Warranty provider. The proposal will require full system details to deal with all junctions, openings etc. together with other project specific requirements provided by the render system company. The render system will need to be installed by a registered and carded installer who has been approved and accredited by the render system manufacturer before work commences.

In all instances where a render system manufacturer's guarantee is required, full project specification and details are to be obtained from the render system manufacturer before any installation commences to ensure that conformity is met. Once work commences, the installation must be inspected and signed off by a render system representative throughout the installation stage and at completion of the installation and confirm that the specification has been met.

The render system together with the backing wall to which they are applied should satisfactorily resist the passage of moisture to the inside of the building.

General render conditions

- Ensure the render being used is suitable for the substrate and is not too strong. Due to shrinkage differentials, avoid applying a thin base coat and a thicker top coat application as the shrinkage values of a thicker top coat could cause the render to delaminate from the base coat. The same effect is also caused by applying a very hard render over a softer base coat.

- 15mm is considered the minimum finished thickness of render applied to a masonry wall, either as a single spray coat or as a two coat hand application. Where structures are located in very severe weather rating locations. or within coastal locations, the depth of render may need to be increased to a minimum of 20mm and a specialist manufacturer's specification will be required to support this.
- 5-6mm is considered the minimum finished thickness of render for applications to specialist insulated render systems. The render thickness will need to be increased where structures are located in very severe weather rating locations or within coastal locations and a specialist manufacturer's specification will be required to support this; approved by the Warranty provider.
- When ashlar detailing is required, it is recommended that a minimum depth to the back of the ashlar cut should be no less than 15mm & 20 – 25mm for applications in very severe exposure zones or within coastal locations. To achieve this depth, it will require the finished thickness of the main render to be increased to accommodate this feature.
- Abutments between cement render and other cladding materials or components should be weather tight and allow for differential movement.
- Any joints in the wall where movement may occur should be continued through the rendering.
- Render should not bridge the Damp Proof Course (DPC) and must be finished onto a durable render stop profile such as a proprietary PVCu bead or stainless steel bead.

CHAPTER 7: Superstructure

- External rendering should comply as a minimum with BS.EN 13914-1:2005 but should also conform with the specialist render manufacturers recommendations.
- Rendering products should be stored separately from other building and concreting sands.
- For bellcasts, PVCu bead or stainless steel bead is acceptable.
- For other beads and stops, a PVCu bead or stainless steel bead is acceptable.
- Render systems which include a cavity as a secondary defence system should also incorporate cavity barriers within the cavity to prevent the spread of fire. The cavity barriers should not obstruct more than 50% of the cavity and should be installed to the internal leaf to retain its ability to drain. The cavity barrier must activate and fully close the cavity when exposed to fire.
- Renders will be reinforced as a minimum with an appropriate certified alkaline resistant fibreglass mesh at corners of all openings and penetrations. For substrates that are prone to movement, an appropriate certified alkaline resistant fibreglass mesh will need to be incorporated throughout the substrate
- Where different materials are being rendered over, the incorporation of an appropriate certified alkaline resistant fibreglass mesh will be necessary to assist with the possibilities of differential movement. The mesh must extend sufficiently over the different materials to resist against differential movement.
- Renders installed between pedestrian level and 6.0m above ground level will be designed to accommodate higher maintenance and impact loads in accordance with Table 2 of BS 8200.
- For exposure zones where the wind driven rain is expected to be more than 75 litres per m² (classed as very severe) then checked reveals will be required.
- All surfaces must be clean, suitably dry and free from anything that may interfere with the adhesion of the material to be applied. The manufacturer's product data sheets should be followed including the manufacturer's surface preparation and suitability checks in full.
- All blockwork mortar joints are to be flush pointed and should be fully cured before the application of the render.
- Only clean water should be used for mixing.
- Protection must be provided when applying renders in rain or other inclement weather. Application should cease in temperature below 5°C or where rapid freezing is considered to be a potential threat.
- When applying in hot weather it is advisable that work coincides with the shaded areas of the building. During longer periods of hot and dry weather it may be appropriate and necessary to apply an even mist spray of clean water to the substrate before application and to surface finish for a couple of days afterwards subject to site and weather conditions.
- Cement products should not be applied to substrates which are frost laden or which have recently been subject to prolonged rain.
- Do not render onto saturated substrates as this may affect the bond strength and cause lime bloom (discolouration), salts to occur and patchiness due to uneven suction.
- Local weather and site conditions must be taken into account by the applicator before any cement product is applied.
- The quantity of material required for a given area should be of the same batch number or if not the different batches must be thoroughly mixed together to avoid shade variations.
- Full masking must be used to give protection to adjacent areas of work, windows, doors etc. and to give clean straight edges. It should be removed immediately after finishing coat has dried.
- Carefully remove splashes of material, in particular from glass or aluminium immediately as they may etch the surface and leave a permanent mark.
- Care must be taken to protect cement and synthetic products soon after the application from rapid freezing and heavy rainfall. For other drying conditions i.e. where there is direct exposure to sunlight or drying winds the render may require to be protected from the elements. This process is important to ensure complete hydration of the products can take place.
- Where an application is not covered in these conditions further advice from the render manufacturer must be sought and submit a suitable manufacturer's specification to the warranty provider for approval.

CHAPTER 7: Superstructure

7.7.1.1 Timber frame background

Unless designated otherwise as detailed in 7.7.1 above, a drained and vented cavity should be provided behind the render system on timber frame construction. The render board should have the capability to be directly rendered to. It should not be a wood based board or cement particle board unless confirmed by a UKAS or European equivalent third party product approval body that confirms it is acceptable for use in the conditions proposed. It should also not be a board that is not approved by the render system manufacturer.

For metal lathing, these should be a proprietary BBA, BRE etc. or ETA certified non-corrosive mesh system and must be fully installed in accordance with the mesh system manufacturer to vertical battens at the stud centres.

The minimum size of the cavity should be 19mm for both the render board or metal lathing applications. Unless proven otherwise, all applications should be used with a water-resistant membrane. When the render board or metal lathing system is unbacked, the minimum cavity should be 50mm. A DPC should be provided between unbacked render and timber battens.

When using external render board you should:

- Fix with the manufacturer's recommended non-corrosive fixings and all in accordance with the manufacturer's installation details, ensuring the vertical board joints are staggered and do not follow directly in line with window, door reveals and other openings.
- Take care to ensure there are no gaps between the boards and appropriate weather seals are incorporated against walls and frames.
- Ensure the boards are cut neat and square; follow the building lines and the screw heads are recessed just below the surface.
- Take particular note of movement joint and fire break requirements and specific application details.
- Ensure all door, window and other openings are fully sealed using an appropriate manufacturer's weatherproof system to provide a primary weather barrier and to resist to movement.

Battens should be either 25mm x 38mm or 50mm x 50mm, preservative treated (BS 8417 or equivalent, hazard class 2) and fixed at spacing's recommended in BS EN 13914-1: 2005. Fixings and preservatives should be compatible.

Battens should be fixed to each stud with annular ring nails of length at least twice the batten thickness plus the sheathing thickness. Nails should be hot dipped galvanised stainless steel or equally durable.

7.7.1.1.1 Cavity barriers

Where cavity barriers are required, they should be correctly fitted without gaps, the cavity filled and fixed with stainless steel staples or equally durable fixings, the settlement joints below the external frames and soffits must be maintained.

7.7.1.1.2 Movement joints

Where cement render spans across an intermediate floor zone in timber frame construction, allow for differential movement due to timber shrinkage by incorporating a movement joint. Vertical movement joints should also be provided at maximum 5m centres.

7.7.1.2 Masonry background

The walls which are to be rendered should be examined for excessive moisture content prior to rendering. This is particularly important where the masonry background has no upper limit on its soluble salts content, e.g. N designation clay bricks.

A specialist render system and mortar should be employed for parapets, chimneys, retaining walls and walls below DPC level with this masonry background type.

Ensure that all joints are finished flush with the surface to avoid shade variations.

To minimise the potential for differential thermal movement and effects that the different suction that each type of background material may create; the section of walling to receive the render should be constructed using the same type and density of material throughout.

CHAPTER 7: Superstructure

When rendering is required to be applied to wet masonry substrates, a specialist sealer key coat prior to applying the main coat of render should be applied, to control suction and reduce the impact of lime blooming occurring through the render. The key coat should provide a sound substrate and be compatible with the subsequent render system.

For high absorption e.g. lightweight blockwork, common bricks etc. and smooth dense substrates (such as engineering bricks); direct rendering should be avoided as the moisture can be extracted by the substrate from the wet render which affects its curing and bonding capability, or it does not bond to the substrate respectively. To control suction always apply a specialist sealer key coat or suitable render preparatory coat. Allow a minimum of 48 hours for the key coat to fully dry before applying the next coat.

It is recommended that;

- The backs and exposed horizontal surfaces of parapets are not rendered using a standard render system. Use a specialist render system designed to combat movement and provide robust weatherproofing.
- Throats or drips to copings of parapets and chimneys should project beyond the finished faces to throw water clear
- Rendering to chimneys should only be carried out where the masonry contains little or no sulphates. An appropriate specialist sealer / bonding key coat should be applied prior to applying the main coat of render. A proprietary alkaline resistant mesh should be embedded throughout the render, the key coat should

provide a sound substrate and be compatible with the subsequent render system.

- As before; horizontal DPC and Damp Proof Membranes (DPM) must not be bridged.
- Rendering below DPC should only be carried out using a specialist render manufacturer's specification. No render system should bridge the DPC and a proprietary PVCu bead or stainless steel bead should be used above and below where the renders meet at the DPC.

7.7.1.3 Other construction detailing

Ensure that drips and throating to sills, coping, etc. project beyond the face of the finished render above the DPC.

Notwithstanding wind loadings, the larger the eaves overhang the better. This will provide protection to the top joint and prevent rain water percolating behind the render.

Angles, stop beads and jointing sections should be secured with drilled or shot-fired fixings, and not with gypsum plaster.

Check whether the rendering can be applied directly onto the wall, or whether any preparatory treatment is required in accordance with the manufacturer's instructions.

The surface should be checked for suction by dampening the wall with clean water.

In accordance with a structural engineers requirements, cracking of the substrate could be significantly reduced by introducing a specialist proprietary bed joint reinforcement within the mortar joints. Ideally this should be applied throughout the building during construction and in accordance with the substrate manufacturer's recommendations. Ensure that the reinforcement is continuous and joints are lapped in accordance with the manufacturer's requirements (generally 450 - 500mm laps and continued around corners). Specialist corner units are likely to be required, check with the manufacturer.

Introducing reinforcement at weak points such as above and below window and door openings is strongly recommended as a minimum requirement in all applications as it will greatly assist in minimising cracking to these areas.

7.7.1.4 Vertical and horizontal flatness

Rendering should have a maximum vertical and horizontal deviation from flatness of +/-10mm in 5m, and is measured in a similar way to straightness on plan and plumb of masonry.

CHAPTER 7: Superstructure

7.7.2 Curtain walling**7.7.2.1 General**

Curtain walling systems should have third-party certification confirming satisfactory assessment, and comply with the requirements of the CWCT Standard for Systemised Building Envelopes, including the following sections:

- Part 1: Scope, terminology, testing and classification.
- Part 2: Loadings, fixings and movement.
- Part 3: Air, water and wind resistance.
- Part 4: Operable components, additional elements and means of access.
- Part 5: Thermal, moisture and acoustic performance.
- Part 6: Fire performance.
- Part 7: Robustness, durability, tolerances and workmanship.
- Part 8: Testing.

The CWCT Standard provides detailed guidance on performance and testing.

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 and take account of the product manufacturer's recommendations. CE marking is to be provided for all curtain walling covered by EN 13830 in buildings constructed after July 2013, and will therefore include the following curtain wall types:

- Stick construction
- Unitised construction
- Double skin walls
- Structural sealant glazing
- Bolted glazing

Cavity barriers and fire stops should be provided in accordance with relevant Building Regulations.

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.

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.

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. It should be designed to resist the passage of airborne and impact sound within the building with particular attention given to flanking transmission at;

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

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

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.

The risk of bimetallic corrosion should be avoided through the isolation of dissimilar metals. Fixings and finishes to curtain walling must take into account the location and corrosion category to ensure corrosion is avoided.

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 should be permitted only in accordance with the manufacturer's recommendations, and should not exceed the maximum depth stated in the designer's calculations.

All packers for brackets supporting or restraining the curtain wall must be metal.

CHAPTER 7: Superstructure

7.7.2.2 Testing

The 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 would be tested to the CWCT Standard 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 location.

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, as an understanding of the scope and size of the project would determine the number of fixings tested. 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 on 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 to allow testing to be planned in advance and made available to the Warranty Surveyor when completed.

Site testing for water penetration of the joints to windows and doors in accordance with the

CWCT test methods is recommended to check the site workmanship of the building envelope as constructed. See CWCT Technical Note No. 41 for guidance on site hose testing.

7.7.2.3 Tolerances

Design should allow for the line, level, plumb and plane of the completed curtain wall 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.

7.7.3 Insulated render systems

These are systems applied to the exterior walls of existing or new buildings, comprising of an insulant and a weather protective finish, of which there are three main types:

- Traditional renders and finishes.
- Thin coat renders and synthetic finishes.
- Pre-formed cladding materials.

All insulated render systems must have appropriate third-party certification and a full manufacturer's specification suitable for the substrate must be provided. Ensure all building criteria's are maintained, e.g. vented cavities should not be blocked, the use of timber supports and blocks within the insulated render system

should not be used unless absolutely necessary. Ensure all fixtures and fittings which penetrate the insulation system e.g. flues, ventilation pipes, water pipes etc. are appropriately sleeved and fully sealed in accordance with the system manufacturer's recommendations.

All the render and cladding guidance/information stated in this chapter must be adhered to when applying an insulated render system.

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 required performance standard. 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.

In accordance with the render system manufacturer's recommendations appropriate trims should be provided at openings, corners, angles and interfaces etc. Reinforcement mesh should be accommodated throughout the base coat application with additional reinforcement to vulnerable areas and corners of openings etc. If there are any concerns regarding straight line joints or other areas where there are unusual constructions requirements an additional layer of mesh should be installed to these locations.

CHAPTER 7: Superstructure

The dead and live loads should be transferred safely to the buildings structure without deformation or deflection of any component. Ensure the insulation continues around openings and other penetrations to maintain the thermal benefits.

Movement within the insulated render system should be accommodated without any reduction in performance.

Movement joints in the backing substrate should be mirrored through the insulated render system and formed in accordance with the manufacturer's recommendations.

When required an approved proprietary fixing should be used in accordance with the design requirements calculated. This generally consists of a minimum of 5 fixings per full insulation board / 8/m² elsewhere with additional fixings to corners and reveals. A pull out test report confirming fixing type and length will be required in accordance with the Construction Fixings Association and made available to the Warranty Provider.

Proprietary preparation works

- Ensure all fixings, cables, fence posts, light fitting, satellite dishes and other ancillary fittings and fixtures are temporarily removed to enable the easy application of the insulated render system.
- Remove existing and provide temporary downpipes, avoid allowing the temporary downpipes to spill water over the render system.

- If required reset all drainage gully's to accommodate the insulation system thickness.
- 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.

Where an insulated render system is used as a cladding to a timber or light gauged steel framed structure a drained and vented cavity will be required. A suitable breather membrane must also be provided to protect the sheathing board and framing system from water penetration reaching the internal finishes. (As described in Chapter 7.2 & 7.3.)

7.7.4 Timber cladding

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: 2003, or equivalent. Further guidance on the durability of timber is provided in Chapter 2 – Materials.

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.

Where cavity barriers are required, they should be correctly fitted without gaps, fill the cavity and be fixed with stainless steel staples or equally durable fixings.

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.

7.7.4.1 Timber boarding

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 least 10% of the board width.

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

Battens should be a minimum of 38mm wide, preservative treated and at maximum 600mm centres. A breather membrane should always be installed when horizontal battens are located against the sheathing. 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).

Boards should be fixed to battens by face or secret nailing with annular ring nails at least twice the board thickness or plain shank nails at least 2.5 times the board thickness.

Butt joints at board ends should occur at battens. Nails should be either hot dipped galvanised, stainless steel or equally durable. Aluminium nails should not be used with timber treated with a preservative containing copper. Galvanised nails should not be used with Western Red Cedar.

CHAPTER 7: Superstructure

7.7.5 Rainscreen cladding systems

A rainscreen cladding system consists of a multi-layer construction of materials which is designed to provide a barrier to the weather on new or existing buildings. The typical build-up would consist of a supporting airtight backing wall and rainscreen system.

The rainscreen should comprise of supporting brackets fixed to the backing wall, insulation between the brackets, a breather membrane over the front face of the insulation, carrier support rails fixed to the brackets, a ventilated and drained cavity and the rainscreen panels.

Rainscreen systems should have third-party certification confirming satisfactory assessment and comply with the requirements of the CWCT Standard for Systemised Building Envelopes. The collation of individual testing of components does not provide an overall performance of the rainscreen system or backing wall.

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 and movement should be accommodated without any reduction in performance. Fixings and supports should be designed to accommodate specified loads and take account of the product manufacturer's recommendations.

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 & 76 may be required to demonstrate the rainscreen's material impact performance.

Design should allow for the line, level, plumb and plane of the completed curtain wall 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.

Cavity barriers within a ventilated rainscreen system must be appropriately selected, suitable for use and be aligned with the compartment wall and floor. 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 there must be a minimum 25mm gap between the intumescent front face of the horizontal cavity barrier and the back face of the rainscreen material.

Rainscreen systems and their materials must comply with the Building Regulations Approved Document B, Part B4 External fire spread. Particular attention should be made to cladding systems on tall buildings where the insulation material used is not of limited combustibility. Compliance will need to be demonstrated though meeting the performance criteria stipulated in the BRE Report for fire performance of external thermal insulation for walls in multi-storey buildings (BRE135) for cladding systems using full scale test data from BS 8414-1 or 2.

Where no test data is available for a rainscreen cladding system, it is acceptable to submit a desktop study report undertaken by a suitably qualified fire specialist, stating whether in their opinion, BRE135 criteria would be met with the proposed system. Test data from a suitable independent UKAS accredited test body must be referenced in the report. Further details of this approach can be found in the Building Control Alliance published best practice guidance for the use of combustible cladding materials on buildings exceeding 18m in height (BCA Technical Guidance Note 18).