## Introduction

This section provides guidance on meeting the performance requirements for factory and site made render applied to a variety of substrates. 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

## 6.4.1 Compliance

Rendering shall meet the performance requirements of this section.

## 6.4.2 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:

### Pre-bagged render

1. A full set of construction drawings detailing the areas to be rendered, location of movement joints and DPCs and subsequent construction details. Drawings must show presence of weep holes to all elevations.
2. Manufacturer's technical information relating to the application and suitability of render to be used on proposed substrates. This should include details on render thickness in accordance with the exposure zone. The specification should also identify the measures proposed to control movement within the back ground substrate and clearly identify the provision of movement joints and any additional reinforcements.
3. Copies of the manufacturer CE/UKCA Marking and declaration of performance relating to the proposed render.
4. Details and classification of render boards where they are proposed (including third party product conformity certificates).
5. Specifications, method statements, etc. relating to the application of renders around services, openings, movement-joints, etc.
6. Ancillary items forming part of the render system (e.g. render beads, stop-ends, etc.).

### Site made render*

1. A specification 'Manual' of the proposed design, preparation and application of the render for the proposed project in accordance with BS EN 13914 – 1. The manual should also provide a specification of the render in accordance with BS EN 13914 – 1. This should include details on render thickness in accordance with the exposure zone. The specification should also identify the measures proposed to control movement within the back ground substrate and clearly identify the provision of movement joints and any additional reinforcements.
2. A quality assurance document detailing how quality assurance will be maintained on site in regards to material storage, mixing and application.
3. A full set of construction drawings detailing the areas to be rendered, location of movement joints and DPCs and subsequent construction details. Drawings must show presence of weep holes to all elevations.

* Site made renders are only acceptable on well-prepared masonry substrates where strict control over workmanship can be demonstrated and the correct selection of materials can be assured.

Site made render solutions will not be acceptable on projects where the render is to be applied on the following substrates:

- Render board.
- Render carriers.
- Hollow clay brick /block units.
- Insulated concrete formwork (ICF).

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.

## 6.4.3 Weather conditions

Local weather conditions shall be taken into account when rendering.

There should be consideration for the anticipated weather conditions when rendering in wet, cold or hot conditions.

### Wet

- The background substrate should not be saturated.
- Render which is curing should be appropriately protected from heavy rainfall.
- Downpipes (or temporary downpipes) should be provided to prevent the substrate or recently rendered walls from becoming saturated.
- Where specialist preparation coats are required they should be as per the render system manufacturers recommendations.

### Cold

- The background substrate should not show signs of frost or should not be saturated.
- Air temperatures should be 2°C and rising.

### Hot

- Render which is curing should not be directly exposed to strong sunlight.
- Lightly spray render with clean water to prevent rapid drying.

## 6.4.4 Site exposure rating to wind driving rain

The design and materials used, shall be suitable for the site specific exposure location.

For further information on determining the exposure for the site location please see ‘Appendix C’.

For exposure zones where the wind driven rain is expected to be more than 75 litres per m² checked reveals will be required. In addition a site specific render manufacturer’s specification will be required and the render manufacturers’ approved contractor should be used.

## 6.4.5 Background substrate suitability

The background substrate should be prepared appropriately and be suitable for the intended purpose.

For Warranty purposes, Render is not considered completely ‘waterproof’ and some water seepage is expected through it to the substrate or cavity. Render is only considered to contribute to the ‘weather resistance’ of an external wall, rather than providing an impermeable barrier. Therefore, all substrates must be constructed to prevent moisture from reaching internal finishes.

### Masonry

This guidance should be read in conjunction with the ‘External Walls – Masonry Cavity Walls’ section.

For masonry substrates 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 PD 6697 for the given exposure zone.

Masonry should be free from dust, loose particles, efflorescence, and organic growth. Masonry walls should be suitably prepared in line with the render manufacturer’s specification.

Adhesion of rendering is determined by suction of the background. Suction may be effected by the moisture content of masonry at any given time. Keys may be provided naturally or artificially and should be regularly spaced over the whole surface and as per the render manufacturer’s recommendations.

Where S1 bricks are used, the render mix should resist sulfate.

For the purpose of Warranty:

- Render on an external leaf of clay bricks (F2, S1 or F1, S1 designation bricks BS EN 771) in severe or very severe exposures is not permitted where the cavity is to be fully filled with insulation.
- Direct rendering is not acceptable on high absorption materials e.g. lightweight blockwork, autoclaved aerated concrete blocks, common brick and/or smooth dense substrates e.g. engineering bricks as the moisture can be extracted by the substrate from the wet render which affects its curing and bonding capability.

#### Masonry outer leaves on framed structures

Where render is applied to masonry outer leaves to timber frame or light gauge steel frame structures, a cavity and breather membrane to protect the framed structure should be provided in accordance with the ‘External Walls – Timber frame’ and ‘External Walls – Light Gauge Steel Frame’ sections.

### Boards on framed structures

#### Third party product conformity certificate

The ‘render system’, including the render (only pre bagged and blended render will be acceptable) and render board, should hold a suitable third party product conformity certificate.

#### Trained operatives

The render system should only be installed by the render manufacturers trained operatives. Evidence of this should be provided to the Warranty surveyor upon request.

#### Protection of the framed structure

A 25mm cavity must be maintained between the render system and framed structure. The cavity should be drained and ventilated for timber framed structures and only drained for light gauge steel frame structures. The framed structure should be protected by a breather membrane.

For further guidance on framed structures please refer to the ‘External Walls - Timber Frame’ or ‘External Walls – Light Gauge Steel Frame’ sections.

### Fixing of render boards

Render boards should be fixed in accordance with the manufacturers recommendations and the site specific location, consideration should be given to:

- Anticipated wind load.
- Pull-out strength.
- Pull through resistance.
- Anticipated movement.

The fixing specification should be checked by an Engineer to ensure it's suited for the site specific conditions and location.

When using external render board you should:

- Fix with the manufacturer's recommended non-corrosive fixings and 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.
- Gaps between boards should be provided in accordance with the manufacturers recommendations however, care should be taken to ensure there are no excessive gaps between the boards and appropriate weather seals are incorporated against walls and frames.
- Ensure the boards are cut neat and square and the screw heads are recessed just below the surface.
- Fixing battens and rails should be installed vertically and not block drainage paths. Battens should be either 25mm x 38mm or 50mm x 50mm, preservative treated (BS 8417 or equivalent, hazard class 2). Fixings and preservatives should be compatible.
- Battens on Timber frame structures 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.

### Cavity barriers

Cavity barriers in external wall voids should be provided in accordance with the relevant Building Regulations. For further guidance on cavity barriers please refer to the 'External Walls - Timber Frame' or 'External Walls – Light Gauge Steel Frame' sections.

## Metal render carrier systems

The carrier system must be Stainless steel in accordance with EN 10088-1 (Austenitic steel) or Zinc coated steel in accordance with EN ISO 16120-2 and EN 10346. Where sited in a coastal location a higher grade A4 stainless steel should be used (please see 'Appendix B' of this Technical Manual).

For metal lathing, these should be a proprietary product with a third party product conformity certificate non-corrosive mesh system and must be fully installed in accordance with the mesh system manufacturer to vertical battens at the stud centres.

## ICF

For Warranty purposes a render directly applied to an ICF structure to provide a weather resistant cladding will not be acceptable and alternative solutions must be made.

For further guidance on ICF, please refer to the 'Modern Methods of Construction' section.

## External Wall Insulation systems (EWIS's)

Where render is to be applied to an EWIS, the guidance in this section should be read in conjunction with the guidance on EWIS's in the 'External Walls – Cladding' section.

5-6mm is considered the minimum finished thickness of render for applications of 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.

The combined system must be installed as per manufacturer's recommendations and may require the insulation to be keyed and mesh reinforcement may be required in the base coat.

## 6.4.6 Accommodating for movement

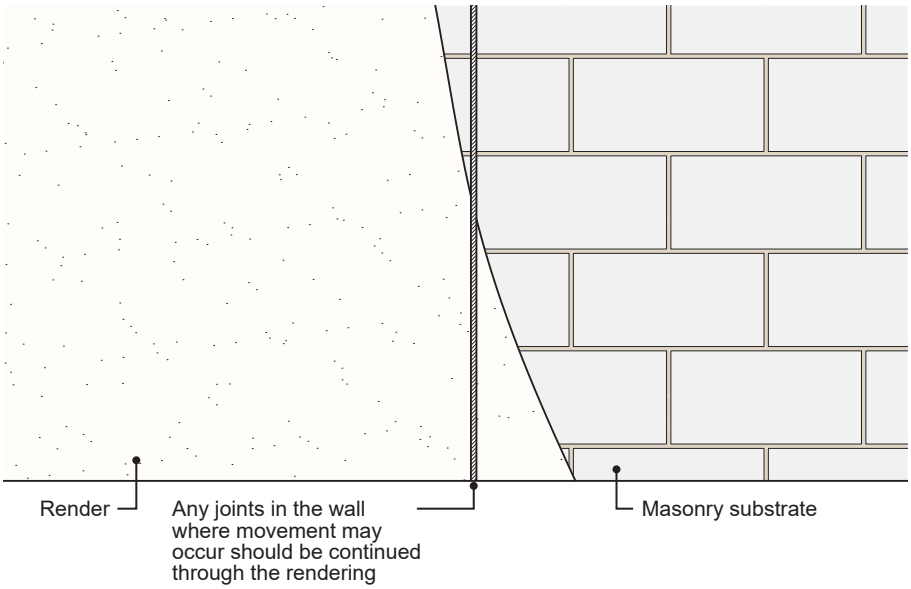
Rendered walls shall be detailed to accommodate any movement in the render system & the background substrate.

## Masonry

Movement joints which are specified in the masonry wall, shall be carried through the render system, be weather tight and not align with any openings.

For any given wall elevation where there is a mix of masonry e.g. brickwork external leaf lower level with a rendered block upper level, the requirement of a full height movement joint should be based on the shorter spacing requirement e.g. for the blockwork at 6m not brickwork at 12m.

For detailed guidance on movement joint provision for masonry walls, please refer to the 'External Walls – External Masonry Walls' section.




### Dissimilar materials

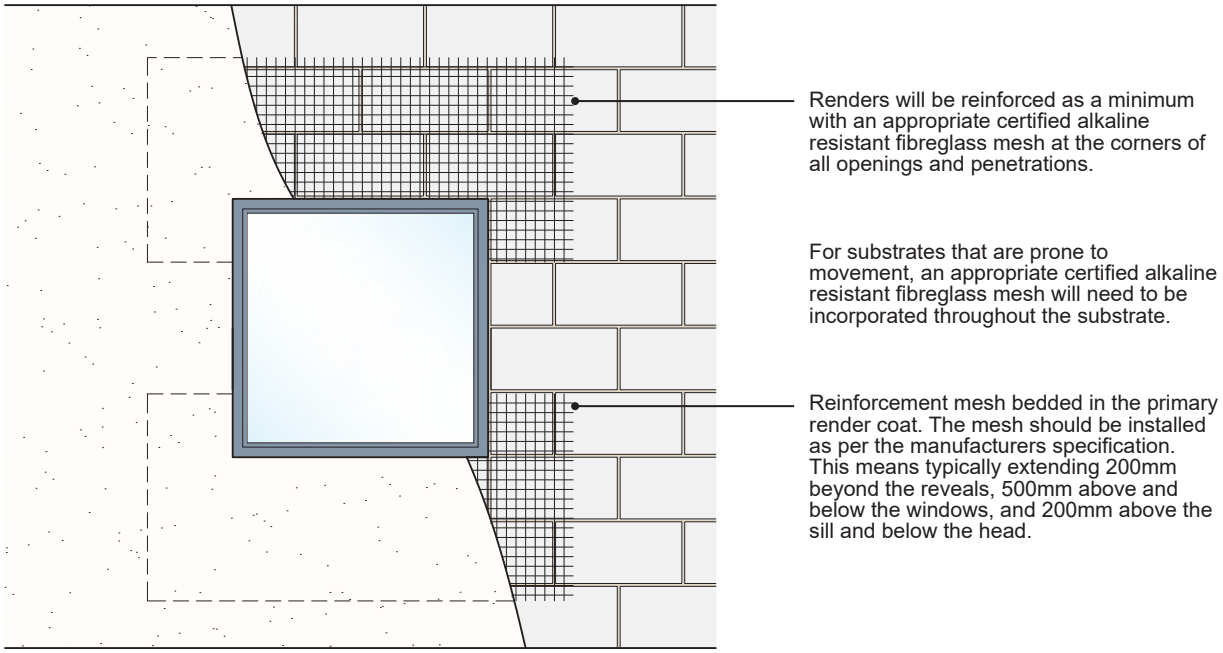
When rendering occurs over dissimilar materials (which have different densities), precautions should be taken to control differential movement between both of the substrates. The render should:

- Be stopped at appropriately formed movement joints, **or**
- Have austenitic stainless steel mesh reinforcement carried across the joint.

### Bed joint reinforcement

Bed joint reinforcement should conform to BS EN 845-3 and be provided in the first two courses above and below any opening with the reinforcement projecting 600mm beyond the opening. Ensure that the reinforcement is continuous and joints lapped in accordance with the manufacturer's requirements (generally 450 - 500mm laps and continued around corners). Specialist corner units are likely to be required.

### Mesh reinforcement




## Timber frame

Where renders 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 be provided at the required intervals. The actual spacing and position of the joints will be determined by the shape of the area to be rendered and generally vertical movement joints should be provided at maximum 5m centres.

### Metal carrier systems

Large uninterrupted areas of cementitious based rendering on metal lathing should be divided by movement joints into panels at intervals of approximately 5m. The actual spacing and position of the joints will be determined by the shape of the area to be rendered. The panels should have a maximum aspect ratio of 3:1 and maximum intervals of approximately:

- For timber backgrounds, 5m horizontally and every storey height.
- For all other backgrounds, 5m horizontally and vertically.

## 6.4.7 Render specification

The render specification shall be compatible with the background substrate and be designed to minimise the risk of de-bonding, cracking or crazing.

### General requirements

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.

Rendering should have a maximum vertical and horizontal deviation from flatness of +/-4mm in 5m, and is measured in a similar way to straightness on plan and plumb of masonry. See the 'Tolerances' section for further information.

### Factory made render

Factory made render should satisfy the requirements of BS EN 13914-1 for the design and application. The render should also be CE/UKCA marked in accordance with BS EN 998-1 or BS EN 15824.

Factory made renders should be applied in accordance with the manufacturer's recommendations.

Avoid applying a thin base coat and a thicker top coat, as this could cause the render to delaminate from the base coat.

Single coat factory made renders in sheltered and moderate exposure zones should be between 15-20mm depending on the background substrate. The render manufacturer's recommendations should be followed for severe and very severe exposure zones.

### Site made render

Site made renders are only acceptable on well-prepared masonry substrates where strict control over workmanship can be demonstrated and the correct selection of materials can be assured.

Where site made render is proposed, a detailed specification should be provided and should include the following:

- Detail specification including information of background suitability, movement control, render mix details, use of any admixtures. The specification should satisfy BS EN 13914 – 1.
- Quality assurance details for materials storage and mixing of the render.
- A full set of construction drawings.

Render mix and specification should be compatible with the background. Ensure the render being used is suitable for the substrate and is not too strong.

#### Render thickness

The number of coats required will depend on the background substrate and site specific exposure conditions.

The render should have a total finished thickness of not less than:

- 16mm for sheltered and moderate exposure zones.
- 20mm for severe and very severe exposure zones.

Avoid applying a thin base coat and a thicker top coat, as this could cause the render to delaminate from the base coat.

#### Quality assurance

The on-site quality control of site made renders is an important aspect to prevent premature failure of the render system.

The QA process should identify the following:

- The suitable storage of the materials on site.
- Only potable water should be used for mixing render.
- Mix ratio should be controlled by volume or weight – Relying on shovels of sand and cement is not acceptable.
- Mechanical mixing only is acceptable, renders should not be hand mixed.
- Additives should not be used unless specified – additives should be appropriately measured in accordance with the specification and manufacturer's instructions.
- Only products specifically designed as mortar additives will be acceptable.

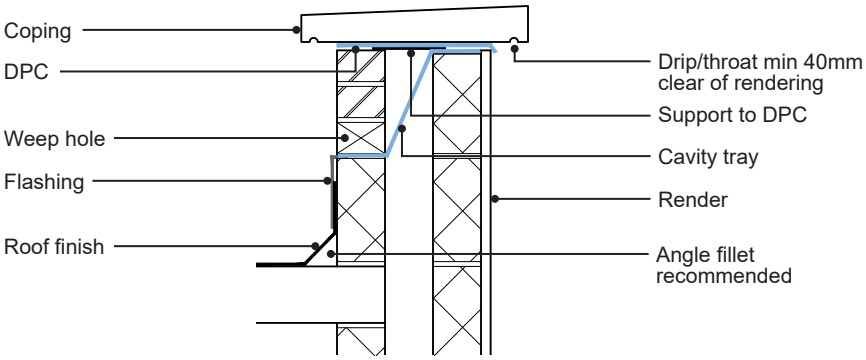
### Ashlar detailing

Where render is specified to provide an ashlar detailing effect it should have a site specific design to ensure durability of the render is maintained.

## 6.4.8 Detailing

Detailing of the render and the external wall should resist the passage of moisture to the inside of the home.

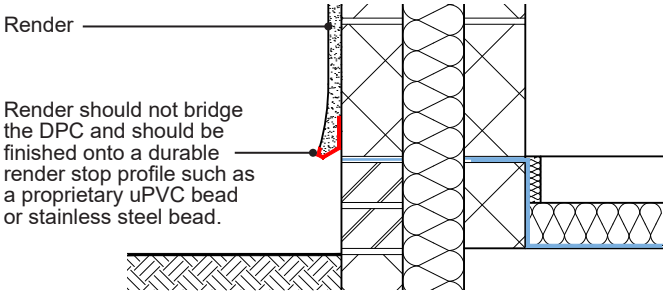
### Parapet wall detail




### Render and DPC levels

Render should not bridge the DPC, however, where this is unavoidable, the following precautions should be taken:

- Render specified below DPC must only be considered if the render manufacturer provides a site-specific specification or where site made render is used, a strong mix (M4) that is sulfate resisting should be used.
- Renders / boards to be used within 150mm of the adjacent ground level, to have a third party product conformity certificate for use in this location.
- There should be appropriate drainage installed along the perimeter or the ground should fall away from the building.
- Adjacent ground surfaces should not promote splashing.

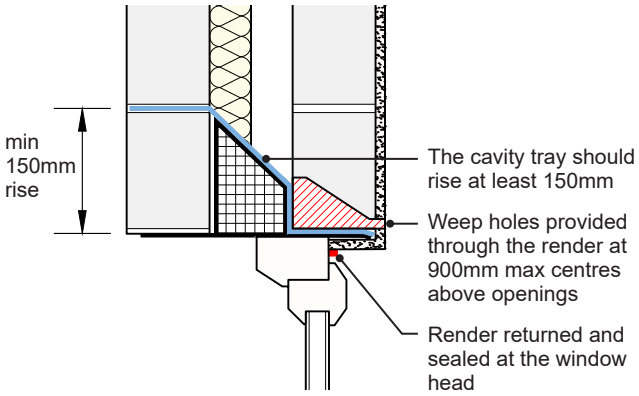



### Weep holes and render

For Warranty purposes, weep holes should always be provided to rendered masonry walls in the following circumstances:

- Where cavity trays are specified. Weep holes should be provided at no more than 900mm centres.
- From the concrete cavity infill at ground level.
- For timber framed buildings to provide drainage and ventilation (open perpends should be used).

For further guidance on weep holes, please refer to the 'External Walls – External Masonry Walls' and 'External Walls – Timber Frame' sections.




### Window sill detailing

Window and door sills should project beyond the wall finish or sub-sill by at least 25mm. The water drip should project at least 10mm beyond the wall finish.

### Abutment detailing

Where rendered walls abut against other elements of construction, appropriate detailing should be specified to prevent moisture passing behind the render or entering the inside of the home.

### Ancillary components

Stop beads and render stops should be austenitic stainless steel or PVC. Beads and stops should either be adhesive fixed in accordance with the manufacturer's recommendations or mechanically fixed with fixing which are appropriate for the environment. Long runs of stainless steel beads should be avoided due to their potential expansion. In coastal locations UPVC or marine grade stainless steel must be specified.