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Subject: Timber frame
Revised: May 2014

Cladding for timber frame buildings

This Wood Information Sheet (WIS) describes the main types of cladding for use on timber frame buildings with insulation between studs and an external cavity wall to provide ventilation for the timber frame and drainage of any water that may penetrate the cladding. It outlines the broad requirements of building regulations to assist in the correct specification and installation of external cladding on timber frame structures.

Building regulations differ nationally so check local requirements. This WIS is based on the requirements for England and Wales.

More detailed guidance on the design and detailing of different types of cladding for timber framed buildings is included in the BM TRADA publication *Timber frame construction* [1]. Further guidance on timber cladding can be found in the BM TRADA publication *External timber cladding* [2].

This Wood Information Sheet (WIS) is an overview of the subject, with signposts to more detailed sources that are listed at the end.

BM TRADA recommends *Eurocode 5 Common rules and rules for buildings* [3] for structural design of timber. However, this WIS includes a summary of variations when using *BS 5268-2 Structural use of timber. Code of practice for permissible stress design, materials and workmanship* [4], which the BSI has withdrawn.

Contents

Figure 1: Timber frame house with a combination of vertical and horizontal timber cladding and rendered cladding
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Key points

- The main functions of cladding on a timber frame building are to provide weather resistance and create the external appearance required by the client.
- Self-supporting cladding is built from its own foundation and tied back to the timber frame structure.
- A brick outer leaf is of the self-supporting type and is the most popular type of cladding used in the UK as the aesthetic requirement for a 'traditional' appearance can be achieved at the same time as utilising the advantages of modern timber frame construction.
- Non self-supporting cladding (timber being the most common) is fully supported by the timber frame structure.
- Non self-supporting cladding is usually fixed to preservative-treated softwood battens nailed to the timber studs through the breather membrane and sheathing.
- An adequately sized cavity should be provided between the external cladding and the timber frame structure to provide sufficient ventilation to the timber frame and drainage of any water that may penetrate the cladding.
- For all cladding types, but especially where the cladding is self-supporting, allow for differential movement between the cladding and the timber frame.
- National building regulation prescribe requirements for surface spread of flame (reaction to fire) for cladding adjacent to boundaries as well as rules limiting the area of combustible cladding on elevations near to boundaries.

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The main functions of cladding on a timber frame building are to provide weather resistance and create the external appearance required by the client.

Materials for cladding can be subdivided into two main categories:

- those which are self supporting – built from their own foundation and tied back to the timber frame structure
- those which are fully supported by the timber frame structure.

The second category is often used in multi-storey construction and in stepped areas at high level where it is not practical to use self-supporting cladding. This type of cladding has also proved more popular in recent years due to increasing acceptance by clients and local planning authorities, along with possible time and cost savings.

Design requirements

To provide sufficient ventilation to the timber frame and drainage of any water that may penetrate the cladding, an adequately sized cavity should be provided between the external cladding and the timber frame structure. Our recommendations regarding external cavity ventilation and cavity widths, are included in the individual types of cladding described in this sheet.

For all cladding types, but especially where the cladding is self-supporting, allow for differential movement between the cladding and the timber frame. Pay particular attention to details on buildings of three storeys or more. For further information, refer to *Timber frame construction* and *Multi-storey timber frame buildings: a design guide* [5].

National building regulation prescribe requirements for surface spread of flame (reaction to fire) for cladding adjacent to boundaries as well as rules limiting the area of combustible cladding on elevations near to boundaries. The allowable amount varies with the distance from the boundary and height above the ground and should be reviewed on a site-specific basis.

Building regulations include requirements for cavity barriers to close a cavity and to limit its area to restrict the spread of smoke or flame in a concealed space. The requirements vary between the national regulations and also depend upon the purpose group of the building.

Cavity barriers

Check the relevant national regulations for requirements. In all areas, cavity barriers in timber frame buildings should provide 30 minutes fire resistance, even where the internal fire resistance of the structure is greater. They can be of rigid and flexible types. In England and Wales *Approved Document B* [6] specifies a number of materials which may be used as cavity barriers to provide 30 minutes fire resistance. These are listed below:

Rigid type

- preservative-treated timber battens, minimum size 38mm x cavity dimension
- calcium silicate, cement-based or gypsum-based boards, at least 12.5mm thick x cavity dimension
- steel, at least 0.5mm thick x cavity dimension.

Flexible type

- wire-reinforced mineral wool at least 50mm thick
- polythene-sleeved mineral wool or mineral wool slab, in either case under compression when installed in the cavity.

Intumescent cavity barriers may be suitable for particular types of construction as providing ventilation openings at floor zones may not be aesthetically desirable. Seek third party approval for all proprietary cavity barrier products.

Cavity barriers such as timber and mineral wool not already encased in polythene should be protected by a polythene damp proof course (DPC) to ensure that moisture is deflected away from the timber frame structure and to the outside. With cladding systems supported on timber battens (timber cladding or other lightweight systems) these timber battens may be used as cavity barriers providing the battens are of the correct size and located in the correct position.

Steps and staggers

Changes in floor level because of ground contours can occur at party walls. Adjoining buildings may also stagger in plan, with or without steps. These conditions give rise to special requirements in detailing and structural design.

With all steps and staggers, especially if they are substantial in dimension, check the structural stability of both units with particular regard to wind transfer across external walls.

As the party wall is formed using two independent frames, it is necessary to protect the exposed wall area above the lower roof level of a step with cladding; masonry is not practicable because it needs support which cannot normally be provided by the timber frame structure due to the additional loadings on the frame and differential movement. Therefore we recommend that lightweight cladding be used and supported by the timber frame. Consider

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also the requirements for the surface spread of flame (reaction to fire) performance and provision of appropriate fire resistance from outside to the upper building.

Differential movement

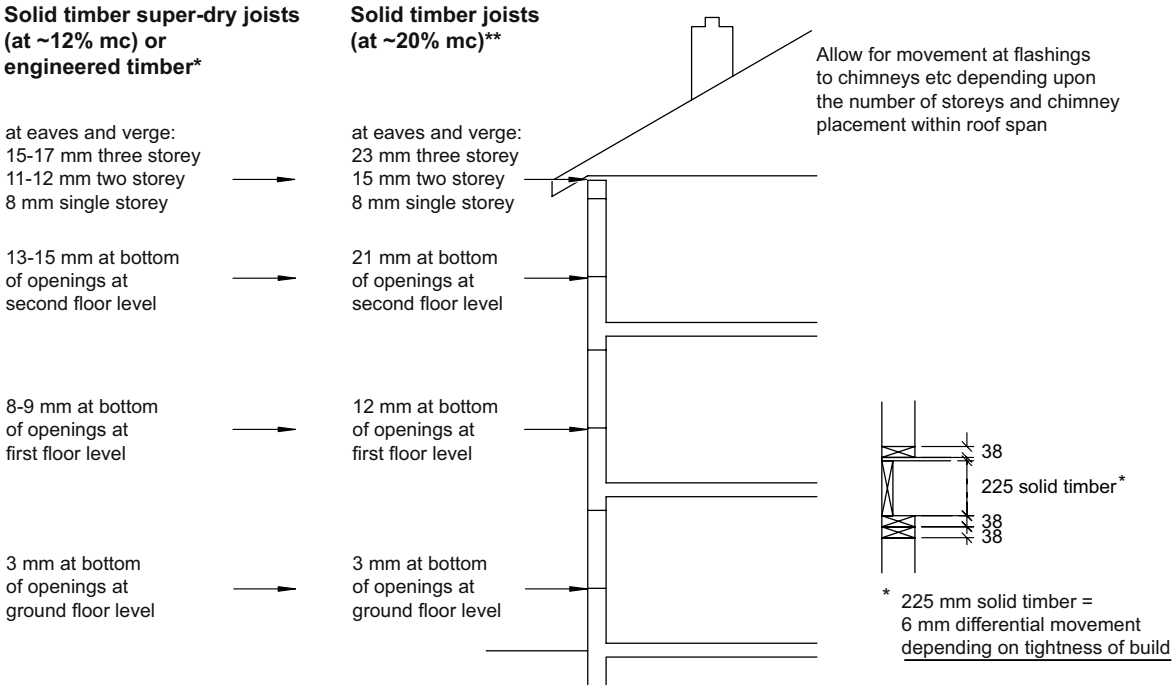
Differential vertical movement can occur between the timber frame inner leaf and self-supporting brick/block cladding. Contributing factors include shrinkage due to reduction in the moisture content of horizontal timber elements (such as rails, binders and floor and roof joists), slight expansion of clay bricks, compression of the timber studs into rails, and settlement of construction gaps. Therefore, any material or component attached to the timber superstructure and which overhangs the brick or blockwork (such as attached cladding, cantilevered floors, window sills, roof eaves and verges) or penetrates through the masonry (such as flues, overflow pipes or balconies) should have a clear gap beneath it and the top of the masonry cladding to allow differential movement to take place.

For a typical softwood timber element, allow a 1% shrinkage across the grain for every 4% reduction in moisture content. This effectively means that 1mm should be allowed for differential movement for every 38mm of horizontal solid timber. Historically, this measurement has been shown to be adequate to allow for settlement of the timber frame after loading, drying out of the timber frame and potential expansion of the external brickwork due to thermal changes.

Figure 2 shows typical differential movement/ settlement of timber frame buildings with solid timber used in the floor zones.

The formula using the 1% for 4% rule does not apply to engineered wood products, such as LVL, prefabricated I-joists and metal web joists. Obtain the rule for % dimension change for % moisture content change from the product manufacturer and make allowances for compression and settlement of the construction and variations depending on construction quality. Typically, 2mm–3mm of differential movement allowance for compression and settlement of floor joists that use engineered wood products will be sufficient. Shrinkage of the solid timber horizontal plates and rails must still be allowed for.

Further guidance is given in *Timber frame construction* and in *Multi-storey timber frame buildings: a design guide*.



Note: **when timber platform frame ground floor is used, add 7mm to the differential movement allowances quoted**

Figure 2: Typical differential movement/ settlement of building with solid timber floor zones and self-supporting cladding

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Balconies

Balconies are often self-supporting but tied back to the floor zone of the timber frame structure to provide lateral stability. Fixings for balconies will therefore inevitably pass through the external cladding and move as the timber frame moves.

Gaps allowing for differential movement will need to be designed into the external self-supporting and non self-supporting cladding. For self-supporting cladding, movement gaps should be below the balcony fixings that penetrate the cladding and, for non self-supporting cladding, gaps should be above the external cladding.

Where balconies are cantilevered out from the timber frame structure, make allowance for differential movement below the balcony supports and self supporting cladding. For non self-supporting cladding, no specific allowance for differential movement need to be considered with cantilevered balconies as there is very little movement between the cladding and the balcony structure.

Pay particular attention to balconies and how to allow for differential movement. Items to consider include:

- pinned-joint or slotted-hole connections to avoid excessive loading and possible damage
- presetting steel balcony supports to allow for movement
- allowance for varying threshold dimensions between balcony and internal floor level in detailing and construction.

Wall ties

Ties and their fixings should be of stainless steel; the size and gauge of fixings should meet the recommendations of the wall tie manufacturer and/or structural engineer. Wall ties should be fixed back to stud locations and should be suitable for the anticipated differential movement.

Lintels

Lintels supporting brick cladding over openings should be structurally independent of the timber frame. Where cavity tray lintels are used, they should not be fixed to the timber frame, but restrained back to the timber frame by clips designed to permit vertical movement. *Figure 3* shows a typical arrangement.

Cavity trays

Cavity trays should be inserted over roof abutments and over lintels above doors and windows if they are not built into the ancillary component. Cavity trays are also required over services that penetrate the external wall cavity, such as extractor vents and meter boxes. They should be fixed to the face of the timber frame

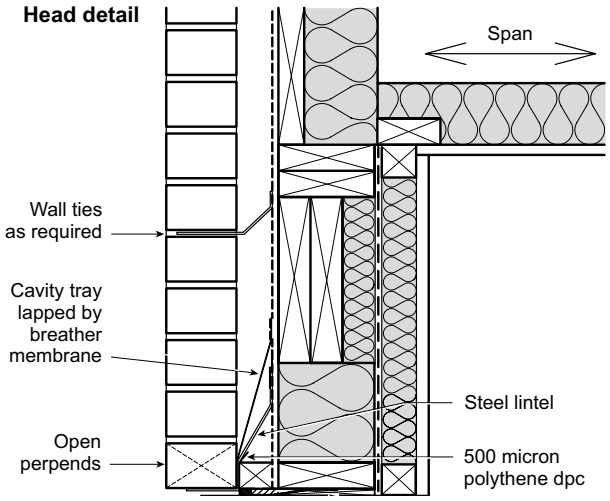

Figure 3: Cavity tray and steel lintel over window head

external wall, lapped underneath the external breather membrane and installed into the correct brick or block course to slope down across the cavity to drain water that may penetrate the cladding.

DPCs over horizontal cavity barriers are not installed in the brick or block course but extend down past the cavity barrier with open perpends above the cavity barrier. The breather membrane should be lapped over this, as shown in *Figure 3*.

Cavity insulation

Designers may specify a wall type that has an insulation material fixed to the outside face of a conventional timber frame structure. Regardless of the cladding type, a clear cavity is still required between the insulation and the cladding to provide ventilation to the timber frame and to provide drainage for water that may penetrate the cladding. Before specifying and installing cavity insulation, a number of factors require consideration:

- identification of stud location
- wall tie type and/or cladding batten fixings
- cavity tray detail above horizontal cavity barriers, windows and doors
- the installation of breather membranes on the outer face of the insulation.

In this wall type, the vapour permeability of each construction element is of the utmost importance, including each layer in the element, such as foil facings on rigid insulation materials, for a condensation risk analysis to ensure that no interstitial condensation will develop in the timber frame elements. We recommend relevant third party approval for this wall type.

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Self-supporting cladding

Brick and block

A brick outer leaf is the most popular type of cladding used in the UK as the aesthetic requirement for a 'traditional' appearance can be achieved at the same time as utilising the advantages of modern timber frame construction. *Figure 4* shows a typical arrangement.

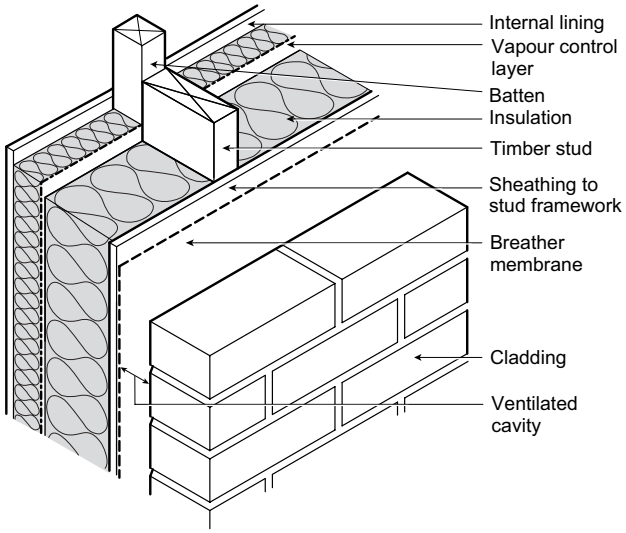

Figure 4: Typical brick clad timber frame wall (insulated service zone added in 2010)

Brickwork should comply with:

- *BS EN 1996-1-1 Eurocode 6. Design of masonry structures General rules for reinforced and unreinforced masonry structures* [7]
- *BS EN 1996-2 Eurocode 6. Design of masonry structures Design considerations, selection of materials and execution of masonry* [8].

Variation when using BS 5268

Brickwork should comply with:

- *BS 5628-1 Code of practice for the use of masonry. Structural use of unreinforced masonry* [9]
- *BS 5628-3 Code of practice for the use of masonry. Materials and components, design and workmanship* [10].

Brickwork can be self-supporting up to six storeys (17m) with appropriate bricks/mortar and wall tie selection. The timber frame test building, TF2000, provided evidence of successful masonry construction to this height. Special differential movement details and bed joint reinforcement may be needed. Consult the Brick Development Association on any design above 12m.

The dimensions for a standard brick are: 215mm x 65mm x 102.5mm (plus mortar joint 10mm.) These dimensions are important in order to determine the overall wall thickness and opening sizes.

Correctly detailed brick or block cladding is capable of contributing to the timber frame structure's resistance to wind loads. Annex D of *PD 6693-1:2012 Recommendations for the design of timber structures to Eurocode 5* [11] indicates how this contribution can be calculated.

Variation when using BS 5268

Guidance on calculating the cladding's resistance to wind loads is found in:

- *BS 5268-6.1 Structural use of timber. Code of practice for timber frame walls. Dwellings not exceeding seven storeys* [12]
- *BS 5268-6.2 Structural use of timber. Code of practice for timber frame walls. Buildings other than dwellings not exceeding four storeys* [13].

Both cladding types support their own weight but are laterally restrained by the timber frame structure using wall ties.

Although now withdrawn, Table 6 in *BS 5268-6.1* gives minimum wall tie density when masonry cladding is to contribute to racking resistance. We recommend that a minimum of 4.4 wall ties per m^2 of external wall should be used. To satisfy this, ties should be on stud centres horizontally and at a vertical spacing of 375mm (5 brick courses) when the timber frame studs are at 600mm centres and at 525mm vertical centres (7 brick courses) when studs are at 400mm centres. In exposed locations and around openings, the tie spacing may need to be reduced. Wall ties must be fixed into structural timber, such as studs and header joists, and not fixed to the sheathing only.

The top of brickwork cladding needs restraint and the top row of ties should be located three courses below the top of the cladding. At sloping verges, ties should be located within 225mm of the top of the brickwork at every fourth course down the slope. Ties should be fixed at the sides of window and door openings spaced at not more than 300mm vertical centres and within 225mm of the jambs.

Maintain a vented cavity between the brickwork and the timber frame structure to increase the safety margin against condensation risk and to drain any water that may penetrate the cladding. We recommend that 10mm x 75mm or equivalent open perpends be installed at maximum 1500mm centres one brick course below the DPC and above all horizontal cavity barriers.

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The cavity between the brick cladding and the outer face of the timber frame should be a nominal 50mm (+/- 10mm). Larger cavities may be used if suitable cavity barriers and wall ties are specified.

Install the splash course of brickwork before the sole plate of the timber frame is laid. This will ensure that the correct size cavity is constructed and readily maintained. Since brickwork cladding is confined to face work only, attention should be given to the maximum lift permitted at any one time to avoid brickwork 'slumping' before curing. This is particularly important when constructing narrow piers.

EN 1996-2 recommends maximum spacing of vertical movement joints at 12m for clay bricks and 8m for calcium silicate bricks.

Variation when using BS 5268

BS 5628-3 recommends maximum spacing of vertical movement joints at 10m–12m for clay bricks and 7.5m–9m for calcium silicate bricks.

When vertical expansion joints are incorporated, the brickwork on either side of the joint should be restrained with wall ties at closer spacings than in other locations (300mm vertical centres within 225mm of the joint). Extra studs may need to be installed for fixing of wall ties.

Render on self-supporting blockwork

Render can be used as a finish on common brick or blockwork cladding. The details are similar to those used for facing brickwork and the render details are the same as for twin-leaf masonry construction. Make allowance for the render (typically 20mm) when the building designer determines the wall thickness and the size of timber studs required. This type of construction results in deeper reveals to door and window openings than render applied to metal lathing. Ensure that render does not fill gaps left for differential movement and ventilation.

Non self-supporting cladding

Battens to support cladding on timber frame

Non self-supporting cladding is usually fixed to preservative-treated softwood battens nailed to the timber studs through the breather membrane and sheathing. Site-cut ends of preservative-treated battens should be brushed with additional preservative to provide protection.

The battens both support the cladding and allow ventilation to increase the safety margin against condensation risk and allow the timber frame structure (and in some instances the cladding) to dry if wetted. They also provide a cavity to allow water that may penetrate the cladding to drain down. The cavity should incorporate cavity barriers to provide the required fire resistance at the positions required by building regulations.

The thickness of horizontal battens will depend on the nail penetration required but the width should never be less than 38mm to avoid the risk of splitting when nailed. Vertical battens should coincide with studs behind and the batten thickness should be a minimum of 19mm. Horizontal battens are normally spaced at maximum 600mm vertical centres, but this will depend upon the cladding type. The structural engineer should calculate the design of the fixings for the appropriate weight of cladding and wind forces. For proprietary cladding, follow the manufacturer's specification and installation schedule.

Horizontal battens which are supported by vertical counter battens need to be sufficiently stiff for nailing and provide sufficient nail retention. We recommend a minimum thickness of 38mm.

Junctions with self-supporting cladding

Non self-supporting cladding is often used alongside self-supporting claddings, such as brick or blockwork. Non self-supporting cladding is attached to the timber frame and therefore allowance for differential movement between the two cladding types must be made in the design. For cladding supported off the timber frame an allowance for differential movement at floor zones is normally required .

Render not on self-supporting blockwork

Render can be used on paper-backed metal lathing or a proprietary system's backing board. *Figure 5* shows a typical arrangement.

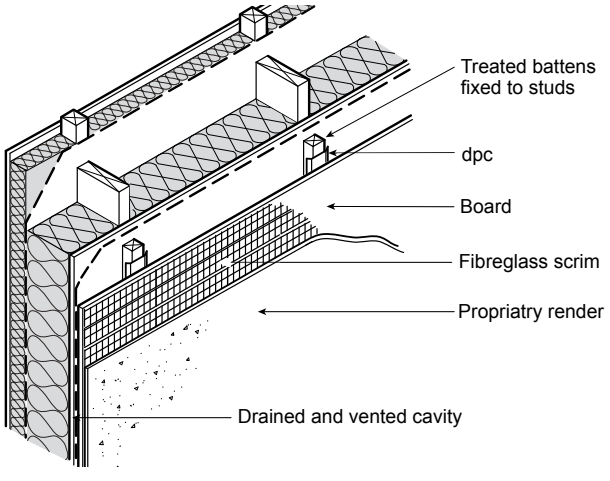

Figure 5: Render on metal lath

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The timber frame structural engineer should be made aware of the render system that will be installed, as well as the size and type of battens and fixings proposed to ensure that additional loadings are considered in the building design. Note that wall panels may require additional studs to support the loads applied by the external cladding. Determine responsibility for installing the cladding battens and fixings.

Proprietary system backing boards or paper-backed metal lathing assist in preventing the render entering the external wall cavity, which can therefore be reduced to 25mm. The breather membrane is still applied to the external wall sheathing as a secondary moisture protection. In some designs, the cavity width will be increased to allow the outer face of the render to follow the line of brickwork below, in which case it is important to have the structural engineer check on the fixings of the battens to the timber frame. Follow the manufacturer's instructions for fixing the proprietary system backing board or metal lathing.

The render materials can be site-mixed or proprietary pre-mixed render can be used which usually requires only the addition of water. Detailed information on render mixes is included in *BS EN 13914-1 Design, preparation and application of external rendering and internal plastering. External rendering* [14]. Consult proprietary system manufacturer's guidance on render mixes and applications. When rendering extends over more than one storey, make provision for movement in the timber frame structure by including horizontal movement joints in the render at the floor zone, as well as in the supporting vertical battens. Similarly, vertical movement joints may need to be included to avoid shrinkage cracks occurring in the width of the cladding. It is important that the type of movement gap can allow all anticipated differential movement to occur without resulting in damage to the render and maintaining adequate cavity ventilation.

Proprietary render or textured cement finishes can also be applied to fibre cement or cement-bonded particleboard backing boards that are fixed to battens on the face of the timber frame panel. Subject to the appropriate allowance for differential movement being made at floor zones, joints between the backing boards can be covered with scrim tape and a flush joint achieved. Follow the board or render manufacturer's details and recommendations.

Tile or slate cladding

Vertical tile hanging using concrete or clay tiles, or natural or fibre cement slates can all provide a long life, low maintenance cladding to timber frame structures. Mathematical tiles can provide a cladding similar in appearance to brickwork, but are not commonly used. *Figure 6* shows a typical arrangement.

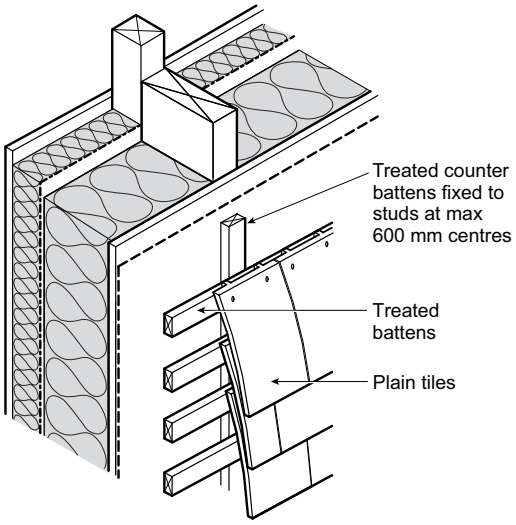

Figure 6: Tile hanging

Tiles or slates are normally fixed to horizontal preservative-treated timber battens. In severely exposed conditions, we recommend the use of vertical counter battens fixed between the horizontal battens and the breather membrane to permit more efficient ventilation and drainage of water that may penetrate the cladding.

Metal sheet cladding

As with other types of cladding, maintain the cavity between the timber frame and the external cladding to provide sufficient ventilation and drainage of water that may penetrate the cladding. Metal sheet cladding should not be placed directly over the outer face of the timber frame sheathing. Allow for differential movement between the metal cladding and any other type of cladding that is to be installed.

Brick slips

Brick slips can be used as the external cladding providing they are not installed directly onto the timber frame external sheathing. Typically they are installed onto a rigid board that is fixed onto steel brackets or preservative treated timber battens which are fixed into the studs through the external sheathing. This will ensure sufficient ventilation to the timber frame and drainage of water that may penetrate the cladding. As with other non self-supporting cladding types, allow for differential movement at floor levels and between any self-supporting cladding.

Timber cladding

All timber cladding should be designed as a 'rainscreen' in principle. This assumes that the cladding will always be subject to some penetration of rainwater. The secondary weather protection provided by the breather membrane, DPCs, flashings and vented cavity disperses this moisture to outside. Timber cladding can

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be used to achieve a variety of patterns, textures and colours on buildings, either as conventional boarding or in open-jointed designs. Boards can be used vertically, horizontally or diagonally and by the use of different widths, profiles and jointing, an almost unlimited variety of surface effects can be achieved. *Figure 7* shows a typical arrangement of horizontal timber cladding.

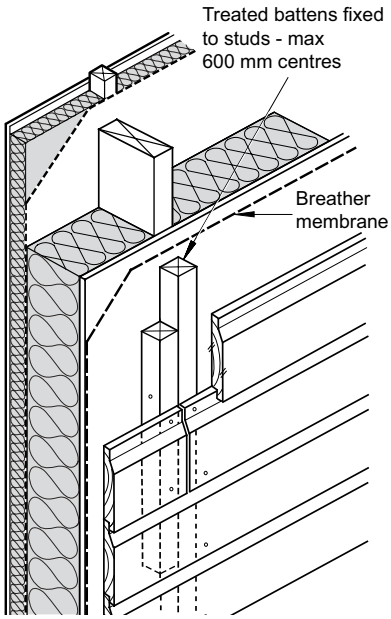

Figure 6: Horizontal boarding

The battens allow ventilation to the back face of the cladding, allowing moisture to evaporate. They also provide a cavity for the drainage of water that may penetrate the cladding. With horizontal boards, the vertical battens create this cavity, but when vertical boarding is used and the battens run horizontally, space for ventilation and drainage must be provided. Close jointed profiles that have a flat back face therefore require vertical counter battens behind the horizontal battens for this purpose. With a 'board on board' system, the gaps between the inner boards may provide sufficient space for drainage and ventilation, and it may not be necessary to provide counter battens. The tops of the horizontal battens should be sloped (by 15° minimum) to the outside to shed any water that accumulates in the cavity and boards should be end-jointed over additional battens. The method of erection and fixing of the cladding should also be considered.

The design of timber cladding and materials selection is covered in detail in *External timber cladding*.

Shingles

Shingles are nailed to horizontal battens normally spaced at 150mm minimum centres (190mm maximum for 400mm shingles) on vertical counter battens fixed to the studs. Joints between shingles should be staggered, usually with a 5mm gap between. Fixing nails should be stainless steel and each shingle should be fixed with two nails. Vertical boards can be inserted behind to form stopped ends for the shingles. Metal flashings, suitably protected, should be used at corners exposed to severe weather.

Fire performance

Timber and wood-based materials may be used for cladding providing that they satisfy the external fire spread requirements of the building regulations, either inherently or by appropriate treatment.

There are provisions for external surfaces in *Approved Document B* to have increased fire performance if the building is within 1 metre of a relevant boundary, over a specified height or above the roof of a stepped adjacent building.

Durability

The design of timber cladding must consider various aspects such as durability, maintenance and aesthetics. The guidance above is specific to the application of timber cladding to timber frame buildings. For further and more complete guidance on external timber cladding please refer to *External timber cladding.*

Other types

Other proprietary cladding types are available but are beyond the scope of this information sheet. Follow the manufacturer's specification and third party approval guidance. Cladding systems should always incorporate a drained a ventilated cavity between the cladding and the timber frame structure to ensure durability of the structure is maintained.

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References

1. Lancashire, R. and Taylor, L., Timber frame construction, 5th edition, ISBN 978-1900510820, TRADA Technology, 2011
2. External timber cladding, 3rd edition, ISBN 978-1909594005, TRADA Technology, 2013
3. BS EN 1995-1-1:2004+A1:2008. Eurocode 5. Design of timber structures. General. Common rules and rules for buildings, BSI
4. BS 5268-2:2002+A1:2007. Structural use of timber. Code of practice for permissible stress design, materials and workmanship, BSI [WITHDRAWN]
5. BRE Report 454: Multi-storey timber frame buildings: a design guide, ISBN 1860816053, BRE, 2003
6. England and Wales Building Regulations: Approved Document B (Fire Safety), Volume 1 - Dwellinghouses and Volume 2 - Buildings other than dwellinghouses, NBS, 2013, available at www.planningportal.gov.uk
7. BS EN 1996-1-1:2005+A1:2012. Eurocode 6. Design of masonry structures General rules for reinforced and unreinforced masonry structures, BSI
8. BS EN 1996-2:2006. Eurocode 6. Design of masonry structures Design considerations, selection of materials and execution of masonry, BSI
9. BS 5628-1:2005. Code of practice for the use of masonry. Structural use of unreinforced masonry, BSI [WITHDRAWN]
10. BS 5628-3:2005. Code of practice for the use of masonry. Materials and components, design and workmanship, BSI [WITHDRAWN]
11. PD 6693-1:2012. Recommendations for the design of timber structures to Eurocode 5: Design of timber structures. Part 1 General – Common rules and rules for buildings British Standards, BSI
12. BS 5268-6.1:1996. Structural use of timber. Code of practice for timber frame walls. Dwellings not exceeding seven storeys, BSI [WITHDRAWN]
13. BS 5268-6.2:2001. Structural use of timber. Code of practice for timber frame walls. Buildings other than dwellings not exceeding four storeys, BSI [WITHDRAWN]
14. BS EN 13914-1:2005. Design, preparation and application of external rendering and internal plastering. External rendering, BSI

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To provide members with the highest quality information on timber and wood products to enable them to maximise the benefits that timber can provide.

What we do

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Research is largely driven by the desire to update and improve our information so that it continues to meet our members' needs in the future.

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