The Scottish Government

The Scottish Building Standards
TECHNICAL HANDBOOK

CONSERVATORIES

2ND EDITION

Conservatories Guide 2nd edition

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Purpose: This document provides guidance on how to meet the requirements of the Building (Scotland) Regulations 2004, as amended, for simple conservatories which are built on to existing houses.

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Version	Date	Notes
1.0	01/05/06	First issue
2.0	11/10/10	Revised to reflect the changes in the 2010 Technical Handbooks.
2.1	26/11/15	Revised to reflect the changes in the 2015 Technical Handbooks and advice on the impact that certain alterations can have to the status of conservatories.

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Conservatories Guide 2nd edition

1. Status of this document

This document provides guidance on how to meet the requirements of the Building (Scotland) Regulations 2004, as amended, for simple conservatories which are built on to existing houses.

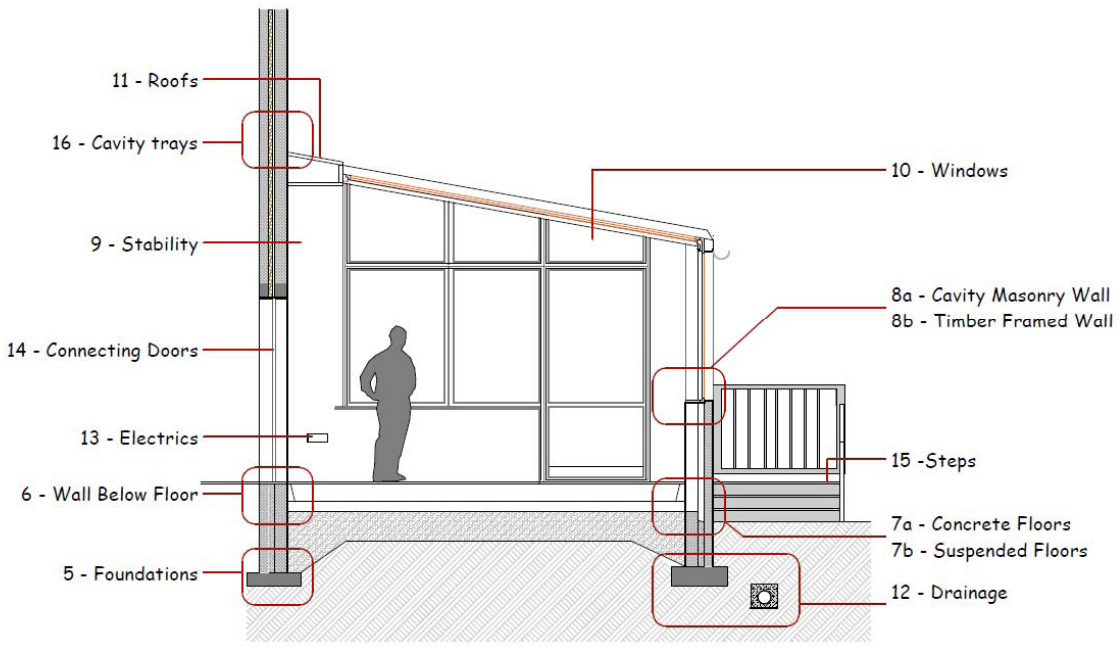
The use of this document does not remove the need to obtain a building warrant for the conservatory. All or some of this document may be submitted to the verifier (who is normally the local authority) as part of the warrant application process. The checklist at the rear of this document should be used to highlight to the verifier which sections of this document relate to the application. For each section that is used the guidance must be followed.

If this guidance is followed it should be accepted by the verifier (local authority building standards department) as indicating that the building regulations have been complied with. Consequently, it is expected that any requests by verifiers for further information will be minimal, thus saving time for both the verifier and the applicant. In addition, a further set of drawings, such as a location plan, block plan, scaled floor plans and elevations, may also be required by the verifier.

It is quite acceptable to use alternative methods of compliance with the regulations. The functional standards set out in schedule 5 to regulation 9 of the Building (Scotland) Regulations 2004, as amended, must be met. A Technical Handbook for Domestic buildings is published, providing detailed guidance on complying with the standards. It may be accessed on the website of the Building Standards Division at http://www.scotland.gov.uk/bsd and any part may be downloaded free of charge.

This diagram shows the relevant sections that can be used for the specification of the conservatory design.

Figure 1 Conservatory Design



2. When you can use this document

This guidance does not cover every conservatory, and in many cases it will be necessary to refer to the Technical Handbooks. This document only applies to conservatories that meet all of the following conditions:

1. Meet the definition of a conservatory 'A conservatory means a building attached to a dwelling with a door and any other building elements dividing it thermally from that dwelling and having translucent glazing (including frames) forming not less than either:

a. 75% of its roof area and 50% of its external wall area; or

b. 95% of its roof area and 35% of its external wall area.'

2. Be attached only to the ground storey of houses, but not **flats** or **maisonettes**, and only when those houses have foundations of traditional concrete strips, or when the ground conditions allow for the use of traditional strip foundations.

3. Have an internal floor area of more than 8 m^2 but not more than 20 m^2.

4. Be the correct distance from any boundary, by building:

- at least 1 m from any boundary; and
- at a distance from the boundary (in metres) of at least 1/6 of the area of glazing and frame (in m^2) facing that boundary. For example, if a side of the conservatory has an area of glass and frame of 9 m^2, then the conservatory must be at least, 9 ÷ 6 = 1.5 m from the boundary which that glazing faces.

5. Have an effective roof area of not more than 35 m^2, which includes any roof area serving the house, drained via the conservatory gutters into a down pipe.

6. Have a floor level the same as, or not more than 600

7. Be fixed directly to a masonry wall at least 100 mm thick.

8. Meet the thermal insulation requirements regardless of whether the conservatory is heated or not.

9. Does not contain a chimney, flue pipe, fixed combustion appliance installation, washbasin, sink, bath, shower, urinal, watercloset or waterless closet.

10. Is connected to the mains drainage system. The invert level of the house drainage system must not be more than 1000 mm from the point of connection.

11. Is not built over:

- any form of underground drain, other than a drain only serving the dwelling over which the conservatory is to be built; or
- an existing rain water down pipe; or

- any existing escape windows.

12. Is not built on or above any contaminated land.

3. Introduction

A conservatory may need no permission, some permission, or many permissions of various types.

For example, you may need to obtain:

- a building warrant;
- planning permission;
- listed building consent; and
- any other permission relevant to the individual circumstances of a project.

If you are in doubt you should contact your local authority building standards department for advice.

This guidance only provides information for building warrant applications. For any other types of permission the relevant regulatory bodies should be contacted.

Generally all new building work in Scotland to which the building regulations apply, must have a building warrant prior to work commencing. Although there are exceptions in the regulations.

A building warrant must be obtained before you start any work where the conservatory is more than 8 m^2 in floor area. A warrant is also required for conservatories below this size if they contain a chimney, fixed combustion appliance, washbasin, sink, bath, shower, urinal, watercloset, waterless closet, or where they are closer than 1 m to a boundary.

This document provides enough information to cover a number of simple conservatories. It does not seek to tell you all you need to build, but to give you sufficient guidance on what must be done to meet the guidance contained in the Technical Handbooks.

This guidance does not cover every conservatory and for many it will be necessary to refer to the Technical Handbooks. Professional advice may be required for conservatories of a more complex design than those covered in this document.

Prior to setting out to commission the design and construction of a conservatory you are advised to fully consider whether or not it will meet your needs for the present and for the future. Being highly glazed structures, they do not always provide the degree of thermal comfort that householders desire. Altering an existing conservatory is not necessarily as straightforward as it would initially appear and some issues to consider in this regard are given in Annex A. In some circumstances, from the outset, a traditional extension or a sun-room with an opaque roof could better suit your needs.

4. Subsoil conditions

This guidance is limited to there being no:

- non-engineered fill (i.e. fill material that has been deposited in an uncontrolled manner as a by product of human activity usually involving the disposal of waste materials or excavations) within the loaded area of the foundation; or
- wide variation in soil type within the loaded area of the foundation; or
- peat within the loaded area of the foundation; or
- subsoil beneath the loaded area of the foundation or beneath the building to which the conservatory is attached that has been subjected to ground improvement (e.g. vibrocompaction).

The conservatory foundation must rest upon natural ground comprising one of the following soil types:

- rock;
- compact gravel or sand; or
- stiff or firm clay/sandy clay.

5. Foundations

In all cases a concrete strip foundation must be used. Where the conservatory is built on a mining area then the foundations must be reinforced using a layer of A142 mesh.

The area of ground where the foundations of the conservatory are to be poured must be stripped of all topsoil, soft subsoil and vegetable matter.

A check must be made of the house foundations prior to work starting. If the house foundations are not ordinary strip foundations, work must cease and the verifier must be informed. This guide is only for use where the ground conditions allow the use of strip foundations.

The foundations must be poured at the same depth as the house foundations or with the underside of the foundations at a minimum depth of 450 mm below ground level.

If the foundations are to be poured at the same depth as the house foundations they must be poured over the scarcement of the house foundations, as shown in the foundation detail below.

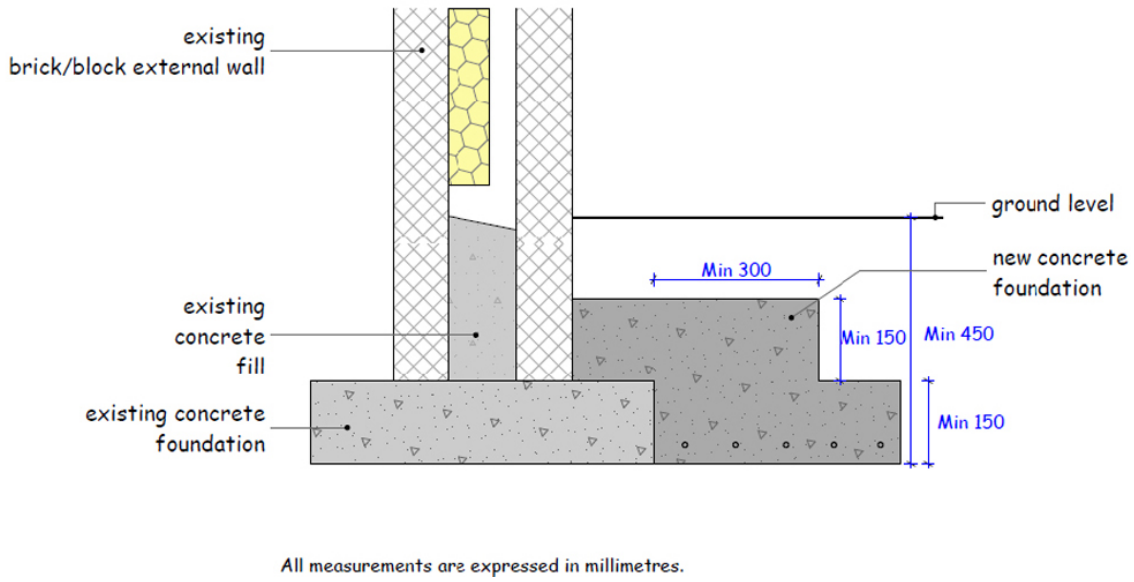
Foundations to intermediate sub-floor walls (if required) must be at least 400 mm wide and at least 150 mm deep.

The foundation must be a minimum of 150 mm thick, and at least 300 mm wider than the overall thickness of the wall e.g. 150 mm either side of the wall.

Where steps in the foundations are required due to a sloping site, the steps must have a horizontal overlap of at least twice the foundation thickness.

The concrete must have a strength grade of at least C20 (a cement/sand/aggregate ratio of 1:2:4).

Figure 2 Foundation Junction Detail



6. Walls below floor level

Walls below floor level must be built of two leaves of at least 100 mm thick brick or block with a compressive strength of at least 5 N/mm^2, with a 50 mm cavity between the leaves of masonry. The two leaves of masonry must be tied together using stainless steel wall ties with a minimum of 4 per square metre.

The mortar to the masonry walling must be of 1 part cement to 4 parts sand mix.

As the external walls above floor level will be insulated the cavity will be 120 mm wide.

The walls must be built centrally on the foundations.

The walls must be of a material suitable for use underground such as common or engineering brick, or dense concrete block, and be built up to the level of the damp proof course (dpc), at least 150 mm above external ground level.

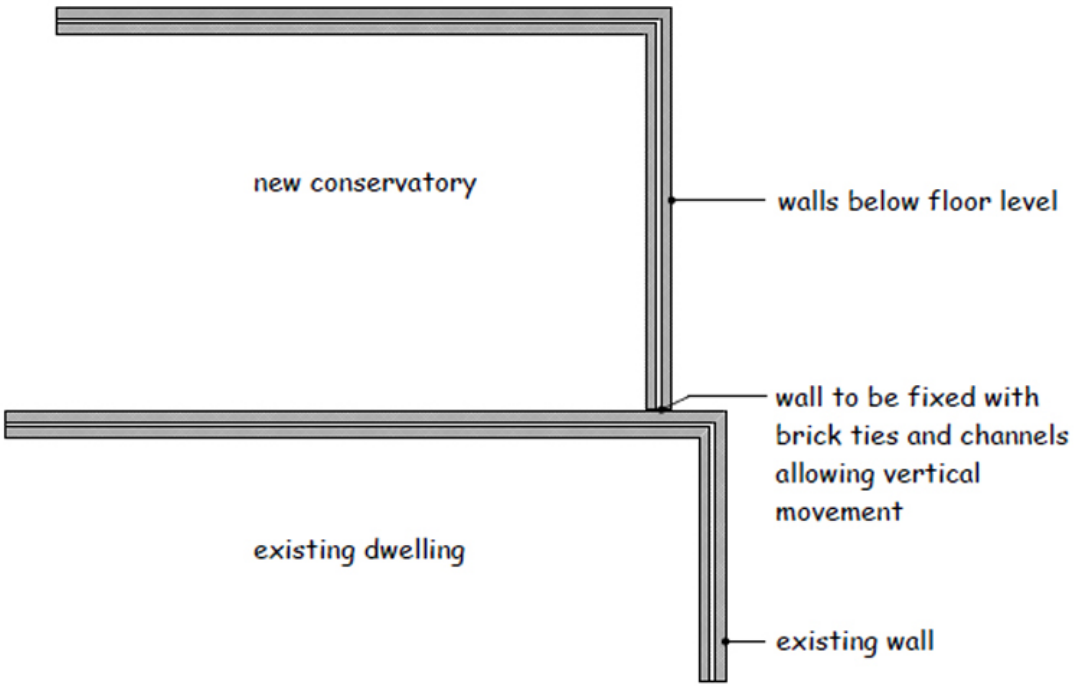
Where the conservatory floor is of concrete construction, laid directly onto the ground, or when the conservatory has a timber floor and the floor joists are supported off joist hangers, both leaves must be 100 mm thick. Where the conservatory timber floor is supported on a wall scarcement, the inner leaf of masonry below floor level must be 215 mm thick.

The cavity must be filled with lean mix concrete up to ground level, to resist lateral ground pressure and prevent the cavity filling up with rain or ground water. The concrete infill must be sloped to the outside face and weep holes (open perpend joints which are the normal provision) must be provided at not more than 1200 mm centres.

The walls must be attached to the house wall using wall ties and channels, allowing vertical movement, as shown in the detail below. This must also be used for the walls above floor level.

Sub-floor walls may be needed to support a suspended timber floor construction. These walls need only be 100 mm thick, but must be built in honeycomb construction or with crawl holes to allow the air below the floor joists to circulate freely.

Figure 3 Sub Floor walls



7. Floors

This document provides guidance on 2 types of floor:

a. concrete floors poured onto a prepared solum, and

b. timber floors suspended above a prepared solum.

The solum is the prepared area of ground inside the perimeter of the external walls.

The preparation of the ground is similar in both floor constructions, as follows:

- all topsoil, vegetable matter and loose sub-soil must be removed down to the firm subsoil. This excavation of the soil must be taken down to at least 250 mm below the existing ground level to prevent frost heave.
- a layer of hardcore, (small sized crushed rock or brick) at least 150 mm thick must be laid on the prepared sub-soil. This layer must be compacted with a roller or vibrating plate in layers not more than 150 mm thick.
- a layer of sand a minimum of 25 mm thick must be laid uniformly over the hardcore.
- a layer of at least 1000 gauge damp proof membrane (dpm) must be laid on top of the sand. All joints must be sealed by either a welted or mastic sealed joint. The dpm must be larger in area than the area of sand, so that the dpm is taken up the inside of the walls below floor level by at least 150 mm.

Perpend weep holes must be provided to the base of the wall to assist any water within the cavity to escape.

Now follow the appropriate specification for either 7a Concrete floors or 7b Suspended timber floors.

7a. Concrete floors

A 100 mm thick layer of polyurethane or other equal insulation boarding (thermal conductivity of not more than 0.023 W/mk) must be laid over the whole floor.

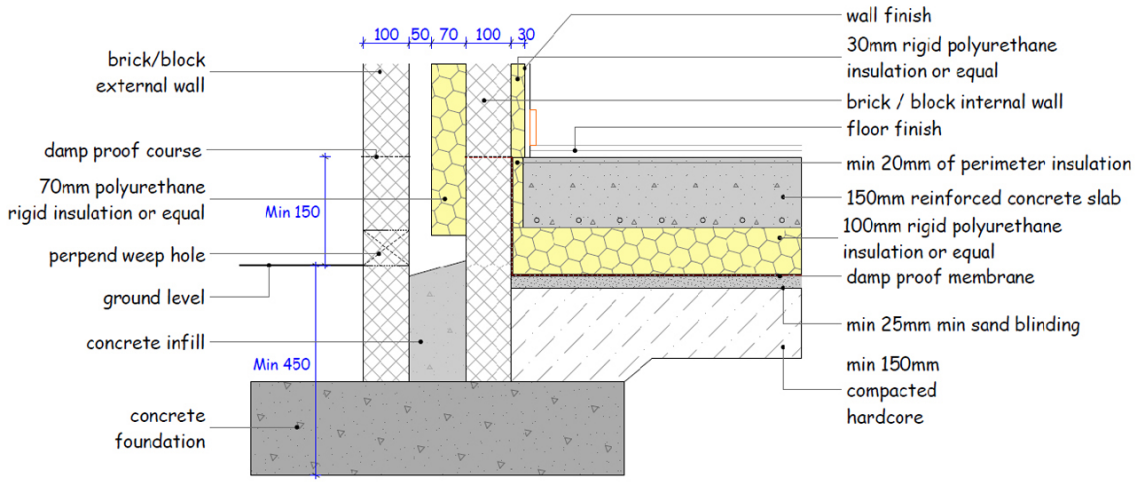
To limit thermal bridging, a strip of perimeter insulation of at least 20 mm with a thermal conductivity of not more than 0.025 W/mK must be installed around the slab and any screed. The perimeter insulation is required to all exposed edges of the slab.

Concrete must be laid over the insulation to give a smooth finish. The concrete must have a strength grade of at least C20 (a cement/sand/aggregate ratio of 1:2:4) and be at least 150 mm thick, or equivalent, with 1 layer of A142 mesh having 50 mm bottom cover.

When a concrete floored conservatory is to be built over existing sub-floor ventilators on the house, these ventilators must be ducted to the outside air through the concrete floor/hardcore using 100 mm diameter uPVC pipes installed in such a way as to prevent water ingress to the existing building.

The damp proof membrane to the floor must be linked to the damp proof course of the external walls.

Figure 4 Concrete Floors



All measurements are expressed in millimetres.

7b. Suspended timber floors

A minimum 50 mm depth of concrete must be poured onto the dpm to give a smooth solum finish. The top of the concrete must be slightly above external ground level.

The joists must be either supported by joist hangers attached to the inner leaf of the external wall, or where a wall scarcement detail is used, on a 100 x 25 mm timber wall plate on a dpc.

The joists must be nominally 195 mm x 47 mm, or equivalent, and be of at least strength grade C16. The joists must be at not more than 450 mm centres and must span not more than 3.34 m, either between the external walls of the conservatory or between one external wall and a subfloor wall.

At least 200 mm thick mineral wool (thermal conductivity of not more than 0.038 W/mK) must be laid between the joists, supported by netting draped over and between the joists. The construction is now ready to lay the tongue and groove floorboards (min 16 mm thick) or tongue and groove chipboard (min 18 mm thick).

To limit thermal bridging, a 20 mm strip of perimeter insulation with thermal conductivity of not more than 0.025 W/mK must be installed between the wall and last joist.

The underside of the joists/insulation must be at least 150 mm above the level of the solum. Sub-floor ventilators 220 x 65 mm must be installed in the perimeter wall at not more than 1500 mm centres.

Any heating pipes below the insulation level must be insulated.

Figure 5 Suspended Timber Floors

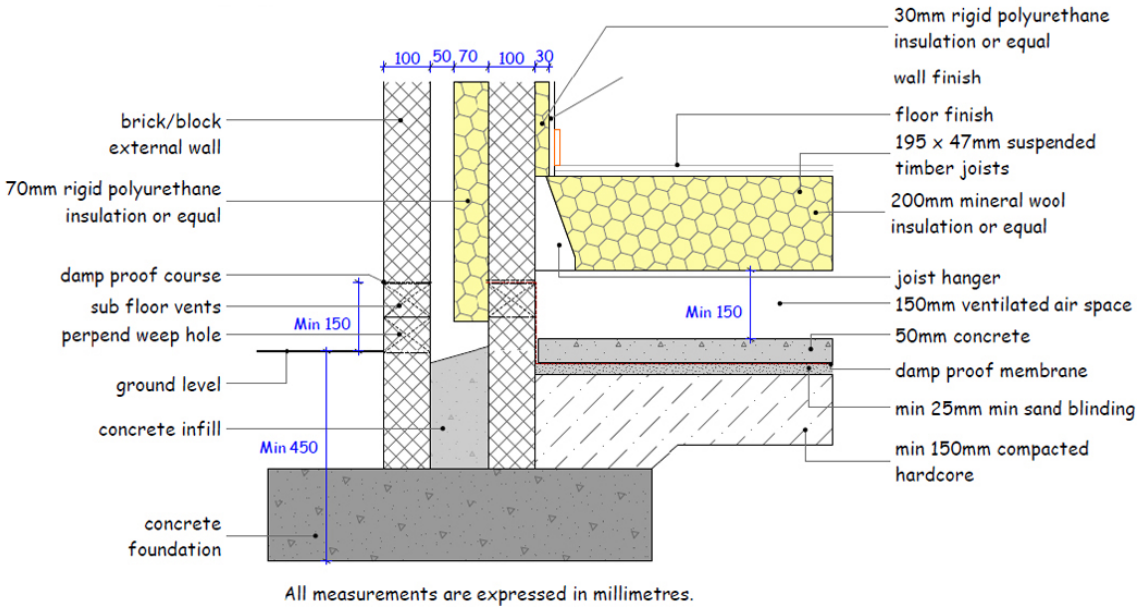
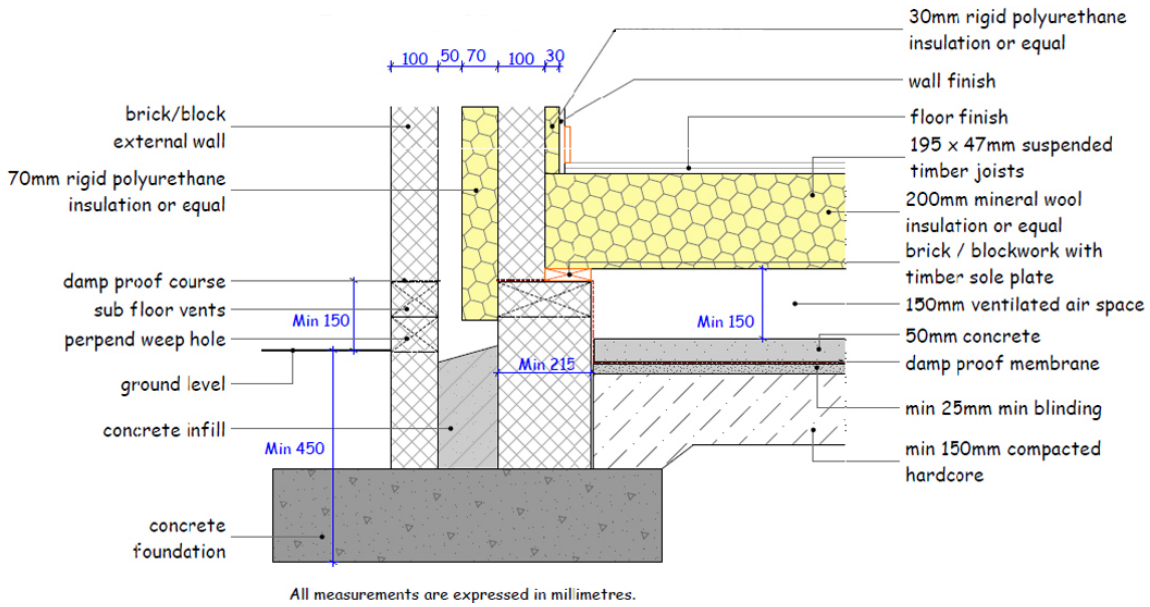


Figure 6 Suspended timber Floor on Scarcement Wall



8. Walls above floor level

External walls above floor level are commonly built to a variety of heights. The conservatory does not have to be built with a wall above floor level, as the windows may start at floor level.

This document provides guidance on 2 types of wall:

a. cavity masonry walls; and

b. cavity walls with masonry outer and timber frame inner leaves.

In all cases the following details must be incorporated:

- the inner and outer leaves of the walls must be tied together using stainless steel wall ties with a minimum of 4 per square metre;
- cavity barriers (providing 30 minutes fire resistance) of mineral wool or timber wrapped in dpc must be provided around all openings in the wall such as, the wall head, door jambs; and
- the walls must be fixed to the house wall using a wall starter.

All gaps and junctions at the walls and floor must be sealed to limit air infiltration, as this will help reduce heat loss. Particular care must be taken at the junctions between walls and floors or walls and ceilings, any openings in walls such as lintels, sills, threshold and jambs, and any service penetrations such as electrical cables.

In all cases the external masonry wall must be of a suitable quality for the exposure the wall will face, see 17 Exposure zones in Scotland, or have a rendered finish.

Now follow the appropriate specification for either 8a Cavity masonry walls or 8b Timber framed walls.

8a. Cavity masonry walls

The walls must be built of two leaves of at least 100 mm thick brick or block with a clear cavity of at least 50 mm. The walls can be constructed with or without roughcast finish externally, and have gypsum board finish internally.

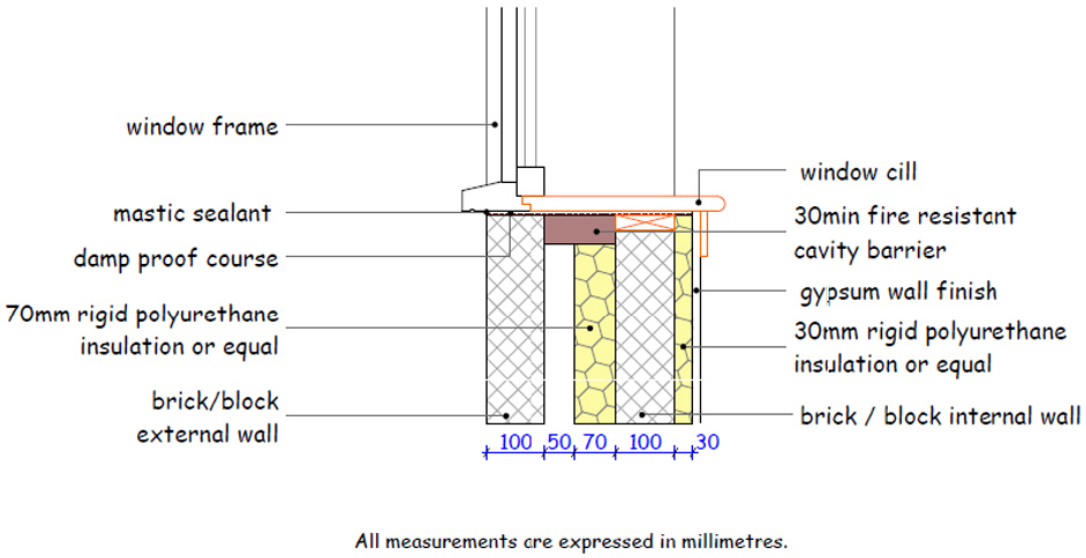
The insulation must be provided in two locations:

- 70 mm polyurethane or equal insulation boarding (thermal conductivity of not more than 0.023 W/mk) within the cavity; and
- 30 mm thick rigid polyurethane insulation boarding or equal (thermal conductivity of not more than 0.023 W/mk) must be provided immediately behind the gypsum board.

A clear 50 mm cavity must still be maintained. This will result in an overall cavity of 120 mm, partially filled with insulation.

To limit thermal bridging, a cavity barrier must be brought to the underside of the sill.

Figure 7 Cavity Masonry Walls



8b. Timber frame walls

The walls must be built of an outer leaf of at least 100 mm thick brick or block, with or without roughcast with a clear cavity of at least 50 mm and a timber frame inner leaf of at least 140 mm thick. The walls can be constructed with or without roughcast finish externally, and have gypsum board finish internally.

The cavity must be vented to the outside air using proprietary perpend ventilators located below the bottom of the timber frame, at not more than 1200 mm centres.

The timber frame must be constructed using 140 x 38 mm minimum studs, of at least strength grade C16, at a not more than 600 mm centres, with a top and bottom rail. Dwangs must be provided at mid height if the timber frame is more than 1200 mm in height.

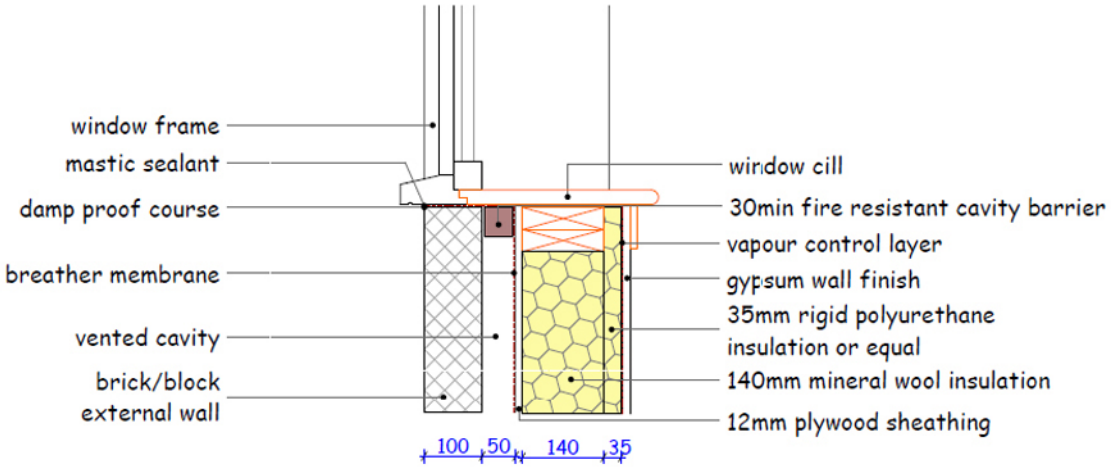
The timber frame must be clad externally with plywood at least 12 mm thick and a breather membrane. The frame must be finished internally with a vapour control layer and plasterboard at least 12 mm thick.

The insulation must be provided in two locations:

- 140 mm thick mineral wool must be provided between the studs; and
- 35 mm thick rigid polyurethane insulation boarding or equal (thermal conductivity of not more than 0.023 W/mk) must be provided immediately behind the plasterboard.

To limit thermal bridging, a cavity barrier must be brought to the underside of the sill.

Figure 8 Timber Framed Walls



All measurements are expressed in millimetres.

9. Stability

The conservatory must be designed and constructed to be stable under the actions of wind and snow load and any other loads liable to act on the structure. In order for stability to be assured the superstructure formed by the glazed units must be tied together and also anchored securely to the wall of the building the conservatory is attached. The roof must be firmly attached to the wall units. The superstructure must be anchored to the walls to resist wind uplift forces.

- The glazed window, door and roof units must be structural and formed from reinforced aluminium/steel PVCu or hardwood timber.

- The glazed window units must be anchored securely to the **masonry** walls using stainless steel 30 mm x 2.5 mm anchor straps, with a minimum length 600 mm, at not more than 1.0 m centres and either side of door openings. It is expected that a plan showing the proposed anchor strap detail will be submitted with the warrant application.

- The glazed window units must be fixed securely together using bolts or self-tapping screws at 150 mm from every corner and at not more than 600 mm centres thereafter.

- The external wall of the house that the conservatory is to be attached must be constructed from masonry, brickwork or concrete blocks.

- The glazed window units must be securely attached to the wall of the house. It is expected that the proposed fixing detail will be submitted with the warrant application.

- Glazed roof units must be restrained against wind uplift. These must be screwed or bolted to the structural framing around the head of the glazed window units using bolts or self-tapping screws fixed at a spacing of not more than 450 mm.

- The manufacturer must be consulted to establish if a roof tie bar is required to prevent deformation/collapse of the structure under load e.g. snow loading/drifting.

10. Windows

Conservatory window units must be of reinforced aluminium/steel PVCu or hardwood timber.

The wall assembly must be covered by a certificate from a UKAS accredited scheme (e.g. BBA) supplied as part of the warrant application, confirming that the complete wall complies with the structural requirements of Standard 1.1. of the Technical Handbooks. Care must be taken that the certificate covers wind loads relative to the location in which the conservatory will be erected.

The units (glass and frame) must be double glazed with a maximum U-value of 1.8 W/m^2K. All windows and doors must be draught stripped.

Glazing in the following locations must be made from safety glass:

- within 800 mm of the floor level of the conservatory;
- within 300 mm of a door leaf and within 1.5 m of the conservatory floor level;
- all glazing within doors.

The term safety glass includes laminated and toughened glass which must be marked with a BS kite mark which confirms that it is safety glass.

The opening area of conservatory windows and doors must be at least 1/30th of the combined floor area of the conservatory and any room covered by the conservatory, or the conservatory must be provided with windows and doors of at least 1/5th of the floor area of the conservatory, whichever is the greater.

To allow a slow change of air within the conservatory without opening the windows or doors there must be provided at least one but preferably two or more trickle ventilators (small closable ventilators which can provide minimum ventilation) with a combined open area of at least 12,000 mm^2. Trickle ventilators should be sized using the equivalent area method, rather that the geometric method. To assist, many manufacturers mark the equivalent area on the unit for easy reference. Trickle ventilators must be positioned to encourage movement of air within the conservatory.

Windows must have no opening part within 800 mm of the floor of the conservatory where the difference between the conservatory floor level and the adjacent external ground is greater than 600 mm.

If the conservatory is to be built over a mechanical extract fan terminal, inlet or outlet, the fan must not discharge into the conservatory. The fan could be relocated by ducting through the conservatory to the outside air.

If the conservatory is to be built over a window to a kitchen, bathroom, shower room or utility room, a mechanical extract fan must be provided (unless one is already installed) to these rooms, leading/ducted to the outside air. The extraction rate of the fans, must be at least:

- Kitchen - 60 litres/sec (216 m^3/hr) (this may be reduced to 30 litres/sec (108 m^3/hr) if an extracting cooker hood is fitted);
- Utility room - 30 litres/sec (108 m^3/hr); and

- Bathroom or shower room - 15 litres/sec (54 m^3/hr).

11. Roofs

The conservatory roof must be constructed from reinforced aluminium/steel PVCu or hardwood timber rafters with double glazed units, or multi-skin polycarbonate sheets between the rafters.

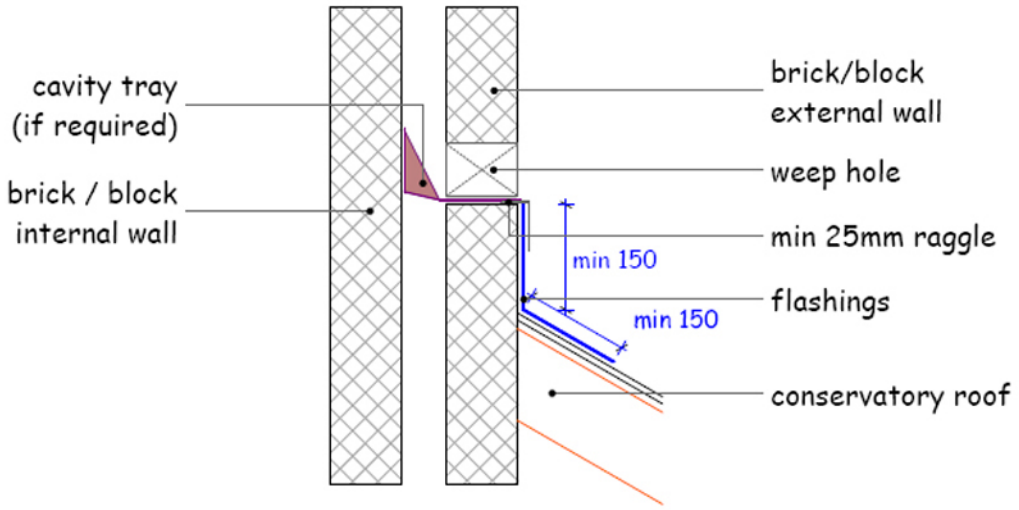
The roof assembly must be covered by a certificate from a UKAS accredited scheme (e.g. BBA) supplied as part of the warrant application, confirming that the complete roof complies with the structural requirements of Standard 1.1. The certificate must cover wind and snow loads relative to the location in which the conservatory will be erected and the potential for drifting due to the conservatory/house arrangement.

The roof must be fixed to the house in accordance with section 9 Stability requirements and the manufacturer's instructions.

The double glazed units or multi-skin polycarbonate roof sheets must have a U-value of not more than 1.8 W/m^{2}K.

The installation of a cavity tray may be required in the existing house wall. If required, this must be located where the conservatory roof meets the house wall. Whether one is required will depend on the construction of the house wall and the amount of wind driven rain this wall is exposed to. See section 16 to calculate if a cavity tray is required.

Figure 9 Cavity Tray Detail in Masonry Cavity Walls



All measurements are expressed in millimetres.

The lead flashing must be raggled into the house wall at least 150 mm higher than the roof bar and dressed down either into the roof bar if the manufacturer's system allows, or a further 150 mm over the roof sheets, see detail above.

The minimum thickness of lead to use for flashing is code 4.

12. Drainage

The rainwater from the conservatory roof must be drained to the main sewer or surface water system via the existing house drainage.

The rainwater discharging from the roof must connect to the existing drain. This must be via 100 mm diameter half round gutters (or of equivalent volume) to 68 mm minimum diameter rainwater down pipe with handhole access, into a 100 mm diameter underground drainage pipe laid at a fall of 1 in 60. The drain must be surrounded by a 150 mm thick layer of pea gravel.

The underground drainage pipes must be laid with a ground cover of at least 600 mm. If this is not achieved, possibly due to the depth of the existing pipes, the new pipe must have a cover of at least 50 mm concrete above the pea gravel.

Rodding access must be provided at all changes of direction.

Where the conservatory is to be built over an existing rodding access point, trap, gulley, manhole or other access point, they must be relocated and sited outwith the area of the conservatory. This will allow the existing drain to be accessed when necessary.

Where the conservatory drain is connected to a drain carrying both rainwater and wastewater, a ventilated trap must be provided to the new rainwater underground pipe as close as possible to the connection of the existing wastewater/rainwater pipe.

Figure 10 Drainage: Example 1

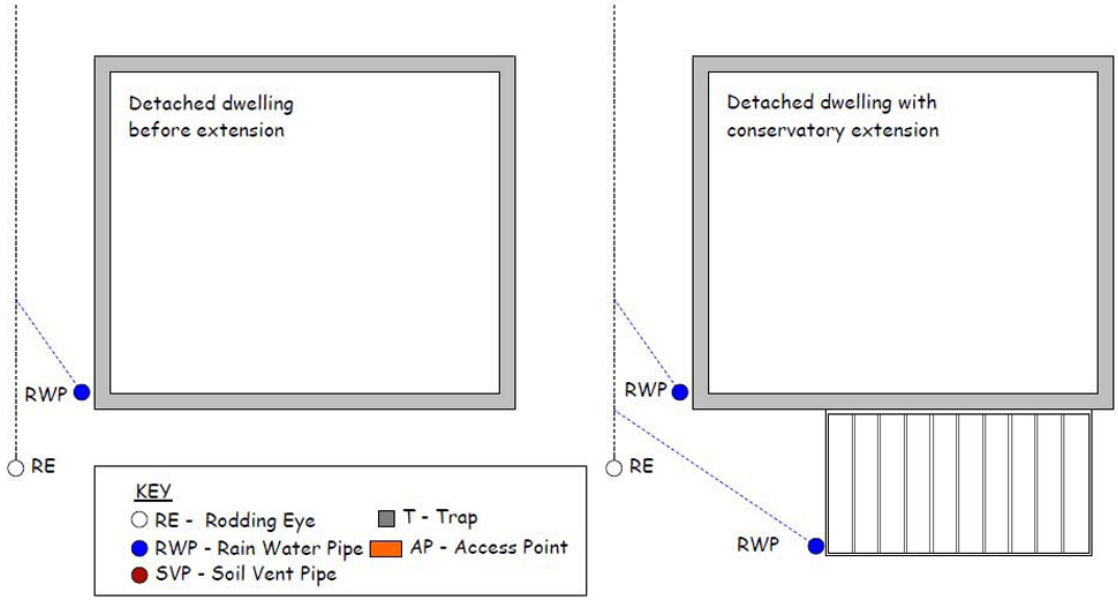
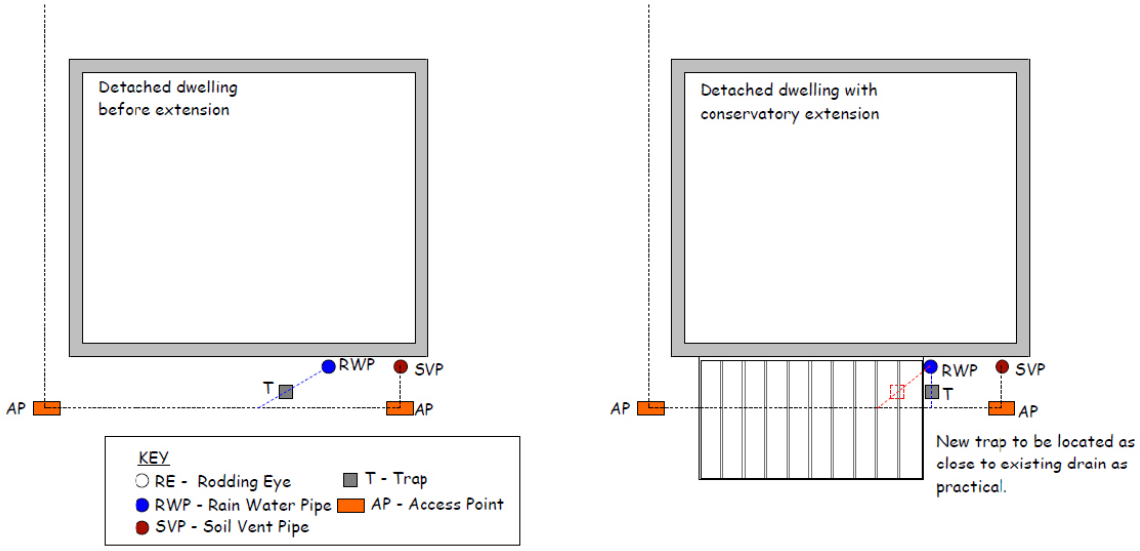


Figure 11 Drainage: Example 2



If it is impractical to re-route the drain around the conservatory, the drainage pipes may remain below the conservatory providing:

- the foundations must not be built over an existing drain;
- the foundations must be below the level of the drain;
- the guidance in section 5 Foundations is followed where there are steps in the foundation.

Where the pipe passes through the external walls of the conservatory they must be constructed as shown in the diagrams below.

Where either a new or existing drain is adjacent to the foundation it may be necessary to protect the pipe and/or foundation. In such situations, the drain trench must be filled with concrete as shown in the diagram below.

Figure 12 Pipe bedded in Foundation Wall below Ground Level

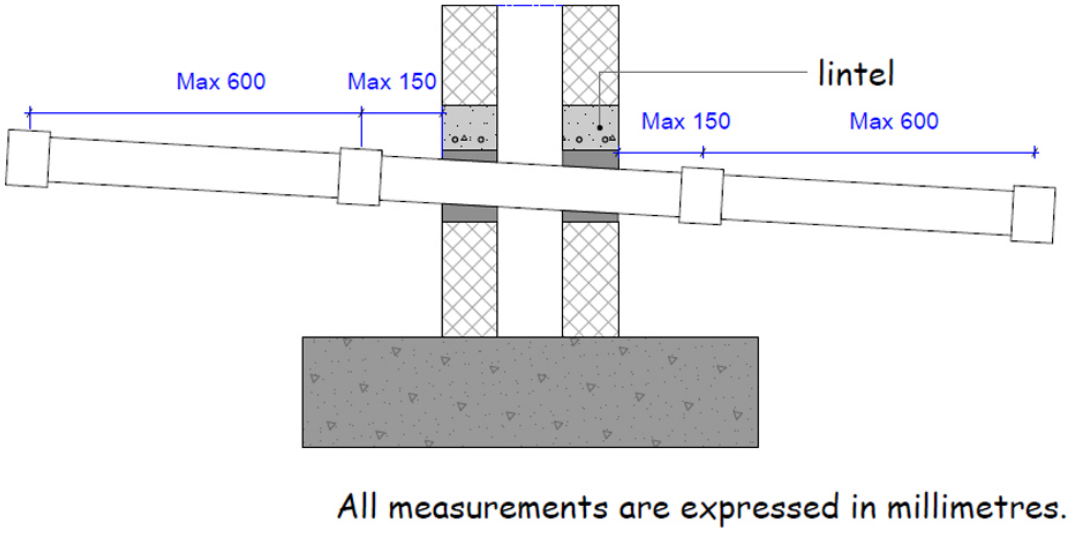


Figure 13 Drainage/Foundation: Example 1

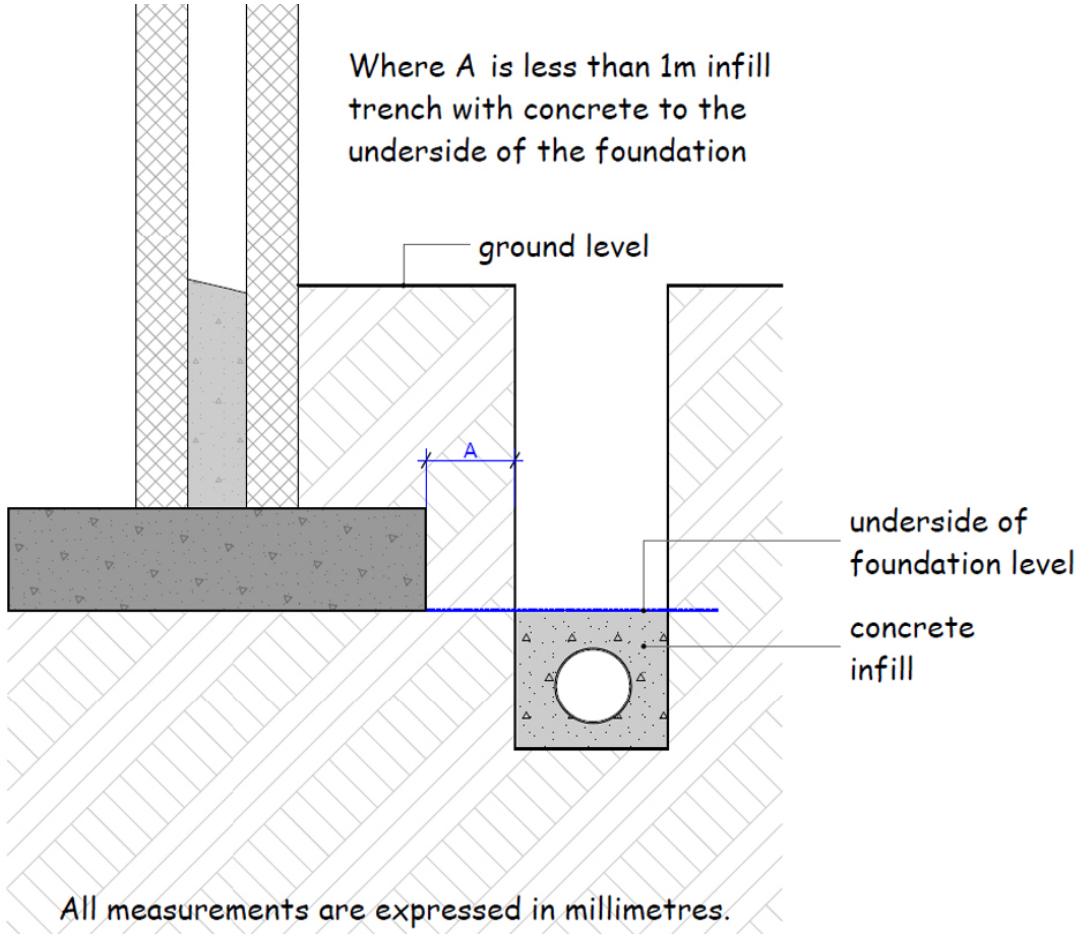
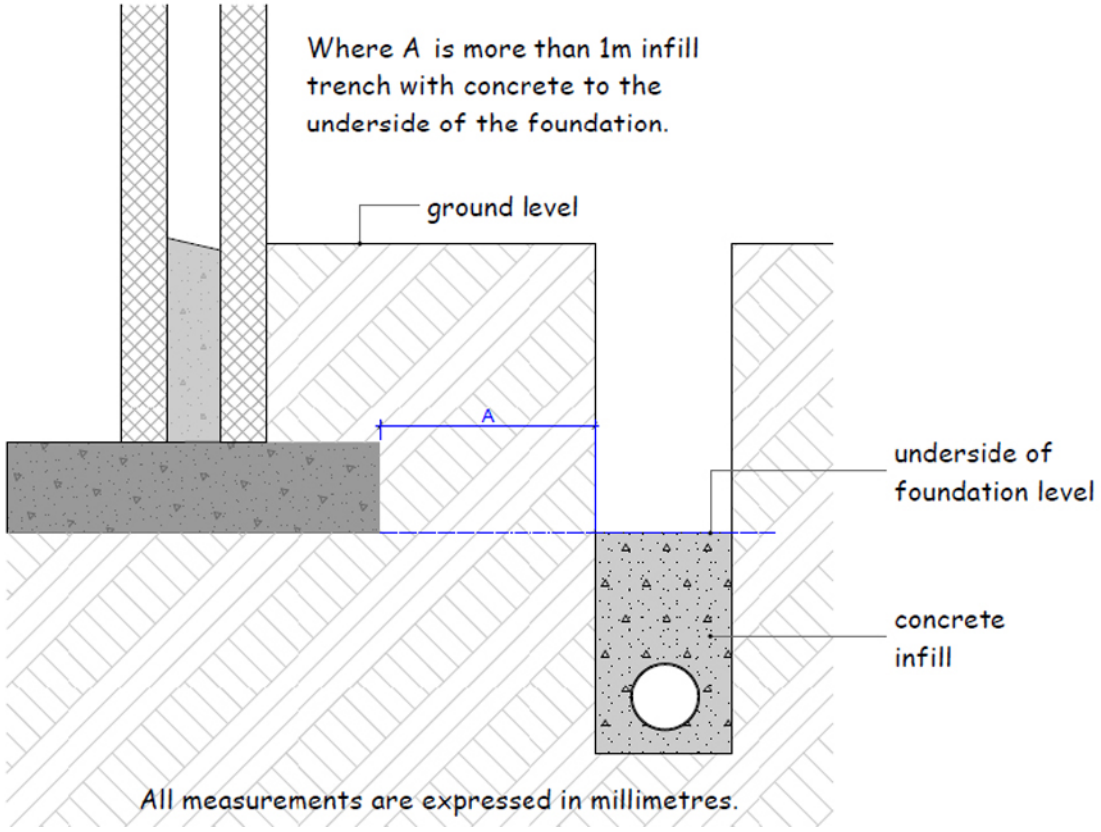


Figure 14 Drainage/Foundation: Example 2



13. Electrics

The electrical installation must be designed, constructed, installed and tested in accordance with BS 7671. This must be carried out by persons who possess sufficient knowledge, relevant practical skills and experience for the nature of the electrical work undertaken. (An approved certifier of construction who has been assessed to have the professional skills and relevant experience can certify compliance of an electrical installation). The details of such approved certifiers of construction can be accessed on the BSD website www.scotland.gov.uk/bsd

Sockets provided within the conservatory must be protected by a 30 mA RCD (residual current device).

Outlets and controls for electrical fixtures must be positioned 350 mm from an internal corner.

Socket outlets must be positioned at least 400 mm above floor level.

Light switches must be positioned between 900 and 1100 mm above floor level.

14. Connecting doors

As a conservatory is a stand-alone building, there must be a door providing thermal separation between the house and conservatory. A new connecting door or doors must have a U-value of not more than 1.6 $W.m^2K^1$and must also have the following security attributes:

1. frame fixings penetrating at least 25 mm into the surrounding structure, located generally at not more than 600 mm centres with corner fixings provided between 150 - 250 mm of any external corner. An intermediate fixing must be provided to the head of the frame if greater than 1800 mm wide (1200 mm for PVCu).

2. any glazing that is provided must be a laminated type.

3. timber doors with leaves at least 44 mm thick, must have a 5 lever mortice dead lock certified to BS 3621, with stiles deep enough to accommodate this and 1½ pairs of hinges (BS EN 1935, grade 11 or above). The door stops, which may be rebated out of the door frame or may be separate pieces securely glued and screwed to the frame, must be at least 18 mm deep. In outward opening doors the hinge pin must not be capable of being removed unless the door is in the open position.

4. PVCu doors constructed to BS 7412: 2007 and fitted with a multi point dead locking system with a lock cylinder in accordance with BS EN 1303: 2005, of at least grade 5 key security and grade 2 attack resistance.

Where the existing external quality doors are retained there is no requirement to meet the above thermal and security requirements.

[1]A Window/Door Energy Rating of Band C or better may also be used.

15. Steps

The following information applies only to steps serving conservatories that do not form part of the route to the accessible entrance of the dwelling. This is normally the main entrance to the house and is provided to allow safe, convenient and unassisted access. Where the conservatory is built over the accessible entrance the level of accessibility must not be any worse than it was originally.

Steps from the conservatory to the ground level and from the house to the conservatory must be provided so that the occupants can enter and exit safely. No steps are required where the difference between the floor level of the conservatory and the adjacent ground level is not more than 170 mm.

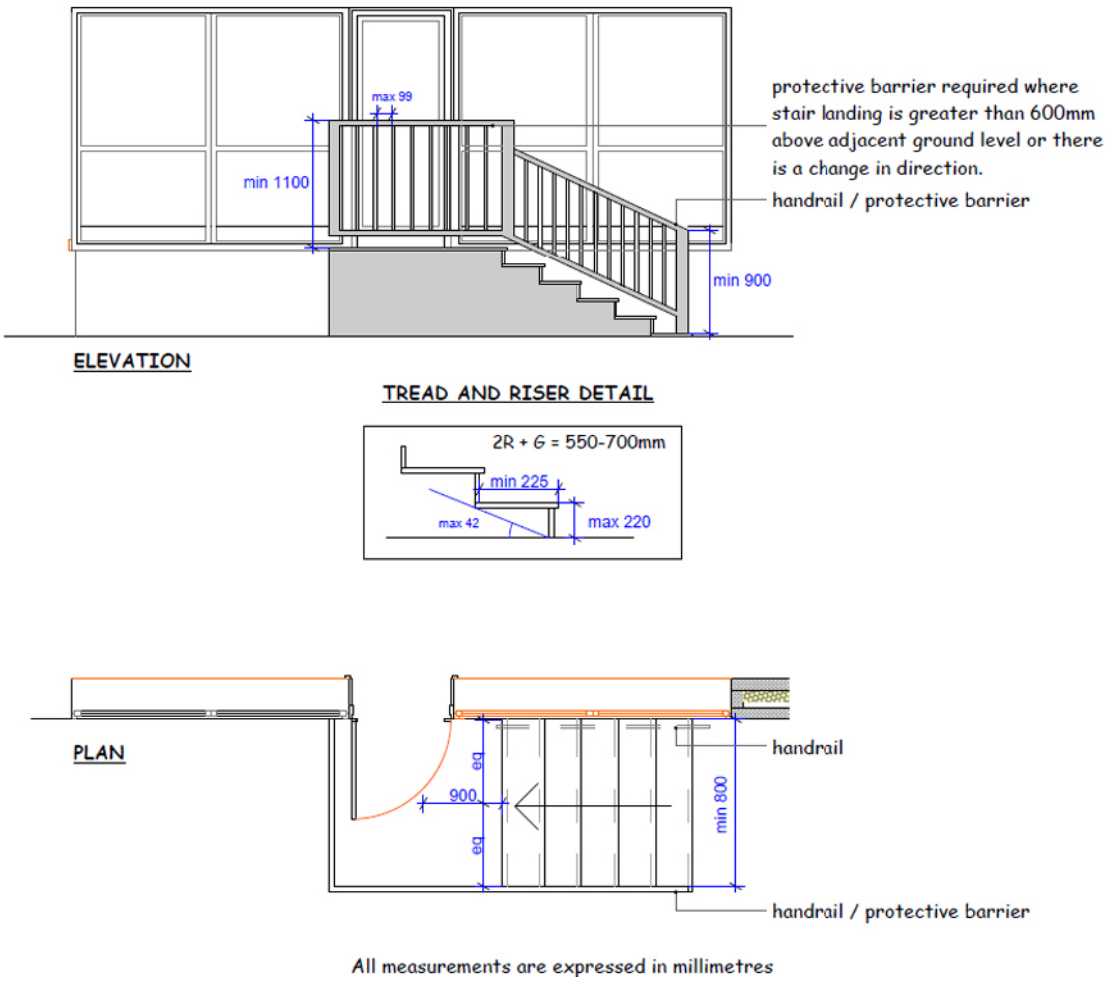
The rise of each step must be uniform over the flight and must be not more than 220 mm or less than 100 mm high. The going of the step must be not less than 225 mm. The aggregate of the going and twice the rise must be at least 550 mm and not more than 700 mm. The flight must have a pitch of not more than 42^{o}. The width of the flight must be at least 800 mm measured between the handrails.

The steps and top landing must be constructed of pre-cast concrete steps supported on 100 mm thick brick or block walls on either side. Paving slabs at least 50 mm thick and not larger than 600 mm x 600 mm may be used when supported on all sides.

If the height from ground level to floor level is more than 600 mm, or is more than 170 mm and the external doors of the conservatory open outwards a landing must be provided at the top and bottom of the flight.

A barrier must be provided to the open sides of the steps and landing where they are at a height of more than 600 mm or where there is a change in direction on the access route. The barrier must be at least 900 mm in height above the steps and 1100 mm on the landing. The barrier must have no gaps within it that would allow a 100 mm ball to pass through. A handrail that has a profile that is easy to grip must be provided to both sides of the stair, and be at a height of more than 840 mm and not more than 1000 mm above the pitch line of the steps.

Figure 15 Stair and Barrier Design



All measurements are expressed in millimetres

16. Cavity trays

Determining the need for the provision of a cavity tray

Correct installation of a cavity tray at the junction of an external cavity wall and a conservatory roof will prevent the ingress of water into the conservatory through the existing external wall of the house.

Designers and householders should be aware that without a properly installed cavity tray some water ingress may occur in certain locations during severe weather conditions.

The following calculation confirms where cavity trays must be provided, based on the wall construction and the exposure to wind driven rain of the existing house.

If this calculation confirms the need for the installation of cavity trays, these must be provided.

Calculation steps:

1. Determine the exposure zone number from the map (see over).

2. Add 1 to that number where conditions accentuate wind effects, such as on open hillsides or in valleys where the wind is funnelled onto the wall, and subtract 1 from the number where walls are well protected by trees or buildings or do not face the prevailing wind.

3. The number arrived via steps 1 and 2 denotes the degree of exposure the house faces.

4. Check the house wall construction against the table below to find the degree of exposure the house wall is designed to withstand.

If the house design number (step 3) is equal to or greater than the exposure number (steps 1 and 2) no cavity tray is required.

Degree of exposure which various wall constructions are designed to withstand

Table 1 Degree of Exposure – Wall Constructions

Existing House Wall Construction Type and Insulation Method	Min Width of Filled Cavity or Clear Cavity (mm)	Max Exposure Zone for Each Construction			
	Cavity Width mm	Roughcast Finish		Facing Brick	
		Full Height of Wall	Above Facing Brick	Flush Joints	Recessed Mortar Joints
Cavity Fill Insulation (2)					
Built-in Full Fill	50	3	2	1	1
	75	3	2	2	1
Injected Fill [not UF (1) foam]	50	3	1	1	1
	75	4	2	2	1
Injected Fill [UF (1) foam]	50	3	1	1	1
	75	3	1	1	1
Partial Fill					
Partial Fill +50 mm Clear Cavity	50	4	3	2	1
Internal Insulation					
No Cavity Insulation	50	3	2	2	1
	100	4	4	4	1

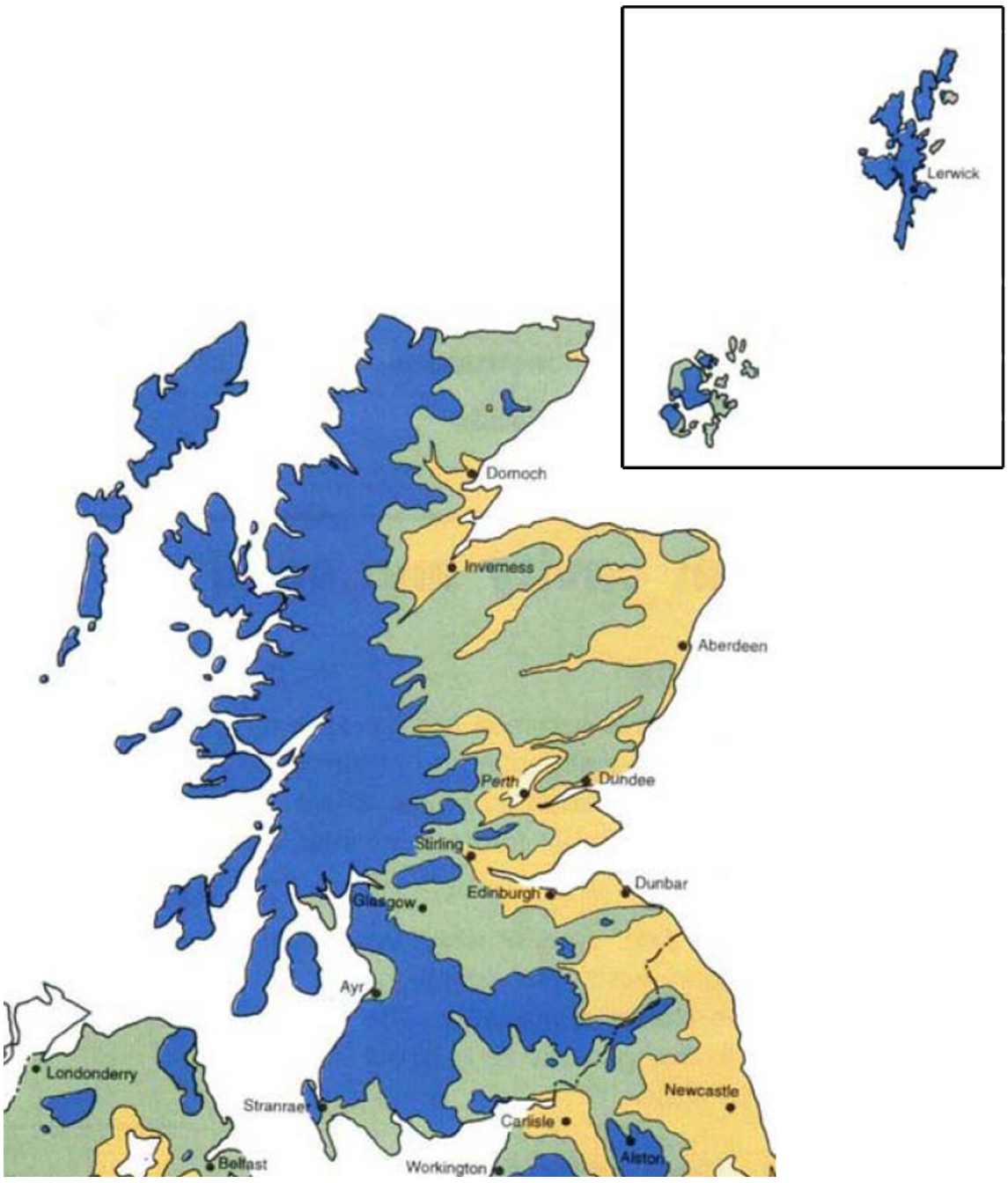
1. UF is Urea Formaldehyde injected foam insulation.

2. Only suitable if a cavity tray is not required.

When unfamiliar with the type of cavity insulation in the house, it may be necessary to cut or drill a small hole in the wall for a visual check.

[Taken from: BS8104: 1992 - Code of Practice for Assessing Exposure of Walls to Wind Driven Rain and BR262: 2002 Thermal Insulation: Avoiding Risks. Reproduced by permission of BRE Press. Copies are available from http://www.brebookshop.com/]

17. Exposure zones in Scotland



1	Sheltered	2	Moderate	3	Severe	4	Very severe

18. Design Checklist

The proposed conservatory is designed to meet the guidance contained in the sections highlighted with a cross (x) below.

Table 2 Design Checklist

Section	Guidance used
4. Subsoil conditions	
5. Foundations	
6. Walls below floor level	
7. Floors	
7a. Concrete floors	
7b. Suspended timber floors	
8. Walls above floor level	
8a. Cavity masonry walls	
8b. Timber framed walls	
9. Stability	
10. Windows	
11. Roofs	
12. Drainage	
13. Electrics	
14. Connecting doors	
15. Steps	
16. Cavity trays	

19. Worked examples for cavity trays

Worked Example 1

The house is located on an exposed hill in Bo'ness, and the conservatory will not face the prevailing wind. The house walls are roughcast over their full height, with a clear 50 mm cavity.

1. Bo’ness is in exposure zone 2.

2. Subtract 1 as the conservatory will face East and add 1 as the house is in an exposed location.

   Degree of exposure the conservatory will face is 2 – 1 + 1 = 2

3. Check the house wall construction against the table to find the degree of exposure the house wall is designed to withstand.

From the table a full height roughcast wall with a 50 mm clear cavity is designed to withstand a degree of exposure of 3.

As the degree of exposure the wall is designed to withstand is greater than the degree of exposure the wall faces, **a cavity tray is not required.**

Worked Example 2

The house is located on a housing estate in Stornoway, and the conservatory will face the prevailing wind. The house walls are roughcast over their full height, with a clear 50 mm cavity.

1. Stornoway is in exposure zone 4.

2. Do not add or subtract anything as the conservatory will not be particularly sheltered or exposed.

   Degree of exposure the conservatory will face is 4

3. Check the house wall construction against the table to find the degree of exposure the house wall is designed to withstand.

From the table a full height roughcast wall with a 50 mm clear cavity is designed to withstand a degree of exposure of 3.

As the degree of exposure the wall is designed to withstand is less than the degree of exposure the wall faces, **a cavity tray is required.**

Worked Example 3

The house is located on a housing estate in Oban, and the conservatory will not face the prevailing wind. The house walls are roughcast over their full height, with a clear 50 mm cavity.

1. Oban is in exposure zone 4.

2. Subtract 1 as the conservatory will face East.

Degree of exposure the conservatory will face is 4 – 1 = 3

3. Check the house wall construction against the table to find the degree of exposure the house wall is designed to withstand.

From the table a full height roughcast wall with a 50 mm clear cavity is designed to withstand a degree of exposure of 3.

As the degree of exposure the wall is designed to withstand is equal to the degree of exposure the wall faces, **a cavity tray is not required.**

Worked Example 4

The house is located on a housing estate in Greenock, and the conservatory will face the prevailing wind. The house walls are facing brick with flush joints, with a clear 50 mm cavity.

1. Greenock is in exposure zone 4.

2. Do not add or subtract anything as the conservatory will not be particularly sheltered or exposed.

   Degree of exposure the conservatory will face is 4

3. Check the house wall construction against the table to find the degree of exposure the house wall is designed to withstand.

From the table a facing brick wall with a 50 mm clear cavity is designed to withstand a degree of exposure of 2.

As the degree of exposure the wall is designed to withstand is less than the degree of exposure the wall faces, **a cavity tray is required.**

Annex A - Issues to be considered when altering a conservatory

In the introduction to this document (section 3), householders are asked to consider whether or not a conservatory will meet their needs. Below are some issues that can arise if a decision is taken at a later stage to make alterations to a conservatory.

Alterations to a conservatory roof

Conservatories are given a concession under the building standards system that allow them to 'lend' natural light to any apartment window that they are built over. An alteration to the roof of an existing conservatory that reduces the area of translucent roof[2] below the percentage applicable in section 2.1 (definition of conservatory) will compromise the natural light to the apartment. So if such an alteration is to be carried out, for example forming a sun-room with an opaque roof, it will be necessary to reassess the natural lighting to the apartment. In some situations, for example where the apartment has several windows and they are not all covered by the conservatory it may be that there is sufficient non-borrowed light from one or more of these windows. However this will not always be the case and in some instances an alternative arrangement will need to be sought, by forming an additional window to the apartment, for example.

Likewise, where conservatories are built over non-moisture producing rooms in dwellings (i.e. not a kitchen, bathroom, etc.) such rooms are allowed to be ventilated through conservatories. This is because traditionally a conservatory is a room that bridges the gap between the garden and the house. As stated in the paragraph above, an alteration that makes the roof opaque would result in the building no longer meeting the definition of a conservatory and the ventilation concession will cease to apply. Alternative arrangements for ventilation to the room beyond the conservatory will need to be sought.

This change in status may also result in some or all of the following being necessary to comply with building standards:

- The opaque roof would need to achieve a minimum U-value of 0.15 or 0.18 W/m^2K depending on the position of the insulation in relation to the ceiling.
- The other parts of the insulation envelope of the conservatory that are altered will be subject to clause 6.2.11 of the Domestic Technical Handbook.
- The loading to the roof and/or walls is increasing, thereby usually incurring additional structural works to cope with the revised loadings.

Removal of connecting doors or windows

The building standards system classes a conservatory as a stand-alone building ancillary to a dwelling and, as above, allows certain concessions on the construction provided there is a 'thermal divide' between the dwelling and the conservatory. Where a door or window between a conservatory and a dwelling is removed, forming a permanent opening between the two areas, the

[2]Note, the installation of adjustable roof blinds would not be considered to be a permanent reduction in the area of translucent roof.

conservatory loses this status, becomes the subject of ‘conversion’, and in addition it is classed as a fully integrated part of the dwelling.

Where a conversion is to be made, building work will have to be done so that all the relevant standards will be met, to the extent specified in schedule 6 of the building regulations. This may mean substantial works would be required in addition to those necessary to remove the connecting door/window, including but not limited to:

- Upgrading the thermal insulation to the roof, walls, floor and windows/doors to the former conservatory structure, and reducing the area of glazing, in accordance with clause 6.2.7 of the Domestic Technical Handbook;
- The other parts of the insulation envelope of the conservatory that are altered will be subject to clause 6.2.11, as read in conjunction with clause 6.2.7 of the Domestic Technical Handbook;
- Upgrading or replacing the roof and/or wall construction to take any additional loads;
- Ensuring the width of the opening between the existing dwelling and the conversion provide adequate “borrowed” natural light; and
- Ensuring the width of the opening between the existing dwelling and the conversion to provide adequate ventilation.

The need for permission

In many cases a building warrant will be required for the type of alterations outlined above. If in doubt about this, contact the local authority for the relevant geographical area.