Housing Extension Construction

General Specification

47a North Road

Royston

Barnsley

S71 4DE

Mr Lewis Willett

23.03.2023

APB DETAILING LTD

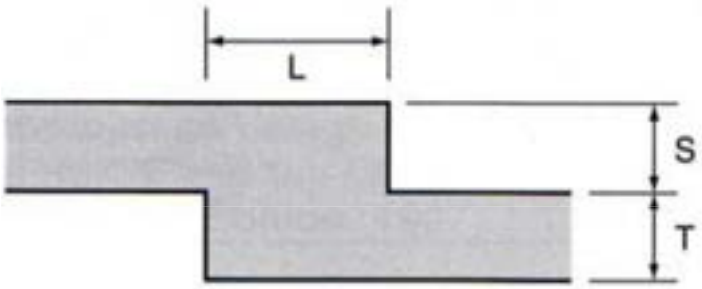
Contents

Site preparation

- Strip from over site area all vegetation and top soil.
- Remove existing building structures such as foundations, drains, trees etc as indicated on drawings prior to construction of proposed development.

Foundations

- Excavate 600mm wide trench fill foundation to all external walls.
- All foundation depths to be agreed on site with Local Authority Building Control Officer and may require adjustment should ground conditions dictate. A minimum of 24 hours notice to be given to the Local Authority to enable them to inspect the foundation prior to any pouring of concrete.
- Where structures have been removed, e.g. old foundations, trees etc foundations to be taken down 300mm into undisturbed ground. Refer to site plan for location of existing and proposed trees and check foundation plan for amended foundation depth, in all cases foundation depth to be taken 300mm below any evidence of roots.
- All foundation concrete to be Gen 3 Designated Mix. Steps in foundations to suit ground conditions and in accordance with diagram below:-



Foundations should unite at each change in level. Minimum overlap L = twice height of step, or thickness of foundation or 300mm, whichever is greater.

S should not be greater than T

(For trench fill foundations, minimum overlap L = twice height of step, or 1m, whichever is greater.)

Oversite

- All voids under floor created by removal of foundations, trees etc to be backfilled with well compacted hardcore in maximum 150mm layers.
- Place 150mm thick hardcore well-consolidated and blinded with sand.
- Damp Proof membrane to be at least 1200g and also suitable as a Radon barrier. It is to be taken across the full width of the cavity and a cavity tray is to be provided above. All joints for surface penetrations to be adequately taped.
- 100mm minimum thick Celotex Extra-RXR 3000 insulation or similar.
- 150mm thick Power Floated Concrete floor slab

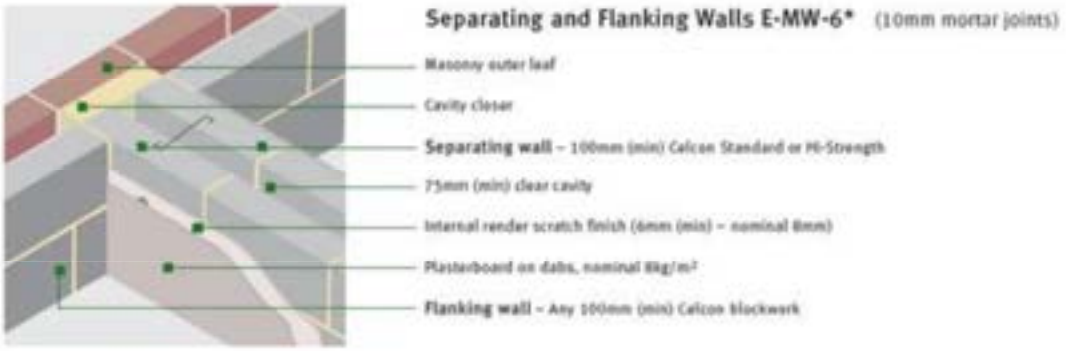
Cavity External Walls

- Ensure wall sits centrally on foundation.
- Below ground level external wall to be 7 N/mm2 concrete blockwork
- Fill cavities with Gen 1 (ST2) concrete up to 225mm below ground level dpc. Clean off surplus mortar from joints on cavity faces as work proceeds. Keep cavities, ties and dpc s free from mortar and debris at all times.
- Facing brick outer leaf to match adjoining building with cement:sand mortar.

- Brick type to be approved in writing by Planning Officer prior to construction of walls, to comply with conditions of Planning Permission.
- Build in cavity tray to act as DPC horizontally in cavity walls laid in continuous length on a full even bed of fresh mortar with 100mm laps at joints and full laps at angles. Immediately lay at least one full course of masonry on a thin bed of fresh mortar. Keep finished joint thickness as close to normal as practicable. Ensure continuity of dpc by lapping with damp proof membrane of ground floor. Ensure that dpc s in external walls are a minimum of 150mm above finished ground level and stepped to suit.
- Mortar to be designated mix to BS5268: part 3 (ii) below dpc level and (iii) above dpc level.
- 100mm wide cavity with wall ties as indicated, slope slightly downwards towards outer leaf with drip centred in the cavity and pointing downwards. Do not bend ties to suit coursing. Evenly space at 600mm horizontally, staggered in alternate courses and at 450mm centres vertically. Double up wall ties at all openings placing ties within 225mm of reveals. Provide final row of wall ties maximum 150mm from wall plate level.
- Provide 100mm thick Rockwool Cavity ensuring that the cavity is fully filled.
- 100mm thick inner leaf Celcon Solar insulation block.
- Do not carry up any one leaf more than 1.5m in any one day unless permitted by engineer.
- Surface internal surface with 13mm thick plaster scrim and skim or 13mm thick plasterboard on plaster dabs, scrim and skim finish.

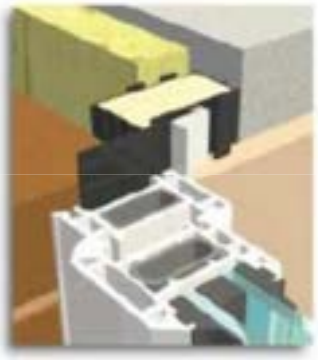
Party Wall

- Construct party wall using Celcon Standard or Hi-Strength blocks. (see extract from Celcon brochure below.
- Unless the site is registered with Robust Details Ltd sound testing will be required upon completion of the dwelling.



Insulated Cavity Closures

- Provide insulated cavity closure to all doors and windows with ties built into cavity wall and fixed to door & window units. These will also act as vertical DPC.
- A suitable closure for example would be Thermabate 100 fixed as shown below:-



Lintols

- Provide Catnic or similar prefabricated steel lintels to BS 5977: Part II to all openings.
- All lintels to be insulated.
- Bed on mortar with a minimum bearing of not less than 150mm. Ensure internal surface is covered with a minimum of 15mm of plaster.
- Provide cavity trays/dpc over all lintels if required with stop ends and weep holes at 900mm centres with a minimum of two per cavity tray.

First Floor Construction

- 47 x 220 C24 floor joists at 400mm centres.
- 25mm thick tongue and groove floor boarding, finish to be agreed with client. Ensure boarding has a density of 15kg/m2.
- Provide block strutting/blocking at mid or third span of floor joists.
- Joists to be supported by joists hangers at all locations.
- Provide treble joists under parallel partitions & bath. Bolt together with M12 bolts and timber connectors at 600mm centres. Provide strutting under stud partitions at right angles to floor joists.
- Trimming joists to stairwell to be designed by structural engineer.
- Surface underside of floor joists with one layer of 12.5mm thick Wall Board plasterboard by Gyproc with joints taped and filled to give a half hour period of fire resistance.
- Board to have a density of 15 kg/m3.
- Infill floor joists with 100mm thick fibreglass insulation as required for sound reduction.

- Ensure fibreglass insulation has a minimum density of 10 kg/m3.

Timber Stud Partitions

- Construct new timber stud partitions to internal walls.
- Studwork to be generally 50 x 75mm SC3 at 450mm vertical and 900mm horizontal centres. Sole and head plates to be 75 x 75mm SC3.
- Both sides of internal partitions to be finished with 15mm thick wallboard plaster boarding, scrim and skim. Board to have a density of 15kg/m2.
- Infill studs with 75mm thick fibreglass insulation with a minimum density of 10kg/m3.

Roof Construction

- Pre-fabricated roof trusses fixed and braced strictly in accordance with manufacturers instructions with a copy of the calculations provided for Local Authority approval if requested.
- Tiles to match existing and to the approval of the Local Planning Authority. Tiles to be fixed and lapped strictly in accordance with the manufacturer s instructions and to be suitable for the intended pitch.
- 25 x 38mm softwood treated battens on 38 x 50mm counter battens fixed to rafters on 1 layer of Klober Permo Forte breather membrane. Membrane to be sealed and lapped by 150mm and installed in compliance with the manufacturer s specification.
- At eaves provide and fix Klober Universal Eaves Carrier under lapping the 1st width of membrane by at least 150mm and dress into gutter.
- Provide 25mm eaves vent to drain counter battens.
- Ensure any water has a clear passage to extend into gutter.
- 100mm upvc gutter, laid to suitable falls on rise and fall brackets, discharging to 63mm diameter down pipes in position shown on plan.
- Provide facia board to match existing.
- Ensure wall/ceiling junction is completely sealed with a continuous band of fixing plaster.
- Provide draught seals to all voids created by service pipes passing throughceiling.
- Provide Code 4 lead flashing at soil & vent pipe location.
- Provide Code 4 lead flashing cut into existing wall and across new roof to porch
- 50 x 100mm C16 wall plate strapped to inner leaf with 30 x 5mm mild steel galvanised straps at least 1m in length at maximum 2m centres as indicated on separate detail sheet.
- Provide roof hatch as required. Double up ceiling joists either side of the roof hatch.

- Internal surface to be 9.5mm plasterboard with integral vapour barrier scrim and skim.

Roof Insulation

Provide 100mm thick Rockwool Roll fibre glass insulation between the ceiling joists and then 200mm thick Rockwool Roll fibreglass insulation placed at right angles to the ceiling joists to give a total thickness of 300mm at level soffits.

Lateral Restraint straps

- Provide Catnic or similar galvanised lateral restraint straps fixed to a minimum of three trusses & floor joists, not less than 30 x 5mm cross section, 150mm cranked end and 1100mm long.
- Position at not more than 2m centres to rafters and all floor joists, which run parallel with extended walls.
- Ensure that cranked end is tight in contact with cavity face of wall inner leaf and is not pointing upwards.
- Fix noggins and packs beneath straps, which span joists/rafters/ties running parallel to wall. Noggins and packs to fit tightly and be not less than three quarters of joist/rafter/tie depth. Notch joists so that straps fit flush with surface. Do not notch rafters/ties.
- Fix straps to joists/rafters/ties with not less than four 50mm x 8 gauge sheradized countersunk screws evenly spread.

Windows

- All windows to match adjoining property in height and style.
- All windows to be fitted with draught-proof seals.
- Units to be provided with ventilation units and safety glazing as indicated in ventilation section of this specification.
- All windows to be fitted with openable lights as indicated on the elevations.
- All opening lights to open to at least 30o.
- Contractor to confirm opening sizes with manufacturer prior to manufacture but opening light must be equal to 1/20th of the floor area of the room in which it is located.
- All new window units to be double glazed units with a sealed 16mm air gap Argon filled using Low E (En = 0.10) glazing (K glass). Note that this is a high specification

for the windows and must be followed to ensure that the Carbon Index rating is satisfactory when works are completed.

- Contractor to confirm structural opening sizes prior to construction of building.
- All first floor bedrooms to be Fire Escape Windows and to have an unobstructed opening of at least 450mm x 750mm for fire escape purposes. Bottom edge of window opening light to be between 800 and 1100mm above finished floor level.
- The total background ventilation required for the dwelling is 40,000mm2. When ordering the windows the manufacturer must be made aware of this requirement and background ventilation should be provided to all windows to ensure that this total is achieved.

External Doors

- All doors to be fitted with draught-proof seals.
- See section on safety glass for glazing requirements.
- Contractor to confirm opening sizes with manufacturer prior to manufacture.
- Glazing to be double glazed units with a sealed 16mm air gap Argon filled using Low E (En = 0.10) glazing (K glass). Note that this is a high specification for the windows and must be followed to ensure that the Carbon Index rating is satisfactory when works are completed.
- Door units to match existing building
- Entrance door to be 932mm wide with a disabled threshold. Ensure door has a minimum clear opening of 775mm.

Ventilation

Background ventilation

To the new dwelling provide a total of 40,000mm2 trickle ventilation with a minimum of 5000mm2 to each habitable room and 2500mm2 to the kitchen, bathroom and toilet.

Opening Lights

Rapid ventilation is provided through openable windows as shown on the plans and elevations with an openable area of at least 1/20th of the floor area and with some part of the opening at least 1.75m above floor level as shown on elevations.

Kitchens

- Rapid ventilation to be provided by either 30 l/sec cooker hood extraction or 60 l/sec extract fan, both terminating externally.
- 2500mm2 background ventilation to be provided

Bathrooms

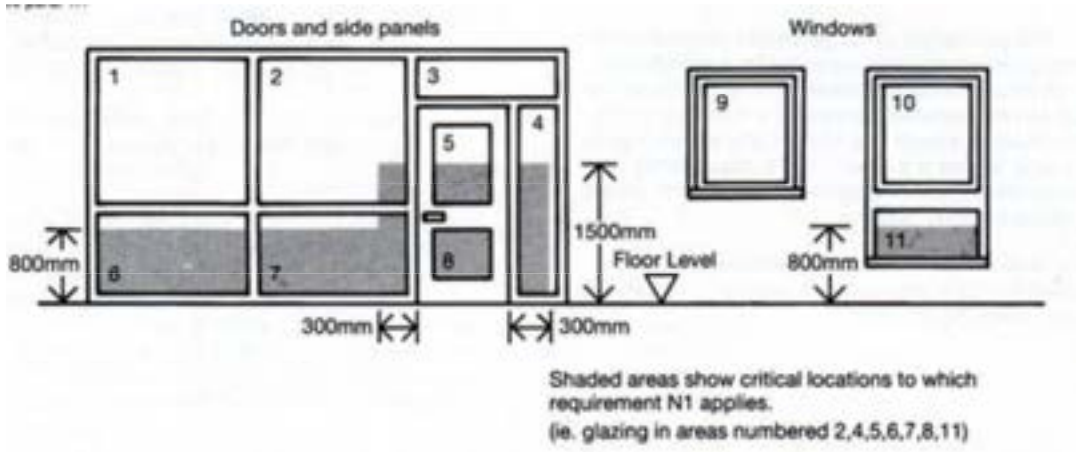
- Rapid ventilation is to be provided by mechanical extract fan capable of extracting at a rate of at least 15 l/sec, which may be operated intermittently and has an over-run period of 15 minutes. Termination should be at roof level through a suitable tile vent or through external walls.
- 2500mm2 background ventilation to be provided

Downstairs W.C s

- Rapid ventilation is provided through openable windows as shown on the plans and elevations with an openable area of at least 1/20th of the floor area and with some part of the opening at least 1.75m above floor level as shown on elevations.
- 2500mm2 background ventilation to be provided

Safety Glazing

- Toughened safety glazing to be provided at areas where glazing occurs less than 800mm above floor level or external ground levels. Also where glazing occurs less than 1500mm above floor level or external ground level within 300mm of any internal or external doors, as indicated on plans and elevations.
- See diagram below for clarification:-



Staircase

- Risers and goings to suit site conditions must fall within all of the following:-

Maximum rise of 220mm

Minimum going of 220mm

Max pitch of 42o

Twice the rise + the going must be between 550 and 700mm

- Goings on tapered treads to be measured at the centre of the tread. A minimum tread width of 50mm is to be maintained at the narrow end.
- Provide a handrail to one side of the staircase.
- Handrail to be at a height of between 900mm measured to the top of the handrail from the pitch line of the stairs. At floor level and landing height of handrail to be 1000mm.
- Handrails to be agreed with client.
- Ensure a minimum 900mm top and bottom landing areas clear of door swings.
- Guarding to open side of stirs and landings to be agreed with client.
- Provide guarding below handrail at open side with a 99mm maximum gap between vertical banisters.
- Ensure a minimum 2000mm headroom over pitch line of stairs and landing areas.

Above ground drainage

General

- Install pipes, fittings and accessories in accordance with BS 5572 so that appliances drain quickly, quietly and completely at all times and discharge is conveyed without cross flow, back fall, leakage or blockage.
- Obtain all components for each type of pipe work from the same manufacturer unless specified otherwise.
- Provide access fittings and rodding eyes as necessary in convenient locations to permit adequate cleaning and testing of pipe work.
- Provide for thermal and building movement when fixing and jointing, and ensure that clearances are not reduced as fixing proceeds. Where not specifies otherwise

use plated, sheradized, galvanised or non-ferrous fastenings, suitable for the purpose and background, and compatible with the material being fixed or fixed to.

- Comply with restrictions on the cutting of holes, chases, notches, etc line with additional supports as necessary at junctions and changes in direction. Fix every length of discharge stack pipe at or close below the socket collar.
- Make changes in direction of pipe runs only where shown on drawings unless otherwise approved.
- Cut ends of pipes to be clean and square with burrs and swarf removed.
- Test upon completion of system, temporarily seal open ends of pipe work with plugs. Connect a U tube water gauge and pump air into pipe work until gauge registers 38mm.
- Allow a period for temperature stabilisation, after which the pressure of 38mm is to be maintained for not less than 3 minutes. Test to be approved by Local Building Control Officer.

WC

- 110mm diameter at a minimum slope of 18mm/m and maximum slope of 90mm/m for pipe work up to 6m in length.

Washbasins

- 32mm diameter pipes at minimum slope of 18mm/m and maximum slope of 22mm/m for pipe work up to 1.7m in length and 40mm diameter pipes at a minimum slope of 18mm/m and maximum slope of 44mm/m for pipe work up to 3m in length and 50mm diameter pipes at a minimum slope of 18mm/m and maximum slope of 44mm/m for pipe work up to 4m in length.

Sinks & Baths

- 40mm diameter pipes at a minimum slope of 18mm/m and maximum slope of 90mm/m for pipe work up to 3m in length and 50mm diameter pipes at a minimum slope of 18mm/m and maximum slope of 44mm/m for pipe work up to 4m in length.
- Washbasin to be fitted with Marley Monitor ant-siphon bottle trap, fitted with cleaning eye.
- Rodding points to be provided to all discharge pipes, which can not be reached by removing traps. Ensure adequate access is provided to all cleaning eyes and rodding points. Provide branch connections to soil pipes connecting to stub stack. All pipe work to be installed to comply with manufacturer s instructions and recommendations.

Traps

- Traps to Washbasins, Sinks and urinal to be 75mm deep and WC to be 50mm.Soil and Vent Pipe
- All above ground waste and soil drainage shall be constructed of upvc by Marley Extrusions or similar to comply with BS 5572:1978.
- Constructed of 100mm diameter upvc by Marley Extrusions or similar to comply with BS 5572. Boxed in within building with 12.5mm plasterboard and skimmed with 5mm plaster, fixed on timber grounds. Screw on access to be provided as necessary to comply with current regulations and recommendations.
- SVP to be taken up between rafters and to terminate minimum 900mm above roof lights or window opening. Provide Code 4 lead flashing to svp passing through roof and seal with roof felt to provide waterproof seal.
- SVP to be fitted with upvc cage at termination level.

Stub Stack (where provided)

- Constructed of 100mm diameter upvc by Marley Extrusions or similar to comply with BS 5572. Boxed in within building with 12.5mm plasterboard and skimmed with 5mm plaster, fixed on timber grounds. Screw on access to be provided as necessary to comply with current regulations and recommendations.
- Stub stacks to be fitted with certified Air Admittance Valves, Durgo or similar. Valves to be fitted in a vertical position above the flood level of the highest sanitary appliance. Fit the manufacturer s insulating cover in unheated locations and locate within a non-habitable space e.g. duct or roof space.

Below Ground Drainage

General

- Refer to site plan for details. The drainage layout is to be deemed provisional until the exact layout is known on site following the excavations for the foundations. An alternative drainage layout may be possible.
- All existing drainage runs are to checked to see if they carry foul or surface water.
- New foul drainage to connect to existing foul sewer.
- Connect new manhole on line of existing sewer.

- Any that are less than 1200mm deep may be constructed using 450mmdiameter preformed plastic manholes.
- Drainage runs constructed of Osma UPVC or similar 100mm diameter pipes with flexible joints. Pipes at a minimum 1:40 fall on minimum 100mmgranular bed in single size pea grave or aggregate to BS 982 nominal size10mm. After testing backfill with selected material free from vegetable matter, rubbish, frozen soil, stones and lumps retained by a 40mm sieve. Lay and compact in layers not exceeding 150mm.
- Provide lintel or sleeve protection to drains passing through walls and foundations and leave a minimum 50mm clear space around pipe. Ensure space around pipe is masked with rigid sheeting.
- Allow for differential settlement at all manholes by way of an extra flexiblejoint.

Inspection Chambers

Plastic

- 450mm diameter pre-formed plastic inspection chamber and benching by Osma or similar.
- Provide 150mm concrete bed and surround to Inspection Chambers.
- Make pipe work connections as indicated on drawing and provide stop caps to unused branches.
- The maximum depth of Inspection Chamber to be 1200mm.
- Manholes and Inspection chamber Covers
- Any internal manholes to be fitted with screw down air tight covers.
- All covers to be grade A in Parking Areas and grade B in other locations.
- Ensure inspection chambers have a minimum clear opening of 450 x 450mm.

Surface Water

The surface water is to connect into the existing surface water systems, the general drainage notes for the foul water system will apply with respect to manholes and pipes.

Refuse Storage

- A 1.2m x 1.2m area is to be set aside within the gardens for refuse storage.
- It must be sited within 25m of the Local Authority Collection point, must notinterfere with pedestrian or vehicle access and be away from any windows andventilators. It should preferably be sited in a shady area.

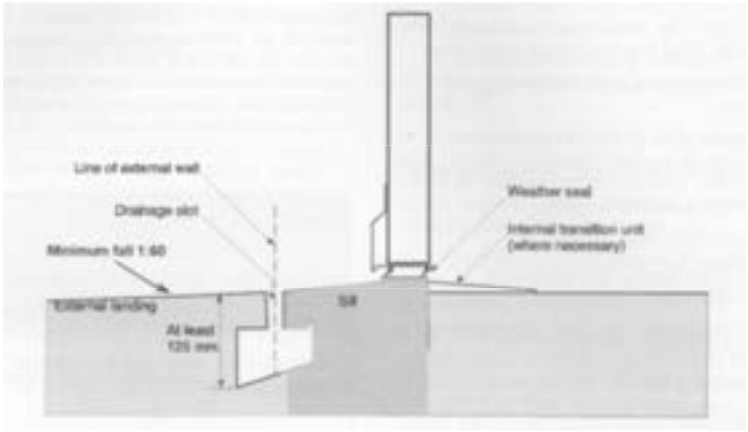
Fire Alarms

- Provide smoke alarms in the downstairs hallway and first floor landing.
- Alarms to be 300mm from walls and light fittings and not located over heaters.
- Alarms to be mains powered with a battery back up and separately fused at distribution board and conform to BS 5446.
- Alarms to be interconnected within the building.
- Ensure system compliance with BS 7671 (The IEE Wiring Regulations).
- Smoke alarms to be placed within 7.5m of all doors to habitable rooms.

Access to and within the dwelling

Entrance Door

- The entrance door must give a clear opening width of at least 775mm. This is taken from the face of the door stop on the latch side to the face of the door when open at 90o.
- A level accessible threshold must be provided as illustrated below.



Ramped Approach

- A 900mm wide ramped approach leading to this threshold must be provided. Its surface must be firm and even at a gradient of 1:12 or if its length exceeds 5m the gradient should be 1:15.
- Landings equal to 1200mm must be provided at the top and bottom of the ramp.
- If the ramp exceeds 10m in length 1200mm long intermediate landings mustbe provided.

Internal Doors

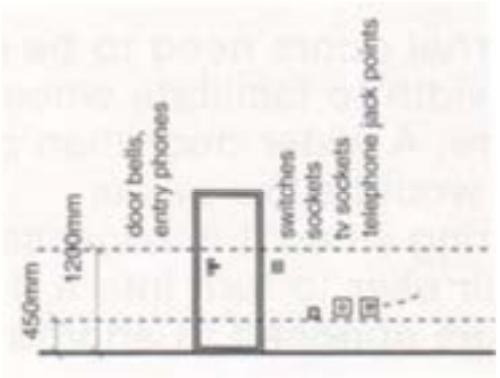
The internal doors to the ground floor should give a clear opening width of 800mm.

This is essential because of the internal lobby arrangement.

There is no minimum width for the doors on the first floor.

Accessible switches and socket outlets

This applies on both the ground and first floor. They must be located in accordance with the following diagram:-



Electrical Installation

Generally

- Types and positions of fittings to be agreed with contractor s installer and Client.
- Lighting and power to be separately controlled circuits as follows with further subdivision where necessary to ensure compliance with BS 7671 (The IEE Wiring Regulations).
- Liaise with the Electrical Supply Company as necessary to ensure suitability of supply and earthing arrangement, and to ensure connection when required.
- Install, test and commission the electrical work in accordance with BS 7671 (The IEE Wiring Regulations) and requirements of the Electricity Supply Company to provide a safe, well insulated, earth protected system capable of supplying the anticipated maximum demand.
- All installations to be tested to BS 7671 (The IEE Wiring Regulations: Part 7) and after satisfactory completion of tests two copies of completion certificates to be submitted to the Client. Ensure that labels and signs required by the Regulations are securely fixed in the correct locations.

Energy Efficient Lighting

- Provide a minimum of 33% energy efficient light fittings to the new dwelling.These to be fluorescent tubes and compact fluorescent lamps not GLS tungsten lamps with bayonet cap or Edison screw bases.

External Energy Efficient Lighting

- Ensure all external lighting is energy efficient. These to be fluorescent tubes and compact fluorescent lamps not GLS tungsten lamps with bayonet cap or Edison screw bases.
- Alternatively provide external lighting that does not exceed 150W fitted with automatic daylight shut off device and when it is not required at night.

Position of Units

- All switches and sockets outlets for lighting and other equipment in habitable rooms at appropriate heights between 450mm and 1200mm from finished floor level as indicated in Diagram 29 of Approved Document M. This applies to the new dwelling only.

Part P Requirements

- All electrical work required to meet the requirements of Part P (Electrical Safety) of the Building Regulations must be designed, installed, inspected and tested by a competent contractor.
- Prior to completion, the Local Authority should be satisfied that Part P has been complied with. This may require an approved BS 7671 certificate to be issued for the work by a competent person registered with an electrical self certification scheme authorised by the Secretary of State.

Heating and Hot Water

General

- Provide new hot water and heating system using a gas combination boiler which has a SEDBUK efficiency of 90% or better.

- Any choice of alternative boiler with a reduced SEDBUK rating must be referred back to the building designer for checking. This is VERY IMPORTANT!
- Boiler to be sited with terminal at least 600mm from any opening into the dwelling.
- Ensure all gas appliances and pipe work are installed to comply with current Codes of Practice and British Standards and installed by an Approved Contractor.
- Commissioning Certificate to be provided upon completion.

Hot & Cold Water Supply

- Complete the design and install the systems to comply with BS6700 and be free from leaks and water hammer.
- All installation work to be carried out by qualified operatives.
- Electrical work in connection with the installation must be in accordance with BS 7671 (THE IEE Wiring regulations).
- All locations where moisture is present or may occur, use corrosion resistant fittings/fixings and avoid contact between dissimilar metals by use of suitable washers etc.
- All equipment, pipe work, components, valves etc to be fully accessible for maintenance, repair or replacement.
- Installation to be fitted with vents at high points and draining taps at low points to facilitate purging and draining.
- Provide insulated hot water vessel if required complying with BS 1566 or BS3198.

Low Temperature Hot Water Heating

- Provide fully automatic and independent temperature and time control of the system. Ensure that all controls are compatible with each other and with the central heating boiler.
- Complete the design, install and balance the system so that it complies with the water supply byelaws/regulations, and is safe, efficient, and free from leaks, excessive noise and vibration.
- All installation work to be carried out by qualified operatives.
- Electrical work in connection with the installation must be in accordance with BS 7671 (THE IEE Wiring regulations).
- Comply with restrictions on the cutting of holes, chases, notches etc in floor joists.
- All locations where moisture is present or may occur, use corrosion resistant fittings/fixings and avoid contact between dissimilar metals by use of suitable washers etc.

- All equipment, pipe work, components, valves etc to be fully accessible for maintenance, repair or replacement.
- Installation to be fitted with vents at high points and draining taps at low points to facilitate purging and draining.
- Provide radiators connected to heating system. Location and number of radiators to be agreed with installer.

Services

- Existing services to be diverted as required.
- Extent of existing services to be agreed on site.
- Ensure all new services to be installed comply with current Codes of Practice and British Standards.
- Refer to site layout plan for known approximate lines of existing services.
- Provide BT, Gas, Water and Electric supplies to new dwelling.

Sound Performance

- The specification for the internal floors and walls must be adhered to to ensure adequate sound insulation within the dwelling/extension is achieved.
- Similarly the specification for the party wall must be followed.
- The floor joists have been put onto joist hangers to help reduce sound transmittance across the party wall.
- Any electrical sockets/switches in the party wall should not be back to back as this will affect the sound insulation properties.
- The new cavity party wall should be cut into the existing so that a cavity between the two dwellings is maintained.
- Upon completion it will be necessary to employ a specialist company to undertake a sound test on the property and send a certificate demonstrating compliance to the Building Control Authority. If the result is not satisfactory remedial work will need to be undertaken.
- The works as specified should achieve compliance but there is an unknown factor regarding the existing external wall which will become a party wall. This could mean that some upgrading will be required. It is suggested that this could be carried out in bedroom 2 and the kitchen of the existing building so it is recommended that these walls are not decorated/plastered until the sound test has been undertaken.

Thermal Performance

- The specification for the insulation and heating systems must be adhered to as they are crucial to the CO2 emission rate calculation for the building demonstrating compliance with the Building Regulations. A calculation has been carried out demonstrating compliance but an as built calculation must also be provided following completion and this must also meet the minimum standard.
- If for any reason alternative materials/systems are used they must be referred back to the Building Designer for checking.
- The design details at the end of this specification have been based on the details contained within the Energy Saving trust Document Limiting Thermal Bridging and air leakage and in accordance with the manufacturers details. Care must be taken to ensure that they are adhered to. will be required to provide certification to the Building Control Officer that adequate site inspection of these elements has taken place.
- Upon completion a Pressure Test will need to be undertaken on the dwelling and the results submitted to the Building Control Authority for approval. In the CO2 emission calculation it has been assumed that a result of q50 = 8 will be achieved.
- The owner of the building and the Building Control Authority are to be provided with commissioning certificates for the heating and hot water systems.
- The owner of the building is to be provided with a suitable set of operating and maintenance instructions for the building services. These will need to include details for the timing and temperature setting controls and any routine maintenance required.
- A copy of the energy rating for the building is to fixed in a conspicuous place within the dwelling.

Concrete Floors, Slabs

Ground Floor Slab Types

1. Solid Floating Concrete Ground Floor Slab

A solid floating concrete ground floor slab should only be used if the depth of granular fill is less than 900mm.

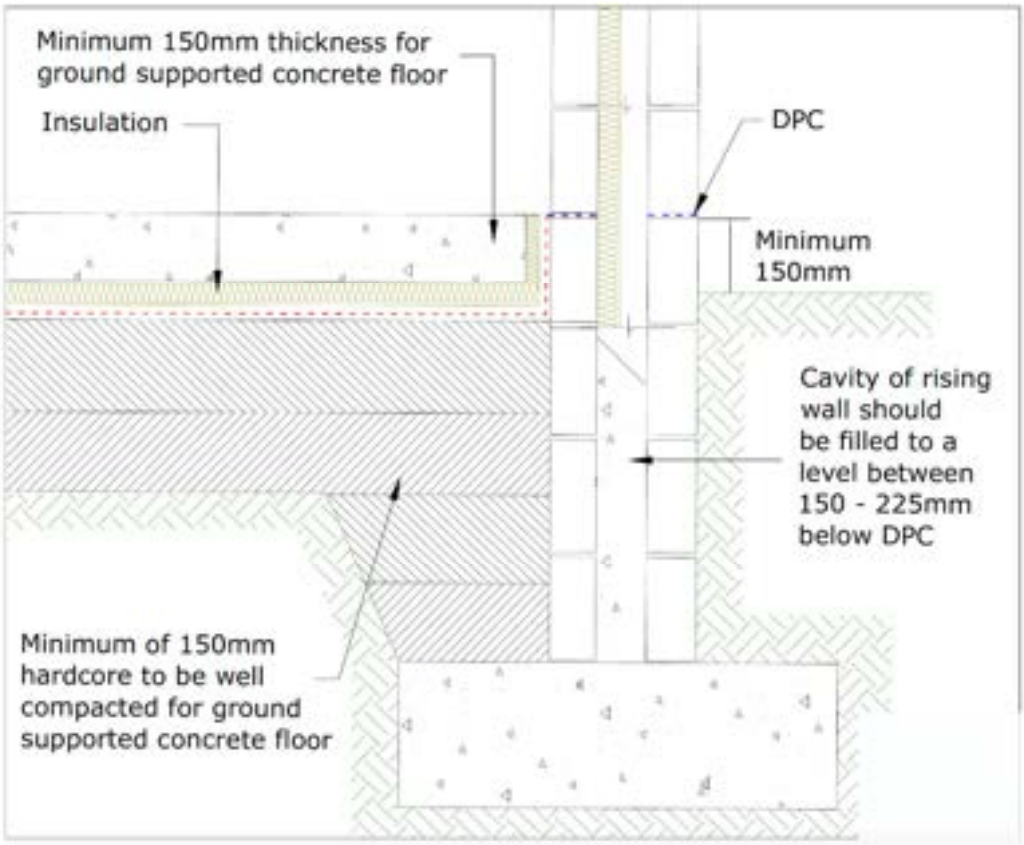


Diagram B51 - Typical detail of solid floating concrete ground floor slab

2. Cast In-Situ Suspended Ground Floor Slab.

Where the depth of granular fill is greater than 900mm a solid floating concrete ground floor slab should be used. Cast in-situ suspended ground floor slabs should only be used in situations where settlement of ground under its own weight is unlikely. If a gap was to form it would create a risk of explosive gas mixtures accumulating under the floor.

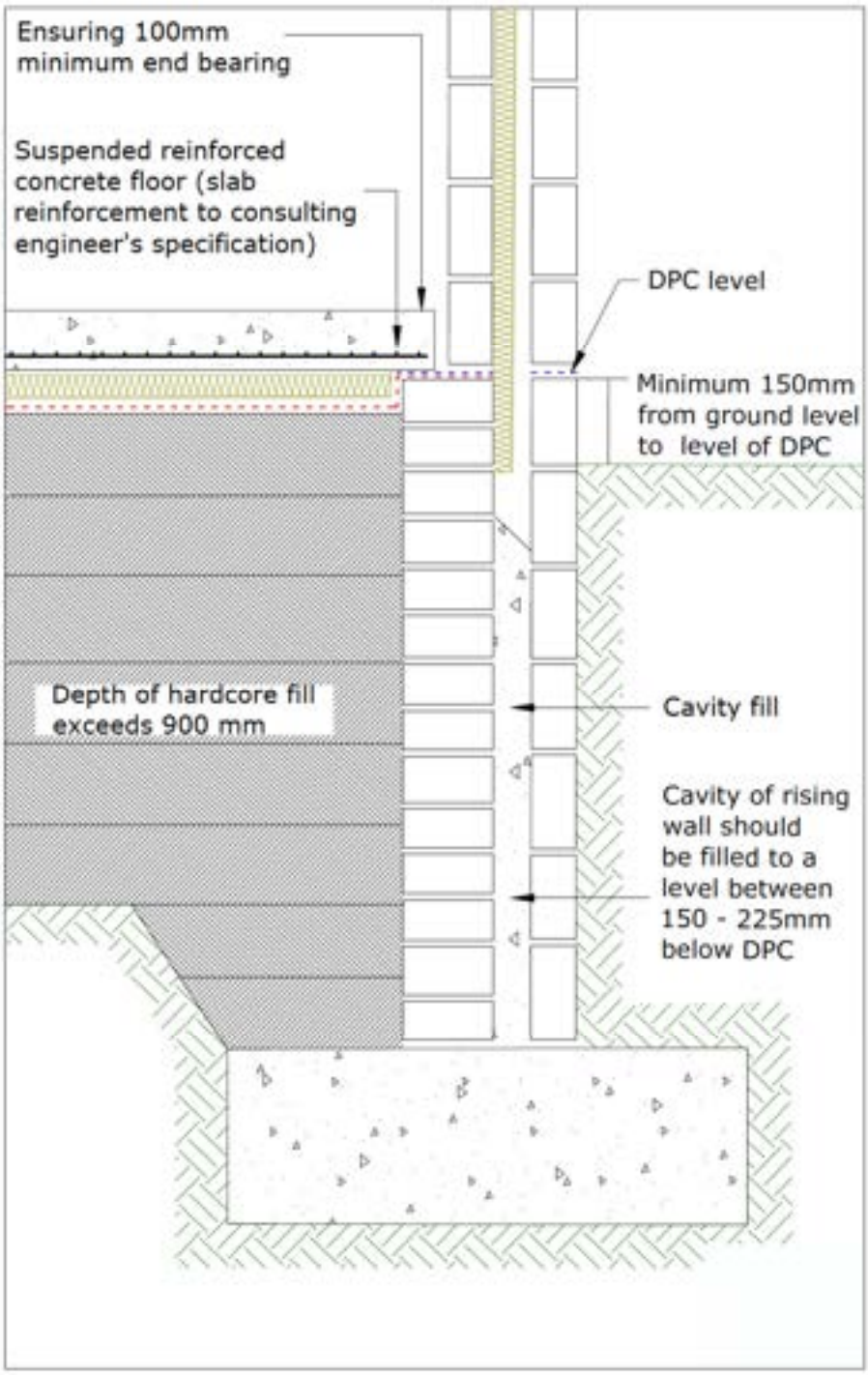


Diagram B52 - Typical external wall detail for a cast insitu suspended floor slab

Cast In-Situ Suspended Floor Slab Party Wall Detail

Where a suspended floor slab runs over a party wall, reinforcement should be placed in the top of the slab to reduce the risk of cracking.

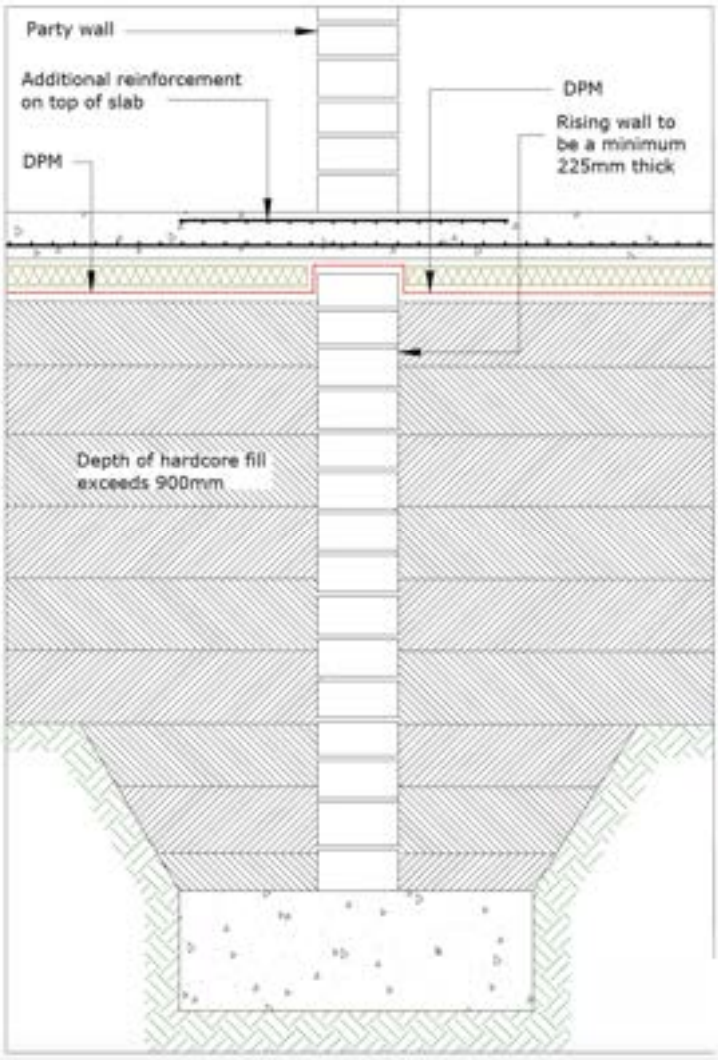


Diagram B53 - Typical party wall detail for a cast insitu suspended floor slab

Explosive Gas Mixtures in Underfloor Voids:

In underfloor voids there is a risk of explosive gas mixtures accumulating.
Gas may occur where:

1. The site on which building takes place is contaminated or reclaimed land, or
2. Gas pipes are present in the vicinity of, or under the building area and the floor slabs are constructed clear of the ground, or where an underfloor void may occur due to settlement of ground.

For the cases outlined above, a ventilated air space no less than 150mm should be provided between the ground and the underside of the floor or insulation (if provided).

It is important to provide perimeter ventilation together with the ventilated air space detailed above to ensure adequate underfloor ventilation is achieved.
In all instances it is important to ensure that the ground floor level outside is lower than the top of the subfloor level to ensure a sump effect situation is avoided.

Problems Associated with Concrete Ground Floors

Failure in concrete floors has been identified as quite a large problem. Failure can generally be put down to one or more of the following: poor materials, poor workmanship or bad design. To prevent the need for expensive and possibly disruptive repairs at a later stage, care should be exercised at each of these stages. Good practice guidelines to avoid these problems are as follows:

1. Strip Existing Ground Appropriately

Ensure existing ground is stripped to a suitable bearing. Before work starts it is critical that all top soil and vegetation is stripped from the entire area of the building. Leaving mounds of soft earth between the foundation trenches is not recommended as it increases the risk of it not being removed before filling the area with layers of granular fill begins. It is important that granular fill is placed on solid, clean and good bearing ground.

2. Granular Fill Appropriate for Purpose Should be Used.

3. Use Vibro Roller to Compact Layers of Granular Fill.

Layers must be less than 225mm and greater than 150mm. Each layer should be compacted after being placed by a whacker plate or a vibro roller. If care is taken at this stage the risk of failure will be reduced.

4. Granular Fill Material Should not be Used if the Depth to Fill is More Than 900mm.

A suspended concrete floor is less liable to fail and should be used in this case.

5. Blinding of Granular Fill Material.

Blinding should not be required if each layer of granular fill has been well compacted. Blinding should be raked to ensure that sharp points left after the vibro roller are covered, once completed, DPM can be laid on the blinding.

6. Use 1200 Gauge Polythene as DPM

It is important that the DPM is not damaged by traffic when slab is being poured as the purpose of DPM is to stop rising damp. Virgin material should only be used and material described as ‘heavy duty’ or ‘C1200’ should be avoided. Virgin material used should comply with the requirements of I.S. EN 13967.

7. Make Sure There is a Lap Between DPC & DPM

A continuous barrier must be formed by the DPC and DPM to prevent the penetration of moisture from the ground below. Construction of walls prior to laying polythene DPM and pouring the floor slab is incorrect as it does not allow a proper lap to be formed between the DPM and DPC.

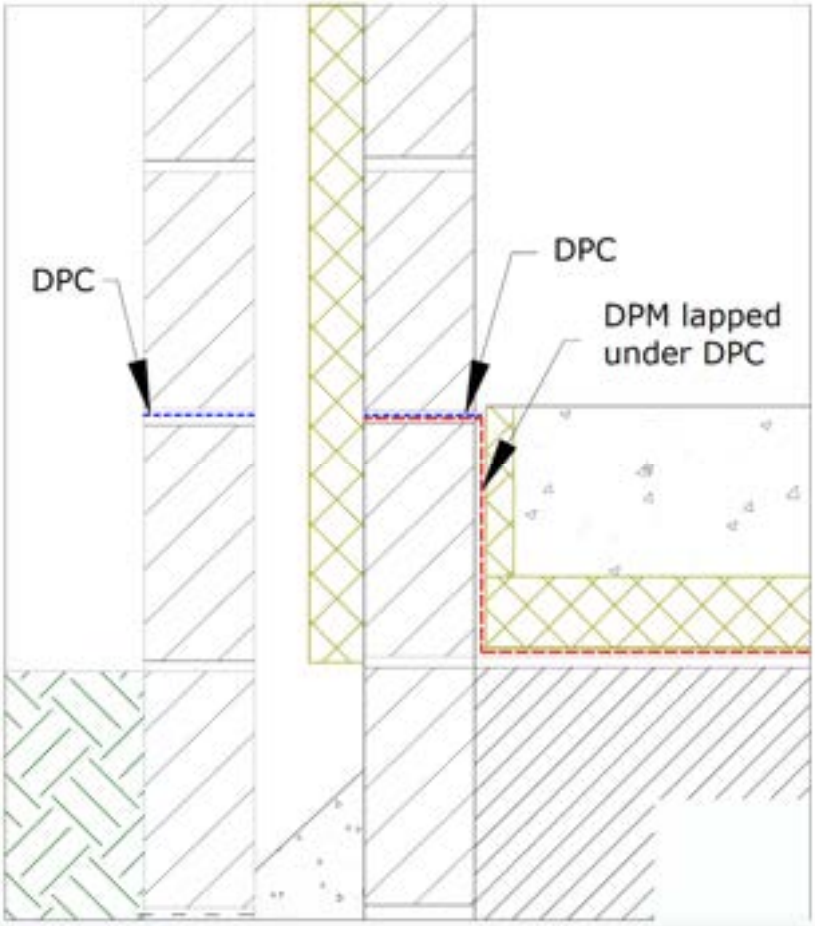


Diagram B54 - Example of correct lap between DPC and DPM

8. Must Not Bear on the Floor Slab.

All blockwork or load bearing stud partitions and rising walls should have foundations as floor slabs are generally not designed or constructed to carry loads such as those from chimney breasts, piers, walls and load bearing stud partitions.

9. Be Careful when Providing Insulation.

Insulation must be provided underneath the full floor area, the amount of insulation to be provided will be dependant on a number of project specific elements such as:

- The type of insulation being used and its properties.
- The required U-value that must be achieved.
- The ratio between the area of the floor and its perimeter etc.

A thermal bridge can occur where two construction elements meet, for example where the floor and wall meet. Thermal bridging can have a large effect on the

overall efficiency of a dwelling and as a result insulation must be carefully detailed and installed at such junctions. A number of methods on how compliance with this aspect of the regulations can be achieved are found in Technical Guidance Document L of the Building Regulations. One method outlined in the text is the use of Acceptable Construction Details (ACDs).

10. Care Should be Taken to Ensure the Risk of Cracking is Avoided.

In hot weather, it is necessary when laying concrete floor slabs to ensure that they are protected from direct sunlight and are kept cool. This will prevent cracking due to drying too quickly.

By including perimeter insulation at the floor/wall junction thermal bridging will be minimised.

Slab Failure Prevention

- All top soil and vegetable matter should be removed from the site.
- Granular fill material should be compacted in layers.
- It is important to ensure an appropriate granular fill material is used.
- Deep fill should not be used.
- Blind the granular fill material.
- A 1200 gauge DPM or radon barrier should be used where required.
- The DPM should be places and the slab should be poured when the walls are at DPC height.
- Walls should never be built directly off the slab; they must have foundations.
- Insulation must be provided under their entire area to ensure compliance with the Building Regulations is achieved.
- For rafts, DPM and screed must be on top of raft and screed must be at least 65 mm thick. It is advisable to incorporate a light mesh within the raft for reinforcement.

Reinforcement to Suspended Floor Slabs

There is a range of reinforcement mesh available, mesh can either be prefixed by the letters A, B or C. For each prefix there are a range of diameters available. Type A mesh consists of 200mm by 200mm squares, the standard range of type a meshes is A98 to A393. Type B mesh consists of 200mm by 100mm squares with the main reinforcement at 100mm centres and cross reinforcement at 200mm centres; the standard range of type a meshes is B196 to B1131. Type C mesh consists of 400mm by 100mm squares with the main reinforcement at 100mm centres and cross reinforcement at 400mm centres; the standard range of type a meshes is C283 to C785.

Due to the risk of explosive gas accumulating under a suspended floor due to settlement of ground under its own weight, Technical Guidance Document C of

the Building Regulations recommends that suspended floors only be used in situations where it is unlikely that settlement will occur.

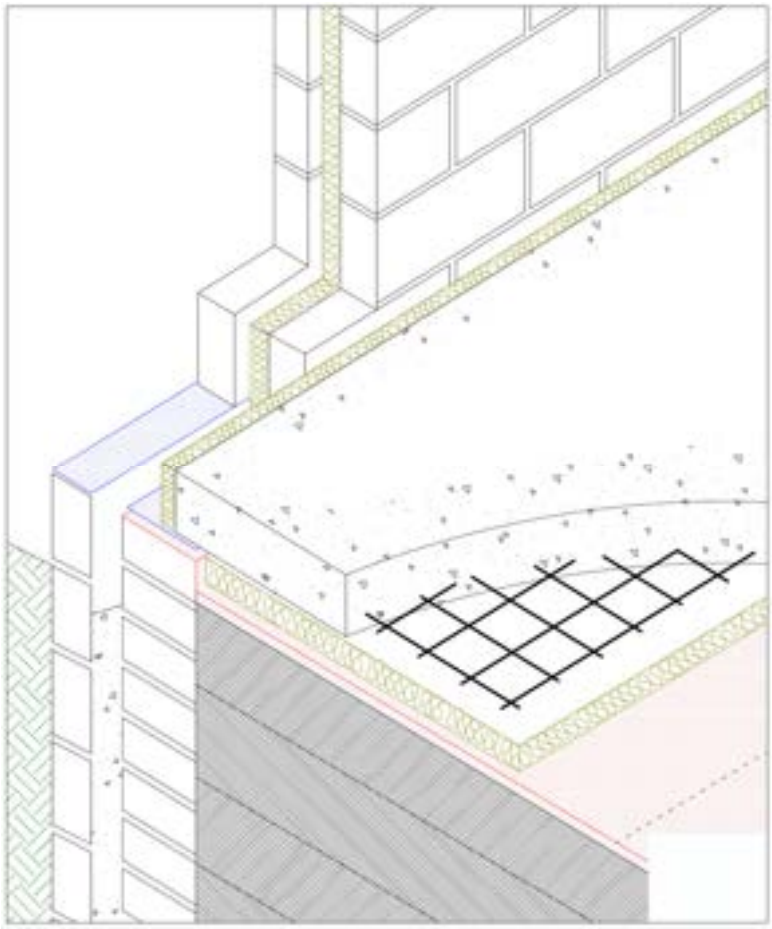


Diagram B55 - Typical suspended ground floor slab - reinforced concrete

Slab Depths & Reinforcement Mesh Types for Typical Domestic Ground Floor Spans

The table below shows the appropriate slab depths and reinforcement mesh types for typical domestic ground floor spans. Assumption: no internal partitions bear on the slab. Main bars to run in direction of span and mesh should be placed with main bars below secondary bars. Nominal cover of 25mm should be provided between the underside of the slab and the main bars. Concrete mix should be 30N20. Supporting rising walls and slab bearing should be at least 100mm.

Max. Slab clear span (m)	Slab Depth (mm)	Reinforcement
3	150	B283 mesh
3.3	150	B385 mesh
4	175	B503 mesh
4.4	200	B503 mesh

Table B5 - Appropriate slab depths and reinforcement mesh types for typical domestic ground floor slabs

Reinforcing Steel Bar Equivalents

The table below lists the reinforcing steel bar equivalents which may be used as an alternative to B meshes. Main bars should be located below the secondary bars and run in direction of span. Bars should be tied at intersections. Assumption: no internal partitions bear on the slab. Concrete cover and strength is the same as above.

Max. Slab clear span (m)	Slab Depth (mm)	Reinforcement	
		Main Bars	Secondray Bars
3.0	150	T10 @ 250mm centres	x T10 @ 450 mm centres
3.3	150	T10 @ 250mm centres	x T10 @ 450 mm centres
4.0	175	T10 @ 150mm centres	x T10 @ 300 mm centres
4.4	200	T10 @ 150mm centres	x T10 @ 300 mm centres

Table B6 - Reinforcing steel bar equivalents to be used as an alternative to meshes T denotes high yield steel.

Alternative Bearing Detail for Suspended Floor Slabs

Shown below is an alternative bearing detail for suspended floor slabs. Additional reinforcement can be placed in the top of the slab at the leading edges and especially in corners to reduce the risk of cracking.

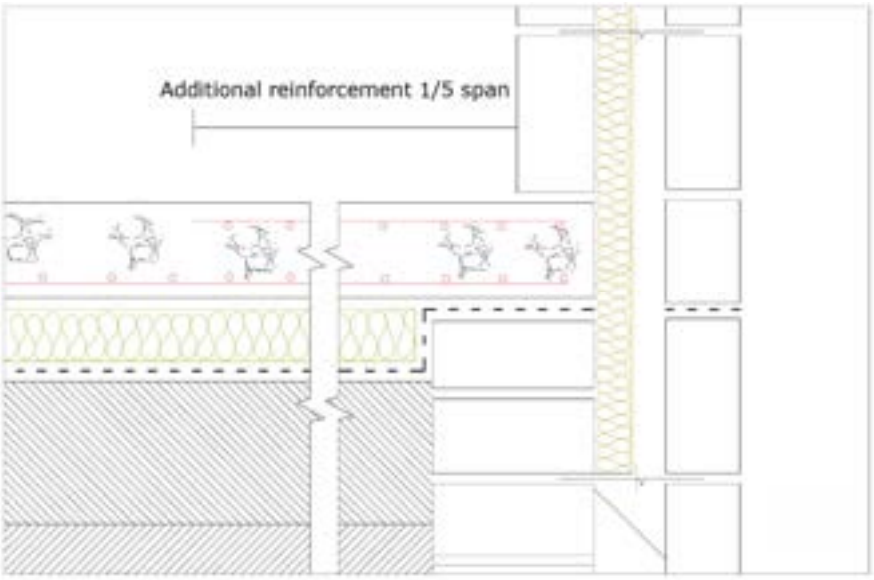


Diagram B56 - Typical edge reinforcement

Continuous slabs over a wall should be provided with additional reinforcement to ensure a reduction in the risk of cracking occuring.

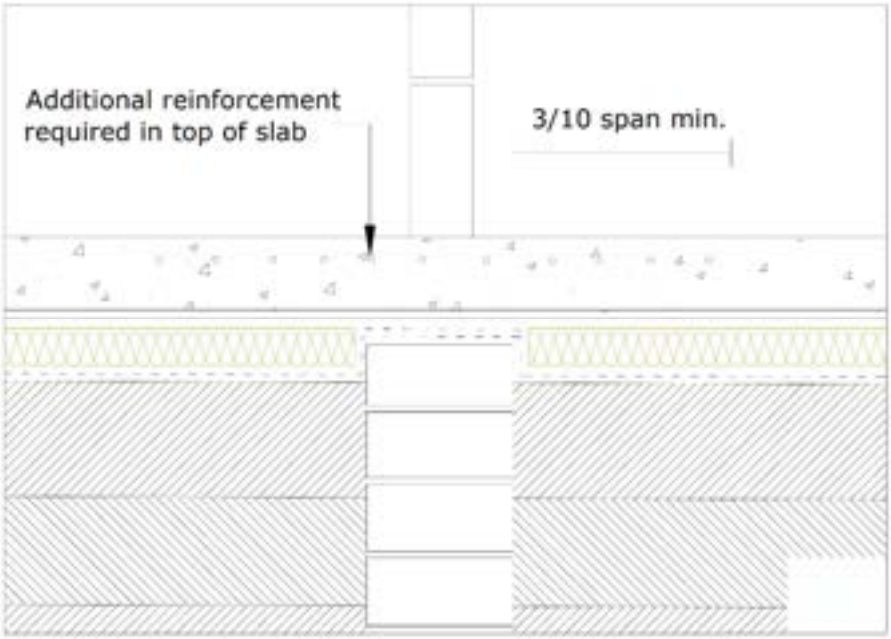


Diagram B57 - Typical slab detail continuous over a wall

It should be noted that it is only permitted to form pipe recesses in the perimeter of slabs.

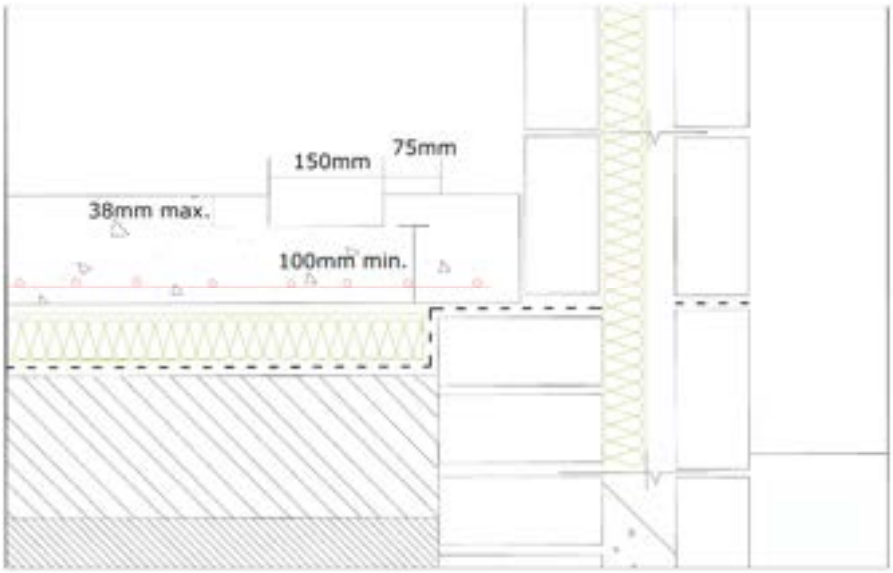


Diagram B58 - Typical detail for pipe recesses

Precast Concrete Floors

A variety of precast concrete floor systems are available for use in suspended floor construction at ground level or above. These systems serve as an alternative to using suspended in-situ concrete floor slabs or suspended timber floors. Precast concrete floors can be categorised, albeit generally, as follows:

1. Hollow slab.
2. Beam and block.
3. Precast plank or pre-stressed plate with in-situ concrete topping (infill blocks or void formers may or may not be included).

Examples of precast concrete floor types are illustrated below. It should be noted that no particular manufacturer's products are represented; illustrations are intended to give an indication as to the range available. Depending on the specific products to be used there may be variations to these details. Manufacturers details should be adhered to.

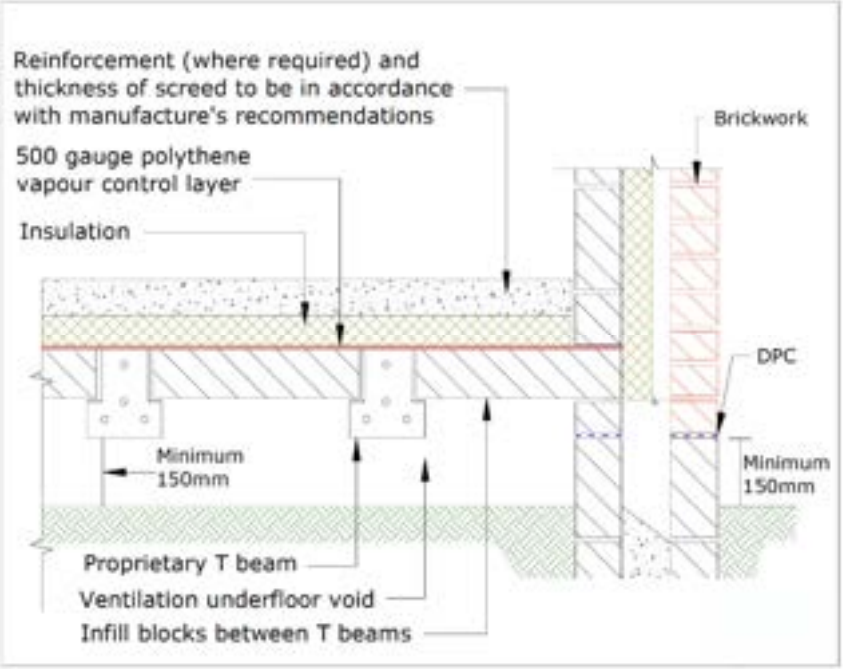


Diagram B59 - Block and beam floor typical detail

Key Installation Points

For systems of the types detailed above, close attention should be paid to the following aspects of installation when following the manufacturer's detailed recommendations:

- The span to be covered and the supports, propping may be required in some systems.
- DPC location.
- What happens when point loads are imposed such as partitions?
- Is reinforcement required for screeds?
- Screeding or grouting requirements.
- Insulation. The location, amount and method used to install the insulation to ensure cold bridging is avoided and it meets Building Regulations requirements.
- Where required, installation details of the radon membrane.