

9.0 Installation

There are three typical methods of installing single-storey and two-storey Litecrete wall panels in conjunction with concrete floor slabs:

Option 1: Panels sit on concrete footings below the floor level, prior to the floor slab being poured. The Litecrete wall panels are manufactured with one or two rows of cast-in steel reinforcing starter bars, at centres as designed by the engineer. The protruding starter bars are bent to vertical for shipping. The panels are positioned on concrete footings, the starter bars are bent back to horizontal and the concrete floor slab is poured. See detail *R(3)1 Panel/Floor Slab Connection*. While single-storey walls are usually trucked standing up, panels over 3 metres high are delivered sitting on their long edge and require pitching to the vertical during the lifting process using rollers attached to the crane boom.

Option 2: Panels sit in a rebate in the floor slab and are attached using Drossbach tubes. The wall panels are manufactured with cast-in 40 mm diameter Drossbach tubes, 800-900 mm high, typically at 600 mm (design by structural engineer). These tubes fit over D12 starter bars which have previously been cast-in to a 230 mm wide x 50 mm deep perimeter rebate when the floor slab is poured, prior to the panels arriving on site. See detail *R(3)2 Panel/Floor Slab Connection*. Once the panels are installed and properly aligned the tubes are filled with epoxy grout from holes on the internal face. The grout holes are plastered over after filling.

Option 3: Panels sit on concrete footings below the floor level, prior to the floor slab being poured. The Litecrete wall panels are manufactured with one or two rows of cast-in Reid brand RB12tiS steel inserts at the bottom of the panel, at centres as designed by the engineer. The panels are positioned on concrete footings, Reid brand RB12 starter bars are screwed into the inserts and the concrete floor slab is poured. See detail *R(3)3 Panel/Floor Slab Connection*. While single-storey walls are usually trucked standing up, panels over 3 metres high are delivered sitting on their long edge and require pitching to the vertical during the lifting process using rollers attached to the crane boom. Before beginning panel installation, at least the day before the delivery truck arrives, mark chalk lines on the footings (or on the perimeter or the floor slab rebate for Drossbach tube connections) to show correct alignment positions for the panels. Also, mark lines for the internal Litecrete walls if applicable. Spray chalk-lines with clear polyurethane so that they do not scuff or wash off. Perimeter levels should be determined and shims placed prior panel installation. The first panel is usually installed at a corner furthest away from the crane. Photos at right show the three options.



Option 1: bent starter bars



Option 2: Starters for Drossbach connection



Option 3: Reid cast-in steel inserts

9.1 Installation using cast-in starter bars

- 9.1.1 Footings are poured to engineer's design to support the Litecrete panels, nominally 400 mm below the floor level.
- 9.1.2 Levels for the footings should be determined and shims placed in position prior to the panels being installed.
- 9.1.3 Lift panel and position in place on top of the footings. Align panel and attach adjustable props with a threaded bolt attached to the cast-in inserts on the internal/external panel face and secure to (a) "dead men" in the ground outside the perimeter of the floor slab or (b) prop off other panels already secured.
- 9.1.4 Adjust props until panel is plumb. Apply same procedure to the other external wall panels, working progressively around the foundation perimeter. See detail *R(3)1 Panel/Floor Slab Connection*. Props should not obstruct the pouring of the floor slab.
- 9.1.5 Ensure that nominal 12 mm vertical gaps are left between each panel.
- 9.1.6 Re-bend starter bars back to horizontal orientation. The panels are now ready for pouring of the floor slab. When the timber top plates are in place and weld plates are secured the props can be removed.

9.2 Installation using Drossbach Tubes

- 9.2.1 The floor slab is poured with a 20 mm deep rebate set around the perimeter slightly wider than the specified width of the panel. Starters are cast-in to the perimeter rebate at nominated centres. The base of the rebate must be level to within +/- 5mm in 5m.

- 9.2.2 Position the panel correctly on the shims, with the inside edge of the panel sitting on the chalk-line and the outside panel edge flush with the outer edge of the foundation. Panels are manufactured with cast-in Drossbach tubes (which are typically 3 x diameter of the starter bars) positioned at centres nominated by the engineer. These tubes fit over the starter bars, which are cast into the slab and extend 600 mm above the slab.
- 9.2.3 Panels are lifted into position, ensuring the starter bars in the slab are guided into the Drossbach tubes in the panel. See detail *R(3)2 Panel/Floor Slab Connection*.
- 9.2.4 Fix adjustable props to upright panel with a threaded bolt attached to the cast-in temporary propping inserts on the panel face (where provided) and to the floor slab using expansion bolts. If the floor slab is to have a polished surface, props should be attached to the external panel face and secured to “dead men” in the ground outside the perimeter of the floor slab. Adjust props until panel is plumb. Epoxy grout is gravity-fed into the tubes through grout holes after the panels are fully aligned. Apply same procedure to the other external wall panels, working progressively around foundation perimeter
- 9.2.5 Ensure that nominal 12 mm vertical gaps are left between each panel. Install lintels, if necessary.
- 9.2.6 When the timber top plates are in place, weld plates are secured and the panel joints are sealed both sides, the props can be removed. Dry pack the gap between bottom of the panels and the slab with mortar. Plaster grout holes.

9.3 Installation using Reid Screw-In Starter Bars

- 9.3.1 Footings are poured to engineer’s design to support the Litecrete panels, nominally 400 mm below the floor level.
- 9.3.2 Levels for the footings should be determined and shims placed in position prior to the panels being installed.
- 9.3.3 Lift panel and position in place on top of the footings. Align panel and attach adjustable props with a threaded bolt attached to the cast-in inserts on the internal/external panel face and secure to (a) “dead men” in the ground outside the perimeter of the floor slab or (b) prop off other panels already secured.
- 9.3.4 Adjust props until panel is plumb. Apply same procedure to the other external wall panels, working progressively around the foundation perimeter. See detail *R(3)3 Panel/Floor Slab Connection*. Props should not obstruct the pouring of the floor slab.
- 9.3.5 Ensure that nominal 12 mm vertical gaps are left between each panel. Screw RB12 starters into cast-in Reid RB12TIS (steel) inserts at the bottom of the panels. *The panels are now ready for pouring of the floor slab.* When the timber top plates are in place and weld plates are secured the temporary props can be removed.

9.4 Installing Litecrete Panels on top of Retaining Walls

Litecrete panels can be stacked on top of standard precast or masonry retaining walls. A typical connection is shown in detail *R3(4) Panel to Masonry Connection*. This detail can also be used where Litecrete panels stack on to standard precast.

9.5 Installing Suspended First Floor Walls

Some houses are designed with first storey Litecrete walls inset from the vertical line of the ground floor walls. A steel beam is required to support the weight of the Litecrete, as shown in detail *R17 Suspended First Floor Wall Panel Installation*.

9.6 Installing Internal Litecrete Walls (if applicable)

As Litecrete internal wall panels are not required to be insulated, a 150 mm panel thickness is suitable. The panels can be installed using either Drossbach tubes – as for external walls; see detail *R3(7) Typical Internal Wall/Floor Slab Connection*, or sitting on purpose-built footings in the ground prior to the floor slab being poured, see detail *R3(6) Typical Internal Wall/Floor Slab Connection*. In detail *R3(7)* the starter bars may be (a) cast-in to the floor slab when it is poured prior, or (b) installed by drilling into the slab using Chemset adhesive, 24 hours prior to panel arrival.

9.7 Installing Weatherboards

Designer will sometimes specify weatherboards as a feature, maybe on a particular elevation, to be fixed over Litecrete panels. For this application we can cast-in vertical H3 treated timber fillets at 600 mm centres which provide fixing for horizontal battens to which the weatherboards are nailed (see detail *R22 Cast-in Timber Fillet for Weatherboard Attachment*).

9.8 Supplementary External Cladding

Additional exterior cladding systems, such as brick or stone veneer, can be attached to Litecrete exterior wall panels to create feature walls.

9.9 Litecrete/Weatherboard Transition

Vertical connection of typical weatherboards butting up to Litecrete. See detail *R10(1) Panel to Weatherboard Connection*.

9.10 Litecrete/Fibre-cement Transition

Vertical connection showing fibre-cement panels butting up to Litecrete. See detail *R10(2) Panel to Fibre-cement Board Connection*.



Thin stone veneers glued to Litecrete panel surface

9.11 Litecrete/Brick Veneer Transition

Vertical connection of brick veneer butting up to Litecrete. See detail *R10(3) Panel to Brick Veneer Connection*.

9.12 External Plant-Ons

There are proprietary products available, which can be attached to the exterior surfaces of Litecrete walls to replicate classic architectural styles with features such as windowsills, quoins, cornices and mouldings. These can be manufactured from lightweight concrete, expanded polystyrene or plaster and attached according to manufactures' recommendations (see www.accumen.co.nz).

9.13 Timber/Ply Mid-floor Installation

Attach continuous ex 200 x 50 timber joists to wall using Ramset M12 Chemset Anchors at 800 mm centres. See detail *R8 Litecrete Wall/Timber Floor Connection*.

9.14 Insitu Concrete Mid-floor Installation

Attach continuous steel supporting bracket to wall, to engineer's design, using Ramset M16 Chemset Anchors at centres as specified by the engineer. For an example of an insitu concrete system see detail *R8(1) Litecrete Wall/Insitu Concrete (Metal Tray System) Floor Connection*.

9.15 Wall Panel/Floor/Deck Connection

See detail *R3(5) Typical Wall Panel/Floor/Deck Connection*.

9.16 Door and Window Openings

Litecrete wall panels will have openings for windows and doors cast-in during manufacture. A weatherstrip is created at the window head and a sloping sill at the bottom (see detail *R5 Litecrete Window Details*). Residential windows are installed as per recommendations of the Window Manufacturers' Association with regard to precast concrete (see detail *R6 Window Installation - double glazing*).

9.17 Ventilation Grilles

Where a suspended ground floor is designed, say 600 mm above the ground level, the cavity space underneath requires ventilation. Cast-in openings can be provided through the Litecrete panels for the installation of proprietary concrete or metal vermin-proof grilles (see detail *R21 Typical Ventilation Grille Opening*).

9.18 Internal timber-framed walls

Internal timber frame walls adjoining Litecrete exterior or interior wall panels are connected by fixing the vertical end stud against the Litecrete wall panel using chemical anchors (see detail *R9 Litecrete Wall/Timber Frame Connection*).

9.19 Parapet Wall and Flush Fascia Details

See details *R11 Litecrete Parapet Wall* and detail *R12 Litecrete Flush Fascia*

9.20 Wall/Roof (Apron Flashing)

See detail *R13 Litecrete Wall/Roof Junction*.

9.21 Gutter/Wall Junction

See detail *R14 Litecrete Gutter/Wall Junction*.

9.22 Meter Box Installation

See detail *R15 Litecrete Meter box Installation*.

9.23 Attaching Top Plates

Fixings for all structural and non-structural fittings, where applicable, should be embedded in the Litecrete panels during manufacture. Threaded rods for the attachment of a 50 mm thick timber top plate (if required) should extend 75 mm out of the top of the panel (see detail *R4 Litecrete Wall/Roof Connection*).

9.24 Services and Wall Penetrations

In some instances, through-services such as plumbing and electrical, are required to penetrate through Litecrete panels. The advantage of precast panels is that openings can be cast in at the time of manufacture. For smaller service holes the Litecrete panels can be easily drilled out on site. Care should be taken when drilling to avoid hitting reinforcing bars. Note that the maximum allowable non-specific dimension of such openings is 400 mm x 400 mm. See detail *R16 Litecrete Pipe Penetrations*.

10.0 External & Internal Finishing

10.1 External plaster and coatings

The smooth exterior surface of the panel (F5) is produced off a steel casting bed. This means that once installed the panels are ready to be painted. In this instance the V-joints between the panels are "expressed" and become a feature. If a plaster finish is specified to hide the joints, they would be filled in and treated as "control joints" - to cope with any seismic movement - (see *detail R18*). However, any paint or plaster system should be of the vapour-permeable variety. We recommend systems that have been BRANZ appraised and/or meet the NZBC requirements. There are numerous proprietary exterior plaster/paint/stain systems available. In all cases the manufacturers' application and maintenance instructions must be followed, with particular attention given to the following areas: