

Litecrete Residential Wall System

1.0 General

- 1.0 Litecrete wall panels: steel reinforcing bars fully embedded in the specified Litecrete lightweight precast concrete. Conduits for services can be set into the panel during the casting process, or trenched into the surface on site, using a diamond-tipped router. A cement render/paint finish is applied to the exterior face, if required and a variety of render-set finishes/paint systems are available for internal walls. Finishing systems must be vapour-permeable. See 13.0, "Clear" Concrete Finish. Buildings designed with Litecrete are subject to specific engineering design.
- 1.1 Fire/acoustic inter-tenancy walls for apartment and other residential buildings, eg hospitals, hotels, etc. Litecrete 150 mm achieves a 240-minute fire resistance rating (refer BRANZ Fire Resistance Test FR 3524) and offers acoustic systems that achieve up to STC 60.

2.0 Supply of Litecrete Panels

Once it has been decided to use Litecrete in a project the architect/designer will consult an engineer, who will design the foundation and structural requirements for the project. The architect/builder will usually send drawings, with the engineer's designs/calculations, so that Litecrete can supply a firm quotation. After acceptance of the quotation, Litecrete produce workshop drawings. These drawings are then signed off by the architect/engineer before manufacture of the panels can begin. With good planning, panels for a typical house could be installed in one to two days.

3.0 Durability

Litecrete does not rot, harbour mould or mildew. When used and installed in accordance with the limitations and instructions of the manufacturer, the specifically designed components of the Litecrete wall panel system can be expected to meet the New Zealand Building Code durability requirement of 50 years, provided the Litecrete wall panels are installed and finished as recommended and all protective linings and coating systems, where applied, are correctly maintained. Associated sealants and flashing systems are required to have 15 years durability.

4.0 Thermal Properties

Litecrete wall panels painted and/or plastered internally and externally have a thermal resistance of $0.12 \pm 0.6 \text{ m}^2\text{KW}^{-1}$. Refer to NZBC, *Building Code Requirements, Section 3, Clause H1 Energy Efficiency & Internal Moisture*.

5.0 External Moisture

Due to the mix design containing 20% more cement content than normal 30 MPa precast concrete, plus proprietary additives, Litecrete has proven to have a superior initial and secondary water absorption rate compared to 30 MPa normal precast concrete. This is detailed in Auckland Uniservices test report (to ASTM C1585-04), 30 October 2006.



"Traydek" insitu concrete midfloor system

6.0 Internal Moisture

The excellent thermal insulation properties of the Litecrete

wall panel system ensures that when used with both an adequate level of ventilation and an appropriate level of ceiling/roof insulation, Litecrete will satisfy the internal moisture provisions of NZBC Clause E3.3.1. Appropriate or adequate levels of ventilation and insulation are provided in the NZBC Acceptable Solution E3/AS1.

7.0 Energy Efficiency

Buildings constructed using the Litecrete precast concrete system is able to meet the performance requirements for energy efficiency as required by NZBC Clause H1.3.1 and H1.3.2. It should be noted that compliance with NZBC H1 would also include a large number of other factors resulting from the design of the building, all of which have an effect on the energy efficiency of a building.

8.0 Retaining Walls

For large retaining walls we recommend standard precast concrete rather than Litecrete. However Litecrete can be designed by the structural engineer for minor retaining purposes but must be appropriately tanked.

9.0 Fire

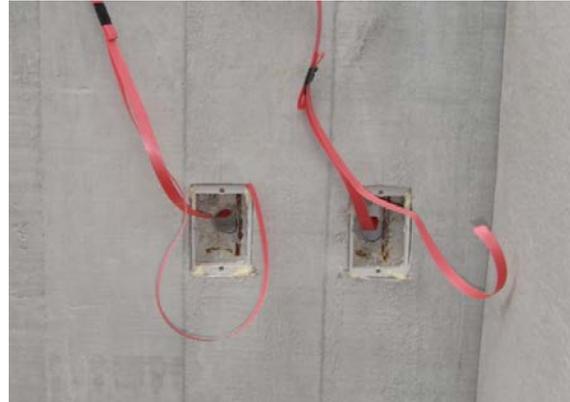
- 9.1 General Properties.
Litecrete @ 150 mm thick has a 4-hour fire resistant rating (refer BRANZ Report FR 3524).
- 9.2 Control of Internal Fire and Smoke Spread.
Internal surface finish requirements are as per Table 6.2 of NZBC Acceptable Solution C/AS1.
- 9.3 Control of External Fire Spread.
External walls that comply with the external wall provisions of Clause 7.11 of NZBC Acceptable Solutions C/AS1 will meet the performance provision of NZBC Clause C3.3.5. Litecrete lightweight precast wall panels will meet the requirements for a type A Heat Release rate in applications covered by Table 7.5 of NZBC Acceptable Solutions C/AS1. Litecrete wall panels will meet the performance provision of NZBC Clause C3.3.5 when restricted to:
 - Single storey buildings 1m or more from the boundary for all purpose groups.
 - Buildings up to 7m high, 1m or more from the boundary, for all-purpose groups other than SC and SD.
 - Fully sprinkled buildings up to 25m high, 1m or more from the boundary for all-purpose groups other than SC, SD, SA and SR.
 - Buildings containing purpose group SH, and with a building height less than 10m and located 1m or more from the boundary.

10.0 Acoustics

Litecrete wall panels provide excellent sound insulation and meet the performance requirements of NZBC G6.3.1 for inter-tenancy walls. The approved acoustic system achieved Sound Transmission Class (STC) 60 when constructed in accordance with the method described in Litecrete Acoustic Systems. *See details IW1 (STC47), IW2 (STC55) and IW3 (STC 60).*

11.0 Electrical Cabling/Conduits

Conduits for electrical and other wiring services can be cast-in during panel manufacture. Access to the conduits is achieved by drilling into the panel using a 51 mm diamond-tipped tube drill. The opening is then squared off using a small electric tile saw with a 100 mm diamond-tipped blade. The flush box is then installed using expanding foam. It is relatively easy to cut a 40 mm deep chase into the Litecrete wall panels to provide plumbing/electrical channels. This can be achieved using an electric router with masonry cutter. Note that the plasticiser in PVC-sheathed electrical cables can migrate therefore such cables must be contained within a plastic conduit if embedded in the Litecrete wall. The conduit must be fixed at regular centres to the bottom of the chase before being plastered over.



Plastic conduits embedded in the panel

12.0 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 structural movement in an earthquake - (*see detail D18*). 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 systems available. In all cases the manufacturers’ application and maintenance instructions must be followed, with particular attention given to the following areas:

- Weathering, flashing and sealing systems at door and window openings, junctions with other materials and any other penetrations of the exterior envelope. The ground/foundation/floor/wall interface. Particular care needs to be given to ensure that minimum distances between ground and floor level, as stated in NZS 3604:2011, are met.
- If external plaster systems are required, they must be installed and cured within the temperature limitations, climatic and curing conditions set by the manufacturer. The finished external plaster system is sealed and protected from the weather with a vapour-permeable coating system.



13.0 “Clear” Concrete Finish

A clear, natural concrete finish can be used for Litecrete panels in residential construction, rather than a paint or plaster finish. However, the following aspects must be considered:

1. As with all concrete, colour variation will occur from batch to batch.
2. If a consistent, blemish-free surface is required, then a vapour-permeable masonry paint or stain should be considered, rather than a natural concrete surface. We strongly recommend that designers and their clients visit the Wilco factory and view typical Litecrete panel surface finishes prior to the start of panel manufacture.
3. From time to time the pumice aggregate will contain minerals which can sometimes result in heavier surface figuring than is the case with normal precast. Photo shows an example of this.

4. Any transit or site damage (chips) to panels can be repaired but the remedial material, being of a different composition, is usually apparent, particularly if a clear sealer is being used.
5. As with all precast concrete with cast-in openings, there is a propensity for hairline cracking to occur from the corners of any openings during craneage in the plant, transportation or during installation on site. Even when temporary steel bracing is installed in panels with large openings, prior to leaving the factory, surface cracks from corners of openings may occur despite all precautions being taken to prevent them. While these cracks are not a structural problem, being only up to 1 mm deep, they are often a concern to the client and remedial work will in most cases be visible.
6. We recommend that a clear matt-finish sealer is applied after installation to prevent airborne grime sticking to the natural concrete surface which allows for easy cleaning by hosing down at least once a year. A sealer should be applied to the internal face if being left in their natural state to prevent dusting.