



BRANZ Appraised

Appraisal No. 681 [2018]

INTEGRA LIGHT WEIGHT CONCRETE FAÇADE SYSTEM

Appraisal No. 681 [2018]

This Appraisal replaces BRANZ
Appraisal No. 681 [2010]



BRANZ Appraisals

Technical Assessments of products
for building and construction.



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Product

- 1.1 The Integra Light Weight Concrete Façade System is a pressure moderated, cavity-based external wall cladding system for residential and light commercial type buildings where domestic construction techniques are used.
- 1.2 The system consists of autoclaved aerated concrete [AAC] panels [Integra panels] fixed over high density polystyrene or timber battens to form a 20 or 40 mm cavity. The coating system consists of a minimum 5 mm thickness of fibreglass mesh reinforced polymer-modified plasters and high-build, tintable finishing plasters. The plaster is finished with a tintable protective finishing coat. The plaster can be applied to give different texture appearances.
- 1.3 The system incorporates Resene Construction Systems EdgeSeal joinery flashings. It also incorporates a primary and secondary means of weather resistance [first and second line of defence] against water penetration by separating the cladding from the external wall framing with a nominal 20 or 40 mm drained cavity.

Scope

- 2.1 The Integra Light Weight Concrete Façade System has been appraised as an external wall cladding system for buildings within the following scope:
 - the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
 - with a risk score of 0-20, calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2; and,
 - situated in NZS 3604 Wind Zones up to, and including Extra High.
- 2.2 The Integra Light Weight Concrete Façade System has also been appraised for weathertightness and structural wind loading when used as an external wall cladding system for buildings within the following scope:
 - the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
 - constructed with timber or steel framing subject to specific engineering design; and,
 - situated in specific design wind pressures up to a maximum design differential ultimate limit state [ULS] of 2.5 kPa.
- 2.3 The Integra Light Weight Concrete Façade System must only be installed on vertical surfaces [except for tops of parapets, sills and balustrades, which must have a minimum 10° slope and be waterproofed in accordance with the Technical Literature].
- 2.4 The system is appraised for use with aluminium window and door joinery that is installed with vertical jambs and horizontal heads and sills. [Note: The Appraisal of the Integra Light Weight Concrete Façade System relies on the joinery meeting the requirements of NZS 4211 for the relevant Wind Zone or design wind pressure.]



- 2.5 Installation of components and accessories supplied by Resene Construction Systems and its approved applicators must be carried out only by Resene Construction Systems approved applicators.

Building Regulations

New Zealand Building Code (NZBC)

- 3.1 In the opinion of BRANZ, the Integra Light Weight Concrete Façade System if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet the following provisions of the NZBC:

Clause B1 STRUCTURE: Performance B1.3.1, B1.3.2 and B1.3.4. The Integra Light Weight Concrete Façade System meets the requirements for loads arising from self-weight, earthquake, wind, impact and creep [i.e. B1.3.3 (a), (f), (h), (j) and (q)]. See Paragraphs 10.1 - 10.4.

Clause B2 DURABILITY: Performance B2.3.1 (b), 15 years, B2.3.1 (c), 5 years, and B2.3.2. The Integra Light Weight Concrete Façade System meets these requirements. See Paragraphs 11.1 and 11.3.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. The Integra Light Weight Concrete Façade System meets this requirement. See Paragraphs 15.1 - 15.5.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. The Integra Light Weight Concrete Façade System meets this requirement and will not present a health hazard to people.

Technical Specification

- 4.1 System components and accessories supplied by Resene Construction Systems are as follows:

EPS Cavity Battens

- **Graphex peel 'n' stick battens** – manufactured from high density (Class H) expanded polystyrene (EPS) with an approximate density of 24 kg/m³. The battens are 45 mm wide by 21 mm thick, are supplied in 1200 mm lengths and are coated on the back face with an acrylic adhesive, which is protected prior to installation by a removable film.
- **Standard EPS cavity battens** – manufactured from high density (Class H) expanded polystyrene (EPS) with an approximate density of 24 kg/m³. The battens are 40 mm wide by 22 or 40 mm thick and are supplied in 2400 mm lengths.

Integra Panels

- **Integra panels** are 50 mm thick, manufactured from autoclaved aerated concrete with an approximate density of 31 kg/m². Integra panels are supplied 2.2 m long x 600 mm wide.

Bedding Compound

- **Rockcote MultiStop FRP Bedding Compound** is a polymer-modified, Portland cement-based thin section jointing plaster supplied in 15 kg bags and mixed on site with clean drinking water. It is applied with a broad knife to the joints of the Integra Panels.

Base, Levelling and Waterproofing Plasters

- A base (mesh) coat is applied using one of the following renders, followed by a subsequent coat of the same render to level the surface.
- **Coarse Mesh Render** is a polymer-modified, Portland cement-based plaster supplied in 20 kg bags and mixed on site with clean drinking water. It is applied as the base coat in a minimum 2 mm layer followed by the embedment of fibreglass mesh reinforcement in the outer surface.
- **Rockcote PM100 Quick Render** is a dry mix, cement-based, polymer-modified plaster supplied in 20 kg bags and mixed on site with clean water. It is used as a base coat for bonding and bedding the fibreglass mesh and is trowel-applied to an approximate thickness of 4-5 mm.
- **Rockcote Mono5 Render** is a dry mix, cement-based, polymer-modified plaster supplied in 20 kg bags and mixed on site with clean water. It is used as a base coat for bonding and bedding the fibreglass mesh and is trowel-applied to an approximate thickness of 4-5 mm.



- **Resene Construction Systems RMaxx** is a high-yielding, cement-free dispersion based basecoat plaster supplied in 20 kg pails. It is applied as the base coat in a minimum 1.5 mm layer followed by the embedment of fibreglass mesh reinforcement in the outer surface. An additional 1.0-1.5 mm is applied to fully encase the mesh.
- **HydroPlast** is an acrylic dry powder with cement activator, that when mixed with water creates a flexible waterproofing render for use over plastered balustrade and fixing blocks. It is supplied in 10 kg bags and is applied over the levelling render with a trowel in a 1 mm layer followed by the embedment of fibreglass mesh reinforcement in the outer surface.

Primer

- **Rockcote Render Prime** is a water-borne acrylic, polymer dispersion, tintable coating supplied in 15 litre pails. It is brush or roller-applied as a primer between the selected base coat and acrylic texture.
- **Resene Limelock** is a water-borne acrylic, polymer dispersion, tintable coating supplied in 10 litre pails. It is brush or roller applied as a primer between the mineral textures and the finishing system.

Mineral Texture Coating

- **Resene Construction Systems Mineral Textures** are dry mix, cement-based, polymer-modified plasters, supplied in 20 kg bags and mixed on site with clean water. They are trowel or spray applied to an approximate thickness of 1.0 – 3.0 mm.

Acrylic Texture Coating

- **Resene Construction Systems** acrylic texture coatings are ready mixed, tintable, mineral-filled, polymer-based, elastomeric high-build coating with in pail and dry film preservatives, supplied in 15 litre pails. They are spray or trowel applied to an approximate thickness of 0.5 – 2.0 mm. The selected Resene Construction Systems texture colour must have a minimum light reflectance value [LRV] of 25%.

uPVC Primer, Plaster Modifier and Finishes

- **Multistop bedding compound** – used as a uPVC primer when mixed with diluted Acrylbond resin or water.
- **Acrylbond** is a water-based co-polymer resin supplied in 4 and 15 litre pails used as a plaster modifier.
- **Rockcote Premium Armour** is a water-borne 100% acrylic-based protective finish for use over mineral and acrylic textures. It is supplied in 4 and 15 litre pails and is brush or roller applied. The protective finish coat must have a minimum LRV of 25%.
- **Resene X200** is an acrylic waterproofing membrane for use as a protective finish over mineral and acrylic textures. It is supplied in 4 and 10 litre pails and is brush, roller or spray applied. The protective finish coat must have a minimum LRV of 25%.

Accessories

- **Reinforcing mesh** – an alkali-resistant fibreglass with a nominal mesh size of approximately 5.0 x 4.0 mm and an approximate weight of 160 g/m².
- **Sticky Mesh** – alkali-resistant fibreglass, 150 mm wide corner pieces.
- **uPVC components** – starter strip flashing, standard corner flashing, vertical control joint, horizontal control joint, EdgeSeal sill, jamb and head flashings, and 50 mm and universal ventilated starter strip.
- **3M All Weather Flashing Tape 8067** – flexible flashing tape with a proprietary backing and an acrylic pressure sensitive adhesive to seal the EdgeSeal head flashing to the building underlay. The tape is available 76 mm wide in rolls 22.8 m long.

4.2 Accessories used with the system which are supplied by the Resene Construction Systems approved applicator are:

- **Timber Cavity Battens** - nominal 50 mm wide x 25 mm thick (minimum finished size of 45 mm wide x 18 mm thick), or 40 x 40 mm dressed timber treated to Hazard Class H3.1.
- **Timber Cavity batten fixings** - 30 or 40 x 2.5 mm hot-dip galvanised steel flat head nails (for 22 mm thick battens), or 60 x 2.8 mm hot-dip galvanised steel flat head nails (for 40 mm thick battens) for timber frame, or construction adhesive for temporary fixing to building underlay over timber or steel frame.
- **uPVC component fixings** - 30 x 2.5 mm hot-dip galvanised steel flat head nails to timber frame and AS 3566 Corrosion Class 3, 20 mm screws to steel frame.
- **Integra fixings (timber frame)** - AS 3566 Corrosion Class 4 hot-dip galvanised wood screws with a head diameter of 14 mm and a shank diameter of 5.1 mm in NZS 3604 defined Exposure Zones B, C and D. Refer to Table 1 for fixing length requirements.

Table 1: Integra panel fixing lengths (timber frame)

Integra Panel and Cavity Batten Thickness	Screw Size
50 mm panel plus 20 mm EPS cavity batten	100 mm or greater
50 mm panel plus 20 mm timber cavity batten	100 mm or greater
50 mm panel plus 40 mm EPS cavity batten	125 mm or greater
50 mm panel plus 40 mm timber cavity batten	125 mm or greater

- **Integra fixings (steel frame)** - AS 3566 Corrosion Class 4 hot-dip galvanised self-drilling screws with a head diameter of 14 mm and a shank diameter of 5.1 mm in NZS 3604 defined Exposure Zones B, C and D. Refer to Table 2 for fixing length requirements.

Table 2: Integra panel fixing lengths (steel frame)

Integra Panel and Cavity Batten Thickness	Screw Size
50 mm panel plus 20 mm EPS cavity batten and 10 mm thermal break	90 mm or greater
50 mm panel plus 20 mm timber cavity batten and 10 mm thermal break	90 mm or greater
50 mm panel plus 40 mm EPS cavity batten and 10 mm thermal break	110 mm or greater
50 mm panel plus 40 mm timber cavity batten and 10 mm thermal break	110 mm or greater

- **Waterproof membrane tapes** - tapes covered by a valid BRANZ Appraisal for use as waterproof membranes over the tops of plastered parapets, balustrades, fixing blocks and the like.
- **Flexible sealant** - sealant complying with NZBC Acceptable Solution E2/AS1, or sealant covered by a valid BRANZ Appraisal for use as a weather sealing sealant for exterior use.

4.3 Accessories used with the system which are supplied by the building contractor are:

- **Flexible wall underlay** - building paper complying with NZBC Acceptable Solution E2/AS1, Table 23, or breather-type membranes covered by a valid BRANZ Appraisal for use as wall underlays.
- **Flexible wall underlay support** - polypropylene strap, 75 mm galvanised mesh, galvanised wire, or additional vertical battens for securing the flexible wall underlay in place and preventing bulging of the bulk insulation into the drainage cavity. [Note: mesh and wire galvanising must comply with AS/NZS 4534.]
- **Rigid wall underlay** - Plywood or fibre cement sheet complying with NZBC Acceptable Solution E2/AS1, Table 23, or rigid sheathing covered by a valid BRANZ Appraisal for use as rigid air barrier systems.



- **Flexible sill and jamb tapes** - flexible flashing tapes complying with NZBC Acceptable Solution E2/AS1, Paragraph 4.3.11, or flexible flashing tapes covered by a valid BRANZ Appraisal for use around window and door joinery openings.
- **Joinery head flashings** - as supplied by the joinery manufacturer or contractor.
- **Window and door trim cavity air seal** - air seals complying with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.6, or self-expanding, moisture cure polyurethane foam air seals covered by a valid BRANZ Appraisal for use around window, door and other wall penetration openings.

Handling and Storage

- 5.1 Handling and storage of all materials supplied by Resene Construction Systems or the approved applicators, whether on or off site, are under the control of Resene Construction Systems approved applicators. Dry storage must be provided on site for the Integra panels, fibreglass mesh and bags of plaster. EPS battens, uPVC flashings and profiles must be protected from direct sunlight and physical damage, and should be stored flat and under cover. Liquid components must be stored in frost-free conditions.
- 5.2 Handling and storage of all materials supplied by the building contractor, whether on or off site, are under the control of the building contractor. Materials must be handled and stored in accordance with the relevant manufacturer's instructions.

Technical Literature

- 6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for the Integra Light Weight Concrete Façade System. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed. The Integra Light Weight Concrete Façade System listing on the BRANZ website excludes specific details. These details have not been assessed by BRANZ and are outside the scope of the Appraisal.

Design Information

Framing

Timber Treatment

- 7.1 Timber wall framing behind the Integra Light Weight Concrete Façade System must be treated as required by NZBC Acceptable Solution B2/AS1.

Timber Framing

- 7.2 Timber framing must comply with NZS 3604 for buildings or parts of buildings within the scope limitations of NZS 3604. Buildings or parts of buildings outside the scope of NZS 3604 must be to a specific design in accordance with NZS 3603 and AS/NZS 1170. Where specific design is required, the framing must be of at least equivalent stiffness to the framing provisions of NZS 3604. In all cases studs must be at maximum 600 mm centres. Dwargs must be fitted flush between the studs at maximum 1200 mm centres.
- 7.3 For specifically designed timber framed buildings situated in Wind Zones above NZS 3604 defined Extra High, there must be a minimum timber framing size of 90 x 45 mm, and a minimum timber grade of MSG8.
- 7.4 Timber framing must have a maximum moisture content of 24% at the time of the cladding application. [Note: If Integra panels are fixed to framing with a moisture content of greater than 24% problems may occur at a later date due to excessive timber shrinkage.]



Steel Framing

- 7.5 Steel framing must be to a specific design meeting the requirements of the NZBC.
- 7.6 The minimum framing specification is 'C' section studs and nogs with an overall section size of 75 mm web and 32 mm flange. Steel thickness must be a minimum 0.75 mm.
- 7.7 In all cases studs must be at maximum 600 mm centres. Dwargs must be fitted flush between the studs at maximum 1200 mm centres.

Integra Setout

- 7.8 Integra panels are installed horizontally. Vertical panel edges may be jointed on-stud or off-stud and vertical panel joints must be staggered for each row. Integra panels must be supported at fixing locations with vertical cavity battens or cavity spacers 100 mm long maximum in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.2 [f]. At the base of the wall, the Integra panels must hang 50 mm below the supporting framing.

General

- 8.1 When the Integra Light Weight Concrete Façade System is used for specifically designed buildings up to design differential 2.5 kPa ULS wind pressure, only the weathertightness aspects of the cladding and maximum framing centres and Integra panel fixing centres are within the scope of this Appraisal. All other aspects of the building need to be specifically designed and are outside the scope of this Appraisal.
- 8.2 Punchings in the starter strip provide a minimum ventilation opening area of 1000 mm² per lineal metre of wall in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.3 [b].
- 8.3 The ground clearance to finished floor levels as set out in NZS 3604 must be adhered to at all times. At ground level, paved surfaces, such as footpaths, must be kept clear of the bottom edge of the cladding system by a minimum of 100 mm, and unpaved surfaces by 175 mm in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Table 18. [Note: A detail showing Integra panel carried within 35 mm of a drain is included in the Technical Literature. This detail is outside the scope of this Appraisal and approval for its use is by specific design.]
- 8.4 At balcony, deck or roof/wall junctions, the bottom edge of the Integra Light Weight Concrete Façade System must be kept clear of any adjacent surface, or above the top surface of any adjacent roof flashing by a minimum of 35 mm in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.3.
- 8.5 All external walls of buildings must have barriers to airflow in the form of interior linings with all joints stopped for wind zones up to and including Very High, and rigid underlays for buildings in the Extra High wind zone and specifically designed buildings up to 2.5 kPa design differential ULS wind pressure. Unlined gables and walls must incorporate a rigid sheathing or an air barrier which meets the requirements of NZBC Acceptable Solution E2/AS1, Table 23. For attached garages, wall underlays must be selected in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.3.4. Where rigid underlays are used, the fixing lengths must be increased by a minimum of the thickness of the underlay.
- 8.6 Where penetrations through the Integra Light Weight Concrete Façade System are wider than the cavity batten spacing, allowance must be made for airflow between adjacent cavities. A minimum 10 mm gap must be left between the bottom of the vertical cavity batten and the flashing to the opening.
- 8.7 Where the system abuts other cladding systems, designers must detail the junction to meet their own requirements and the performance requirements of the NZBC. The Technical Literature provides some guidance. Details not included within the Technical Literature have not been assessed and are outside the scope of this Appraisal.

Electrical Cables

- 8.8 PVC sheathed electrical cables must be prevented from direct contact with EPS cavity battens. When cables must penetrate the EPS for exterior electrical connections, the cable must be directly supported by passing through an electrical conduit. There is no separation requirement for PVC sheathed electrical cables passing through Integra panels.

Control Joints

- 9.1 Control joints where Integra panels are used must be constructed in accordance with the Technical Literature and be provided as follows:
- Horizontal control joints - at maximum 6.0 m centres.
 - Vertical control joints - at maximum 8.0 m centres; aligned with any control joint in the structural framing, or where the system abuts different cladding types.

[Note: Horizontal and vertical control joints must be located over structural supports. The Technical Literature provides some guidance for the design of vertical control joints where the system abuts different cladding types. Details not included within the Technical Literature are outside the scope of this Appraisal and are the responsibility of the designer - see Paragraph 8.7.]

Inter-storey Junctions

- 9.2 Inter-storey drained joints must be constructed in accordance with the Technical Literature. Inter-storey joints must be provided to limit continuous cavities to the lesser of 2-storeys or 7 metres in height, in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.9.4 [b].

Structure

Mass

- 10.1 The mass of the Integra Light Weight Concrete Façade System is approximately 34.5 kg/m², therefore it is considered a medium wall cladding in terms of NZS 3604.

Impact Resistance

- 10.2 The system has adequate resistance to impact loads likely to be encountered in normal residential use. The likelihood of impact damage to the system when used in light commercial situations should be considered at the design stage, and appropriate protection such as the installation of bollards and barriers should be considered for vulnerable areas.

Wind Zones

- 10.3 The Integra Light Weight Concrete Façade System is suitable for use in all Wind Zones of NZS 3604, up to, and including Extra High where buildings are designed to meet the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 1.1, or up to design differential 2.5 kPa ULS wind pressure when the buildings are specifically designed.

Integra Fixing

- 10.4 Integra panels where a 20 mm deep cavity is used must be fixed through the cavity battens and cavity spacers to the wall framing with two screws per stud. The screws must be positioned 50 mm minimum [100 mm maximum] from the panel edge. Integra panels where a 40 mm deep cavity is used must be fixed through the cavity battens and cavity spacers to the wall framing with three screws per stud. The top and bottom screws must be positioned 50 mm minimum [100 mm maximum] from the panel edge, with the middle screw positioned near the centre of the panel. The fixing heads must finish flush with or slightly below the surface of the panel. Where studs are at 600 mm centres, one fixing is required into the bottom plate at mid-dwang length.

Durability

- 11.1 The Integra Light Weight Concrete Façade System meets the performance requirements of NZBC Clause B2.3.1 [b], 15 years for the cladding system and plaster finish, and the performance requirements of NZBC Clause B2.3.1 [c], 5 years for the exterior paint system.



Serviceable Life

- 11.2 The Integra Light Weight Concrete Façade System is expected to have a serviceable life of at least 30 years provided the system is maintained in accordance with this Appraisal, and the Integra panels, fixings and plaster are continuously protected by a weathertight coating and remain dry in service.
- 11.3 Microclimatic conditions, including geothermal hot spots, industrial contamination and corrosive atmospheres, and contamination from agricultural chemicals or fertilisers can convert mildly corrosive atmosphere into aggressive environments for fasteners. The fixing of Integra panels in areas subject to microclimatic conditions requires specific design in accordance with NZS 3604, Paragraph 4.2.4, and is outside the scope of this Appraisal.

Maintenance

- 12.1 Regular maintenance is essential to ensure the performance requirements of the NZBC are continually met and to ensure the maximum serviceability of the system.
- 12.2 Regular cleaning [at least annually] of the paint coating is required to remove grime, dirt and organic growth and to maximise the life and appearance of the coating. Grime may be removed by brushing with a soft brush, warm water and detergent. Paint systems must be recoated at approximately 5-8 yearly intervals in accordance with the paint manufacturer's instructions.
- 12.3 Annual inspections must be made to ensure that all aspects of the cladding system, including the coating system, plasters, flashings and any sealed joints remain in a weatherproof condition. Any cracks, damaged areas or areas showing signs of deterioration which could allow water ingress, must be repaired immediately. The Integra Light Weight Concrete Façade System must be repaired in accordance with the instructions of Resene Construction Systems.
- 12.4 Minimum ground clearances as set out in this Appraisal and the Technical Literature must be maintained at all times during the life of the system. [Note: Failure to adhere to the minimum ground clearances given in this Appraisal and the Technical Literature will adversely affect the long term durability of the Integra Light Weight Concrete Façade System.]

Control of External Fire Spread

- 13.1 The Integra Light Weight Concrete Façade System using Rockcote PM100 Quick Render with a mineral texture coating and Rockcote Premium Armour protective finishing coat has an exterior surface finishes peak heat release rate of less than 100 kw/m² and a total heat released of less than 25 MJ/m². Testing was carried out as per NZBC Acceptable Solutions C/AS1 Paragraph 5.4 and C/AS2-C/AS6 Paragraph 5.8.1.
- 13.2 The Integra Light Weight Concrete Façade System using Rockcote PM100 Quick Render with a mineral or acrylic texture coating and Resene X200 protective finishing coat has an exterior surface finishes peak heat release rate of less than 150 kw/m² and a total heat released of less than 50 MJ/m². Testing was carried out as per NZBC Acceptable Solutions C/AS1-C/AS6 Paragraph 5.8.1
- 13.3 The Integra Light Weight Concrete Façade System using any other Resene Construction Systems base plaster, texture or surface finish has not been assessed for a peak heat release or total heat released rating.
- 13.4 Refer to NZBC Acceptable Solutions and Verification Methods C/AS1-C/AS7 and C/VM2 for Requirements for fire rating and exterior surface finish requirements of external walls.

Prevention of Fire Occurring

- 14.1 Rockcote Integra panels need not be separated from fireplaces, heating appliances, flues and chimneys. However, when used in conjunction with, or attached to heat sensitive materials, the heat sensitive material must be separated from fireplaces, heating appliances, flues and chimneys in accordance with the requirements of NZBC Acceptable Solutions C/AS1 to C/AS6, Paragraph 7.5.9 for the protection of combustible materials.



External Moisture

- 15.1 The Integra Light Weight Concrete Façade System, when installed in accordance with this Appraisal and the Technical Literature, prevents the penetration of moisture that could cause undue dampness or damage to building elements.
- 15.2 The cavity must be sealed off from the roof and sub-floor space to meet the performance requirements of Clause E2.3.5.
- 15.3 The Integra Light Weight Concrete Façade System allows excess moisture present at the completion of construction to be dissipated without permanent damage to building elements to meet the performance requirements of Clause E2.3.6.
- 15.4 The details given in the Technical Literature for weather sealing are based on the design principle of having a first and second line of defence against moisture entry for all joints, penetrations and junctions. The ingress of moisture must be excluded by detailing joinery and wall interfaces as shown in the Technical Literature. Weathertightness details that are developed by the designer are outside the scope of this Appraisal and are the responsibility of the designer for compliance with the NZBC.
- 15.5 The use of the Integra Light Weight Concrete Façade System where there is a designed cavity drainage path for moisture that penetrates the cladding, does not reduce the requirement for junctions, penetrations, etc to remain weather resistant.

Internal Moisture

- 16.1 The Integra Light Weight Concrete Façade System alone does not meet NZBC Acceptable Solution E3/AS1, Paragraph 1.1.1 [a]. Buildings must be constructed with an adequate combination of thermal resistance and ventilation, and space temperature must be provided to all habitable spaces, bathrooms, laundries and other spaces where moisture may be generated or may accumulate.

Water Vapour

- 16.2 The Integra Light Weight Concrete Façade System is not a barrier to the passage of water vapour, and when correctly installed will not create or increase the risk of moisture damage resulting from condensation. Refer to Paragraph 16.3 for specific requirements for steel framed buildings.
- 16.3 When the Integra Light Weight Concrete Façade System is installed over a steel frame, an expanded polystyrene thermal break must be installed over each steel member to provide a thermal break in accordance with the requirements of NZBC Acceptable Solution E3/AS1, Paragraph 1.1.4 [d]. The wall underlay, cavity battens and the rest of the Integra Light Weight Concrete Façade System are then installed over top of the thermal break in accordance with the Technical Literature and this Appraisal.

Installation Information

Installation Skill Level Requirements

- 17.1 Installation and finishing of components and accessories supplied by Resene Construction Systems and its approved installers must be completed by trained applicators, approved by Resene Construction Systems.
- 17.2 Installation of the accessories supplied by the building contractor must be carried out in accordance with the Integra Light Weight Concrete Façade System Technical Literature and this Appraisal by, or under the supervision of, a Licensed Building Practitioner (LBP) with the relevant Licence Class.



System Installation

Wall Underlay and Flexible Sill and Jamb Tape Installation

- 18.1 The selected wall underlay and flexible sill and jamb tape system must be installed by the building contractor in accordance with the underlay and tape manufacturer's instructions prior to the installation of the cavity battens and the rest of the Integra Light Weight Concrete Façade System. Flexible wall underlay must be installed horizontally and be continuous around corners. Underlay must be lapped 75mm minimum at horizontal joints and 150 mm minimum over studs at vertical joints. Generic rigid wall underlay materials must be installed in accordance with NZBC Acceptable Solution E2/AS1 and be overlaid with a flexible wall underlay. Proprietary systems shall be installed in accordance with the manufacturer's instructions. Particular attention must be paid to the installation of the wall underlay and sill and jamb tapes around window and door openings to ensure a continuous seal is achieved and all exposed wall framing in the opening is protected.
- 18.2 Where studs are at greater than 450 mm centres and a flexible wall underlay is being used, a wall underlay support must be installed over the underlay at maximum 300 mm centres horizontally.

Aluminium Joinery Installation

- 18.3 Aluminium joinery must be installed by the building contractor in accordance with the Technical Literature. A 7.5 - 10 mm nominal gap must be left between the joinery reveal and the wall framing so a PEF rod and air seal can be installed after the joinery has been secured in place. The joinery must be spaced 22 - 23 mm off of the face of the wall underlay to allow the Integra Light Weight Concrete Façade System flashings to be installed.

The Integra Light Weight Concrete Façade System

- 18.4 The system must be installed in accordance with the Technical Literature by Resene Construction Systems approved applicators.
- 18.5 The Integra Light Weight Concrete Façade System plaster system must only be applied when the air and substrate temperature is within the range of +5°C to +30°C.

Inspections

- 18.6 The Technical Literature must be referred to during the inspection of Integra Light Weight Concrete Façade System installations.

Finishing

- 18.7 The paint manufacturers' instructions must be followed at all times for application of the paint finish. The plaster must be cured for a minimum of 2-3 days and must be dry before commencing painting.

Health and Safety

- 19.1 Cutting of Integra panels must be carried out in well ventilated areas, and a dust mask and eye protection must be worn.
- 19.2 When power tools are used for cutting, grinding or forming holes, health and safety measures must be observed because of the amount of dust generated.
- 19.3 Safe use and handling procedures for the components that make up the Integra Light Weight Concrete Façade System are provided in the relevant manufacturer's Technical Literature.

Basis of Appraisal

The following is a summary of the technical investigations carried out:

Tests

20.1 The following testing has been undertaken by BRANZ:

- BRANZ expert opinion on NZBC E2 code compliance for the Integra Light Weight Concrete Façade System was based on evaluation of all details within the scope and as stated within this Appraisal and testing of the Integra Light Weight Concrete Façade System and Graphex Insulated Façade System to E2/VM1. The testing assessed the performance of the foundation detail, window head, jamb and sill details, meter box head, jamb and sill details, vertical and horizontal control joints, internal and external corners and balustrade to wall junction with a plastered cap. In addition to the weathertightness test, the details contained within the Technical Literature have been reviewed, and an opinion has been given by BRANZ technical experts that the system will meet the performance levels of Acceptable Solution E2/AS1 for drained cavity claddings.
- Wind face load and fastener pull through testing for the Integra Light Weight Concrete Façade System. BRANZ determined design wind suction pressures, and by comparing these pressures with the NZS 3604 design wind speeds and AS/NZS 1170 pressure coefficients, the fixing requirements were determined for timber and steel framed walls.
- In-plane shear testing of the Integra Light Weight Concrete Façade System to determine the system's ability to resist its self-weight.
- A racking test was completed to examine the performance of the Integra Light Weight Concrete Façade System when the system was subjected to both serviceability level and ultimate level seismic racking deflections, taken to be ± 8 mm and ± 36 mm respectively. The plaster system did not crack or show signs of damage for the entire test program.
- Durability testing of the Integra panels to verify the durability of the system. The testing included compressive strength, length change during moisture movement, corrosion protection of steel reinforcement and mineralogy by x-ray diffraction crystallography.

Other Investigations

- 21.1 Structural and durability opinions have been provided by BRANZ technical experts.
- 21.2 Site visits of Integra Light Weight Concrete Façade System installations have been carried out by BRANZ to assess the practicability of installation, and to examine completed installations.
- 21.3 The Technical Literature for the Integra Light Weight Concrete Façade System has been examined by BRANZ and found to be satisfactory.

Quality

- 22.1 The manufacture of the plasters and finishes has been examined by BRANZ, including methods adopted for quality control. Details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory.
- 22.2 The manufacture of the Integra panels has been examined by an agent of BRANZ, including methods adopted for quality control. Details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory.
- 22.3 The quality of materials, components and accessories supplied by Resene Construction Systems is the responsibility of Resene Construction Systems.
- 22.4 Quality on site is the responsibility of the Resene Construction Systems approved applicators.
- 22.5 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of framing systems and joinery, wall underlays, flashing tapes and air seals in accordance with the instructions of Resene Construction Systems.
- 22.6 Building owners are responsible for the maintenance of the Integra Light Weight Concrete Façade System installations in accordance with the instructions of Resene Construction Systems.



Sources of Information

- AS 3566 - 2002 Self-drilling screws for the building and construction industries.
- AS 3730 Guide to the properties of paints for buildings.
- AS/NZS 1170: 2002 Structural design actions.
- NZS 3602: 2003 Timber and wood-based products for use in building.
- NZS 3603: 1993 Timber Structures Standard.
- NZS 3604: 2011 Timber-framed buildings.
- NZS 4211: 2008 Specification for performance of windows.
- Acceptable Solutions and Verification Methods for New Zealand Building Code External Moisture Clause E2, Ministry of Business, Innovation and Employment, Third Edition July 2005 [Amendment 7, 01 January 2017].
- Ministry of Business, Innovation and Employment Record of Amendments for Compliance Documents and Handbooks.
- The Building Regulations 1992.



BRANZ Appraised
Appraisal No. 681 [2018]

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22 November 2018

INTEGRA LIGHT WEIGHT
CONCRETE FAÇADE SYSTEM



In the opinion of BRANZ, **Integra Light Weight Concrete Façade System** is fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided it is used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **Rockcote Resene Ltd T/A Resene Construction Systems**, and is valid until further notice, subject to the Conditions of Appraisal.

Conditions of Appraisal

1. This Appraisal:
 - a) relates only to the product as described herein;
 - b) must be read, considered and used in full together with the Technical Literature;
 - c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
 - d) is copyright of BRANZ.
2. **Rockcote Resene Ltd T/A Resene Construction Systems**:
 - a) continues to have the product reviewed by BRANZ;
 - b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
 - c) abides by the BRANZ Appraisals Services Terms and Conditions;
 - d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
 - a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
 - b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
 - c) any guarantee or warranty offered by **Rockcote Resene Ltd T/A Resene Construction Systems**.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to **Rockcote Resene Ltd T/A Resene Construction Systems** or any third party.

For BRANZ

Chelydra Percy

Chief Executive

Date of Issue:

22 November 2018