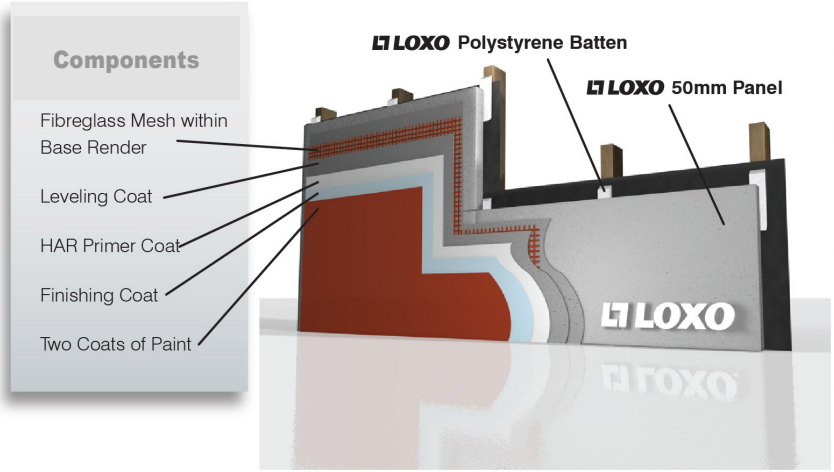
C908
[EXPIRY DATE AUG 2014]

BEAL Appraisal

LOXO Cladding Panel Veneer System



LOXO CLADDING SYSTEMS

Product

1.1 The LOXO Cladding Panel Veneer System is a cavity-based aerated concrete wall cladding with a painted textured finish. It is designed to be used as an external wall cladding system for residential and light commercial type buildings where domestic construction techniques are used in wind zones up to and including Very High.

1.2 The system consists of autoclaved aerated concrete (AAC) panels (LOXO Cladding Panels) fixed over high density polystyrene battens or H3.1 timber battens to form a cavity from 20mm (Classic) minimum to 50mm (Deluxe) maximum. The coating system (Grano Sponge Finish Satin System) consists of a 3mm thick fiberglass mesh reinforced, base coat plaster, followed by the application of a 2mm thick leveling coat of plaster. A coat of water based primer/sealer is then applied followed with the application of a 2mm thick high build acrylic based Tuscany coarse which is finished with a 100% acrylic based exterior paint system.

1.3 The system 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 20mm (Classic) minimum or up to 50mm (Deluxe) maximum drained ventilated cavity or with LOXO Cladding NZ Limited approval as a closed cavity system (non ventilated).

Building Regulations

2.1 In the opinion of BEAL, the LOXO Cladding Panel Veneer System, if designed, installed and maintained in accordance with the statements and conditions of this Appraisal Certificate, will meet the following provisions of the NZBC.

2.2 Clause B1 STRUCTURE

Performance B1.3.1 and B1.3.3. The LOXO Cladding Panel Veneer 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 11.1-11.4

2.3 Clause B2 DURABILTY

Performance B2.3.1 (b), 15 years, B2.3.1 (c), 5 years, and B2.3.2. The LOXO Cladding Panel Veneer System meets this requirement. See paragraphs 12.1-12.5

2.4 Clause E2 EXTERNAL MOISTURE

Performance E2.3.2. The LOXO Cladding Panel Veneer System meets this requirement. See paragraph 14.1-14.7

2.5 Clause F2 HAZARDOUS BUILDING MATERIALS

Performance F2.3.1. The LOXO Cladding Panel Veneer System meets this requirement and will not present a health hazard to people.

Applicant:
LOXO CLADDING SYSTEMS

LOXO Cladding NZ Ltd
P.O.BOX 10 176
CHRISTCHURCH
TEL: 03 372 3343
FAX: 03 365 8589
www.loxocladding.co.nz

Appraiser:

BEAL
2A Plimmerton Drive
Plimmerton, Porirua, NZ
Tel: +64 233 6661
Fax: +64 233 6662
E-Mail: sales@beal.co.nz
www.beal.co.nz

2.6 The LOXO Cladding Panel Veneer System has been appraised as an **Alternative Solution** in terms of New Zealand Building Code Compliance.

Scope and Limitations

3.1 The LOXO Cladding Panel Veneer System has been appraised for use as an external wall cladding system for buildings within the following scope:

- Scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
- Constructed with timber framing complying with the NZBC; and,
- Constructed with steel framing complying with the NZBC; and,
- With a risk score of 0-20, calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2; and,
- Can be situated in up to and including 'Very High' wind zones as described in NZS 3604 Building Wind Zones

3.2 The LOXO Cladding Panel Veneer System has also been appraised for weathertightness and structural wind loading when used for timber or steel framed buildings subject to specific design up to a design differential ultimate limit state (ULS) wind pressure of 2500Pa.

3.3 The LOXO Cladding Panel Veneer 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).

3.4 The system is appraised for use with aluminum window and door joinery that is installed with vertical jambs and horizontal heads and sills. (The Appraisal of the LOXO Cladding Panel Veneer System relies on joinery meeting the requirements of NZS 4211 for the relevant building wind zone or being specifically designed for use in specifically designed buildings).

3.5 Installation of components and accessories supplied by LOXO Cladding NZ Ltd must be carried out only by personnel trained and certified by LOXO Cladding NZ Ltd.

Technical Literature

4.1 Refer to the LOXO Cladding Panel Veneer System Technical Manual Edition August 2013. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained within the Technical Literature and scope of this Appraisal Certificate must be followed .

4.2 For a copy of this Technical Literature and any subsequent updates please refer to:
www.loxocladding.co.nz

Technical Specification

5.1 System components and accessories supplied by LOXO Cladding NZ Ltd as follows:

Frame Protection System

A wind-tight Frame Protection System is required to be installed before the installation of a cladding system over typical timber and light gauge steel framing.

A system for the protection of framing will include at least the following components all complying with the performance requirements of the New Zealand Building Code:
1. Underlay – also known as 'wall wrap' or 'building wrap';
2. Seam tape – which may be suited for flashing around openings;
3. Flashing tape – designed for waterproofing around openings such as windows and doors
4. Boots – for sealing between round pipes of various diameters, and the underlay, or alternatively use of flashing tape. The installation of the Frame Protection System shall be completed by the owner, or typically the builder, representing the owner.

Cavity Battens

<u>22mm to 50mm Cavity Battens</u>

- Cavity battens are manufactured from very high density (Class VH) EPS with a density of no less than 28kg/m³ or H3.1 timber. The battens are 40mm wide by 22mm to 50mm thick and are supplied in 1200mm lengths.

LOXO Cladding Panel

- LOXO Cladding Panels are 50mm or 75mm thick, manufactured from autoclaved aerated concrete with an approximate density of 560kg/m³. LOXO Cladding Panels are supplied in lengths of 2200mm long by 600mm wide.

Accessories

- uPVC Components – LOXO
  - PVC Jamb flashing
  - PVC sill flashing
  - PVC slotted vermin control cavity closer
  - PVC control joint moulding
  - PVC base cap moulding 50mm
- Vents - LOXO Classic vent (90mm x 66mm) and LOXO Deluxe vent (125mm x54mm)
- LOXO Cladding Panel Fastener [Classic 20mm cavity] - 14 -10 x 100mm long AS3566 corrosion class 3 or 4 Bugle head screws for use in NZS 3604 defined corrosion zones 1,2, 3 and 4. Grade 304 stainless steel in the sea spray zone.
- LOXO Cladding Panel Fastener [Deluxe 50mm cavity] - 14 - 10 x 150mm long AS3566 corrosion class 3 or 4 Bugle head screws for use in NZS 3604 defined corrosion zones 1,2,3 and 4. Grade 304 stainless steel in sea spray zone.
- Reinforcing Mesh - High quality akali resistant fiberglass mesh with a nominal size of approx. 4mm square and a weight of 150g/m² for use in domestic and light commercial situations.

Grano Sponge Finish System *(Coating system)*

5.2 All Plaster components used for the coating of the LOXO Cladding Panels are to be supplied by Valspar Paint (NZ) Ltd.

Base Coat Plasters

- ***Grano Adhesive Mortar Coarse*** is a polymer-modified, cementitious rendering material specifically designed for thin section rendering over AAC. It is applied as a base coat, in a minimum 5mm layer followed by the embedment of high quality alkali resistant fibre glass mesh reinforcement, followed by a further 2mm layer.
- ***Grano Sponge*** is a pre-blended polymer-modified, cement-based texturing plaster designed to be applied 1-2mm over Grano Adhesive Mortar Coarse.

Finishing Coatings

- ***GranoPrime*** is an acrylic primer sealer applied over the Grano Sponge to enhance adhesion.
- GranoPrime can be applied by brush, roller, con ventional or airless spray. The primer is applied over the leveling coat, and also used as a primer/ adhesion promoter for flexible sealant application.
- ***GranoImpact*** is an is a high performance elastomeric coating able to be applied in a variety of styles over the sealed Grano sponge plaster. A mini-mum of two coats of Wattyl GranoImpact must be used over the finishing plasters to make the system weathertight and produce the desired finish to exterior walls.
- Proprietary paint systems not supplied by Valspar Paint (NZ) Ltd. have not been assessed and are therefore outside the scope of this Appraisal Certificate.

5.3 Accessories used with the system which are supplied by the LOXO Cladding NZ Ltd certified installers are:

- LOXO cavity batten fixings - 50mm hot dipped galvanised steel flat head nail for use with the (Classic) 20mm batten and 75mm hot dipped galvanised flat head nail for use with the (Deluxe) 50mm batten to timber frame. A construction adhesive is used to temporarily fix the battens to the building wrap over timber or steel frame.
- Liquid Applied Waterproof membrane - Bostik Dampfix Gold is an elastomeric one-part fibre-reinforced water based PU membrane used over the tops of AAC parapets, balustrades and the like where waterprooging is required. The membrane is also applied to the bottom edge and 50mm up the back of panels. Bostik Dampfix Gold is supplied in 15 litre pails.
- Waterproof Membrane tapes - tapes covered by a valid BEAL and /or BRANZ Appraisal for use as waterproofing membranes over the tops of plastered parapets, balustrades and the like.
- Flexible sealant – Bostik SEAL 'N' FLEX MS or Holdfast FIX ALL 220 MS or other sealant complying with NZBC Acceptable Solution E2/ AS1 for use as a weather sealing sealant for exterior use.
- Adhesive Sealant - Holdfast SB and Bostik GOLD is used for adhering uPVC accessories to LOXO Cladding Panel.
- LOXO Panel Adhesive - AAC compatible adhesive for bonding Cladding Panel joints during construction.
- Corrosion protection paint - CRC ZINC IT primer is a single component zinc rich compound with a special epoxy binder and contains over 90% pure zinc. CRC ZINC IT is brushed on to exposed reinforcing steel (grounded back) to prevent corrosion. CRC ZINC IT is supplied in 1 litre pails.
- EPS Cavity battens - construction adhesive is used for temporary fixing of battens to the building wrap over timber or steel frame fixed at maximum 600mm centres. Additional battens can be placed to allow for irregularities in framing or where extra support is required.
- Foam tape - Inseal 3259 single sided foam tape 3mm wide by 3mm thick length cut to suit.
- Damp proof course (DPC) - Supercourse 500 DPC, Malthoid DPC or 0.25mm polythene DPC .

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

- Head flashing - Head flashing complying with NZBC Acceptable Solution E2/AS1 paragraph 4.6.1.6 and table 7 with a minimum stop end of 10mm, installed in accordance with the Technical Literature
- Building wrap - paper or wrap complying with the requirements of NZBC Acceptable Solution E2/ AS1 Table 23 and BEAL TP120 for testing the resistance of moisture migration through the wrap.
- Flexible flashing sill and jamb tapes - flexible flashing tapes complying with AAMA 711-07, or a flexible flashing tape covered by a valid BEAL and/or BRANZ Appraisal for use around window and door joinery openings.
- Air seals around windows and doors - air seals complying with NZBC Acceptable Solution E2/ AS1 9.1.6, or low foaming self expanding, moisture cure polyurethane foam air seals covered by a valid BEAL and/or BRANZ Appraisal for use around window, door and other wall penetration openings or manufactured to comply with AAMA 812-04.
- Building wrap strapping - Polypropylene tape for securing the building wrap in place and preventing bulging of the insulation into the drain cavity where cavity battens are installed at greater than 450mm centres as per NZBC Acceptable Solution E2/AS1 9.1.8.5 (b).

Handling and Storage

6.1 Handling and storage of all the materials supplied by LOXO Cladding NZ Ltd or the licensed contractor, both on and off site are under the control of LOXO Cladding NZ Ltd licensed contractors.

6.2 Dry storage must be provided on site for the LOXO Cladding Panel, fiberglass mesh and bags of render with the LOXO Cladding Panels stored flat and protected from physical damage. EPS, timber battens, uPVC flashing and mouldings must be protected from direct sunlight, physical damage and stored flat and under cover. All liquid components shall be stored in dry, frost free conditions.

6.3 Handling of LOXO Cladding Panels require care to prevent damage to corners or excessive flexing.

6.4 Handling and storage of all the materials supplied by the building contractor, both on and off site is the responsibility of the building contractor. Materials must be handled and stored in accordance with the manufacturers instructions.

Design Information

Framing

Timber Framing

7.1 Timber used in timber framing shall be treated as required by NZS 3602

7.2 Timber framing must comply with NZS 3604 for both buildings or parts of buildings within the scope limitations of NZS 3604. Where buildings or parts of

buildings are outside the scope of NZS 3604 then they must be to specific design in accordance with NZS 3603 and AS/NZS 1170. Where specific design is required, the framing must be of at least the equivalent stiffness to the framing provisions of NZS 3604. In all cases, studs must be at a maximum of 600mm centres.

7.3 Timber framing must have a maximum moisture content of 18% at the time of cladding application. *(Problems could arise later on due to timber shrinkage if over 18%)*

Steel Framing

7.4 Steel framing must be to a specific design meeting the requirements of the NZBC. (NASH 3405: 2006)

7.5 The minimum steel framing specification is 'C' section studs and nogs of overall section dimensions of 76mm web by 40mm flange. Steel thickness must be a minimum 0.55mm.

7.6 For steel framed buildings situated within NZS3604 defined wind zones up to and including 'Very High', studs must be at maximum 600mm centres. All other buildings studs must be at maximum 400mm centres. Dwangs must be fitted flush with the stud.

Frame Protection System

7.7 A Frame Protection System as described earlier is required to be installed.

LOXO Cladding Panel Layout

7.8 LOXO Cladding Panels are installed horizontally in a stretcher-bond pattern. Vertical panel edges may be jointed on stud or off stud. LOXO Cladding Panels must be supported at fixing locations with vertical cavity battens or cavity spacers 100mm long max. in accordance with the requirements of NZBC Acceptable Solution E2/AS1, paragraph 9.1.8.2(f). At the base of the wall the LOXO Cladding Panel can be either rested on a concrete rebate (75mm below finished floor level) or hang 50mm below the finish floor level.

General

8.1 Punchings in the slotted vermin control cavity closer provide a minimum ventilation opening area of 1000mm² per lineal metre of wall as per the requirements of NZBC Acceptable Solution E2/AS1, paragraph 9.1.8.3 (b).

8.2 The LOXO Vents (both Classic and Deluxe) provide a minimum ventilation opening area of 1000mm² per lineal metre of wall, when fixed at 1000mm(Classic) or 1500mm(Deluxe) centres respectively as per the requirements of NZBC Acceptable Solution E2/AS1 paragraph 9.1.8.3 (b).

8.3 The ground clearance between the finished floor level and ground level as outlined in NZS 3604 must be adhered to at all times. At ground level, paved surfaces must be kept clear from the bottom edge of the LOXO Cladding Panel Veneer System by a minimum of 100mm, and unpaved surfaces by 175mm in accordance with the requirements of NZBC Acceptable Solutions E2/AS1, Table 18.

8.4 At balcony, deck or roof to wall junctions, the bottom edge of the PANEL NAME must be kept clear of any adjacent surface, or above the top surface of any adjacent roof flashing by a minimum of 35mm in accordance with the requirements of NZBC Acceptable Solution E2/AS1, paragraph 9.1.3.6.

8.5 Where the LOXO Cladding Panel Veneer System abuts other cladding systems, designers must detail the junction to meet their own requirements whilst meeting performance requirements of the NZBC. The Technical Literature does provide some guidance. Details not included within the Technical Literature have not been assessed and are therefore outside the scope of this Appraisal.

8.6 All buildings must have barriers to airflow consisting of interior linings with all joints stopped, or where walls are not lined, such as attic spaces at gable end, a rigid sheathing or air barrier, complying with Acceptable Solutions E2/AS1 Table 23, must be fixed to framing prior to fixing cladding or cavity battens as per paragraph 9.1.4 E2/AS1.

8.7 PVC sheathed electrical cables must be prevented from direct contact with the LOXO EPS cavity battens. When cables must penetrate the EPS cavity battens for electrical connections, the cable must be directly supported by passing through an electrical conduit.

Control Joints

9.1 Control joints where LOXO Cladding Panels are used must be constructed in accordance with the Technical Literature and as follows;

- Horizontal control joints - To be installed when intermediate floor joists are not seasoned and/or when the height of the wall exceeds 8m
- Vertical Control Joints - at maximum 8m centres; aligned with any control joint within the structural framing, or where the system abuts other cladding systems. Located at both internal and external corners.

(Note: Where possible control joints shall be located in line with window and door openings. 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 or those that are marked as 'Specific Design Only' are outside the scope of this Appraisal Certificate and are the responsibility of the designer.)

Interstorey Junction

10.1 Inter-storey drained joints must be provided for walls over 2 storeys in height in accordance with the requirements of NZBC Acceptable Solution E2/AS1, paragraph 9.1.9.4 (b).

Structure - Clause B1

Mass

11.1 The mass of LOXO Cladding Panel Veneer System (panel and coating system) has a approximate mass of 32kg/m², considered a medium wall cladding in terms of NZS 3604.

Impact Resistance

11.2 The system has adequate resistance to impact loads that the cladding system is likely to be subjected to when used in a residential situation. The likelihood of impact damage to the system when used in light commercial situations should be considered at the design

stage, with appropriate protection provided such as bollards or barriers where necessary.

Wind Zone

11.3 The LOXO Cladding Panel Veneer System is suitable for use in all building wind zones as per NZS 3604, up to, and including 'Very High' where buildings are designed to meet the performance requirements of NZBC Acceptable Solution E2/AS1, or up to the ultimate limit state (ULS) wind pressure of 2500Pa when the building is subject to specific design.

LOXO Cladding Panel Fixing

11.4 Where a 20mm (Classic) or 50mm (Deluxe) cavity is produced the respective cavity battens are fixed (either deluxe or classic) through to the wall framing at 600mm centres vertically. The LOXO Cladding Panel must then be fixed through the cavity batten and/or cavity spacers and into the framing with a bugle head screw. (refer to 4.1) at 500mm centres.*

Note:

- *500mm centres is applicable to both;*
  Low to very high NZS 3604 defined building wind zones with studs at maximum 600mm centres, and;
  Specifically designed buildings up to design differential 2.5kPa ULS wind pressure with studs at maximum 600mm centres.
- ** Fixings to be positioned minimum 50mm in from the edge of the panel giving an overall layout of 500mm centres per panel.*
- *Fixings are also required horizontally at 600mm centres.*
- *A minimum of 6 bugle headscrews per full panel (2200 x 600mm) is required.*
- *Bugle head screws must be embedded a minimum of 5mm into the* LOXO Cladding Panel *and a maximum of 10mm.*

Durability– Clause B2

12.1 The LOXO Cladding Panel Veneer System when used in accordance with this Appraisal Certificate and subjected to normal conditions of environment and use will meet the performance requirements of NZBC B2.3.1 (b), 15 years for the cladding system and plaster finish, and the performance requirements of NZBC B2.3.1 (c), 5 years for the exterior paint system (the life of the product not being less than 5 years).

Maintenance

12.2 Regular maintenance is essential to ensure the performance requirements of the NZBC are met and to ensure the maximum serviceability of the LOXO Cladding Panel Veneer System.

12.3 Regular cleaning (at least annually) of the paint coating is required to remove grime, dirt and organic growth as per the Technical Literature in order to maximize the life and appearance of the acrylic paint coating. Paint coatings must be reapplied every 10 years in accordance with the paint manufacturers instructions. Re-coating colours shall have an LRV (light reflectance value) of 40% or greater.

12.4 Regular inspections (at least annually) must be made on the system to ensure that all aspects of the LOXO Cladding Panel Veneer 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 that could allow water ingress, must be repaired immediately. The LOXO Cladding Panel Veneer System must be maintained and repaired in accordance with the instructions from LOXO Cladding NZ Ltd.

12.5 Minimum ground clearance as set out in this Appraisal and Technical Literature must be maintained at all times during the life of the system to maintain the durability and weathertightness of the system.

External Fire spread - Clause C3

13.1 The LOXO Cladding Panel Veneer System is considered to meet the performance requirements of NZBC C3.3.5 for use as an external wall cladding 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.

13.2 Clearance separations from chimneys and flues are not required for the LOXO Cladding Panel. Where the panel is used with or attached to a heat sensitive material, the heat sensitive materials must be separated from chimneys and flues in accordance with the performance requirements of NZBC Acceptable solution C/AS1, part 9 for protection of combustible materials.

External Moisture - Clause E2

14.1 When installed in accordance with this Appraisal Certificate and Technical Literature, the LOXO Cladding Panel Veneer System will prevent the penetration of water that could cause undue dampness and/or damage to building elements and will therefore comply with clause E2.3.2.

14.2 The cavity must be sealed off from the roof and subfloor space in order to meet the performance requirement of E2.3.5.

14.3 The LOXO Cladding Panel Veneer System allows excess moisture present at the completion of construction to be dissipated without causing permanent damage to the building elements to meet the performance requirement of Clause E2.3.6.

14.4 The details provided within the Technical Literature for weather resistance are based on the design principle of employing both a 1st and 2nd line of defence against moisture entry for joints, penetrations and junctions. Moisture ingress must be prevented by detailing any joinery or wall junctions as shown in the LOXO Cladding Panel Veneer System technical manual. Any weathertightness details developed by a designer are outside the scope of this Appraisal Certificate and are the responsibility of the designer .

14.5 The presence of a drained cavity does not reduce the requirement to ensure the cladding wall and all the relevant junctions, penetrations etc remain weather resistant in order to comply with Clause E2.3.6.

Water Vapour

14.6 The LOXO Cladding Panel Veneer System is not a barrier to the passage of water vapour, and when correctly installed in accordance with both this Appraisal and Technical Literature will not create or increase the risk of moisture damage resulting from condensation.

When installed over steel frame please refer to 14.7.

14.7 When the LOXO Cladding Panel Veneer System is installed over a steel frame, 10mm (V.H) expanded polystyrene thermal break sheeting with a R value of at least 0.3, must be installed over the steel frame (stud, nog, top and bottom plate) to provide a thermal break in accordance with the requirements of NZBC Acceptable Solution E3/AS1, Paragraph 1.1.4(d). Building wrap is then dressed over the top of the sheeting followed by the installation of the cavity battens.

Installation Information

Installation Skill Level Requirement

15.1 The Frame Protection System shall be installed according to the manufacturer's instructions, according to good trade practice to ensure compliance with the performance requirements of the New Zealand Building Code.

15.2 To achieve the latter requirement, installers of cladding systems, need a suitable check-sheet, which the owner (or their representative) signs off before installation of the cladding commences.

15.3 Installation and finishing of the components and accessories supplied by LOXO Cladding NZ Ltd and the licensed contractors must be completed by trained installers/applicators, certified by LOXO Cladding NZ Ltd.

15.4 Installation of the accessories supplied by the building contractor must be completed by a tradesperson who has an understanding of cavity based cladding construction, in accordance with instructions given within the LOXO Cladding Panel Veneer System Technical Manual and this Appraisal Certificate.

System Installation

16.1 The selected building wrap and flexible flashing tape must be installed by the building contractor in accordance with the wrap and tape manufacturer's instruction, prior to the installation of the cavity battens and the rest of the LOXO Cladding Panel Veneer System. The building wrap shall be run horizontally and be continuous around corners. The wrap must be lapped not less than 75mm at horizontal joints and not less than 150mm over studs at vertical joints. Care must be taken in the installation of the building wrap and flashing tape around window and door openings to ensure a continuous seal is achieved and all exposed wall framing in the opening is protected.

16.2 Aluminum joinery must be installed by the building contractor in accordance with the LOXO Technical Literature. A 7.5-10mm nominal gap must be left between the joinery reveal and the wall framing so a PEF rod and airseal can be installed after the joinery has been secured in place. The joinery must be spaced approx 22-23mm from the outside of the wall frame for the Classic 20mm cavity system.

16.3 The joinery must be spaced approx 52-53 mm from the outside of the wall frame for the Deluxe 50mm cavity system.

LOXO Cladding Panel Veneer System

16.4 Must be installed in accordance with the Technical Literature by LOXO Cladding NZ Ltd licensed contractors.

16.5 The Technical Literature must be referred to during the inspection of the LOXO Cladding Panel Veneer System installations.

Finishing System

16.6 The application of the Grano Sponge Finish Satin System must be applied in accordance with the manufacturers instructions at all times. The plaster must be cured for a minimum of 2-3 days and must be dry before painting may commence.

Health and Safety

17.1 When cutting, drilling or grinding the LOXO Cladding Panel, this must be carried out in an open air or well ventilated area, and a dust mask, eye protection and gloves must be worn.

17.2 All aspects of cutting, drilling or grinding must comply with the latest regulations of the occupational safety and health division of the labour department.

17.3 Refer to the Technical Literature from the relevant manufacturer for the safe use and handling of the components that make up the LOXO Cladding Panel Veneer System.

Basis of Appraisal

BEAL use the compliance verification procedure to demonstrate compliance with the relevant clauses of the NZBC based on a risk analysis procedure. The following is a summary of the technical investigations carried out

Tests

18.1 The following testing of the LOXO Cladding Panel Veneer System and its respective components has been undertaken by BEAL unless otherwise noted:

- BEAL opinion on NZBC E2 code compliance was based on the evaluation of all details within the scope of this Appraisal and testing of LOXO Cladding Panel Veneer System to E2/VM1. The testing assessed the performance of the window head, jamb and sill details, meterbox head, jamb and sill details, vertical control joints, internal and external corners. BEAL have also reviewed the details contained within the technical manual, and a opinion has been given by BEAL that the system will meet the performance levels of E2/AS1 for a drained cavity system.
- Adhesion and compatibility testing of the Grano Sponge Finish plaster products with the LOXO Cladding Panel in accordance with ASTM C297.
- The flexural ability of the Grano Sponge Finish plaster products were also assessed to verify durability.
- Testing undertaken by OPUS laboratories in determining the compressive strength, dry bulk density and drying shrinkage of the LOXO Cladding Panel to verify the durability of the system.
- Corrosion protection of the steel wire reinforcement in the LOXO Cladding Panel was tested to verify durability and conducted by AZUMA design in Australia to AS2331.3.11 and ASTM B117.

Other Investigations

19.1 Wind loadings, self weight, seismic loadings, shear force, panel capacity, fastener pull through testing and calculations for the LOXO Cladding Panel Veneer System were determined by an independent Chartered Engineer in respect to the requirements of compliance document B1 Structure. Structural and durability opinions were provided.

19.2 Ease of application has been assessed

19.3 The Technical Literature for the LOXO Cladding Panel Veneer System has been examined by BEAL and found to be satisfactory.

Quality

20.1 The manufacture of the renders has been assessed by BEAL, including quality control measures. Details regarding the quality and composition of the materials used were obtained by BEAL and found to be satisfactory.

20.2 The quality of materials, components and accessories supplied by LOXO Cladding NZ Ltd is managed through the use of the Building Product Quality Plan.

20.3 The LOXO Cladding NZ Ltd Building Product Quality Plan ensures continuous conformance with the quality requirements from purchase to supply of components.

20.4 LOXO Cladding NZ Ltd Building Product Quality Plan is reviewed at least annually by BEAL.

20.5 Quality on site is the responsibility of the LOXO Cladding NZ Ltd licensed contractors.

20.6 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of framing systems, joinery, building wrap, flashing tapes, head flashings and air seals in accordance with the instructions of LOXO Cladding NZ Ltd and this Appraisal Certificate.

20.7 For a copy of this Technical Literature and any subsequent updates please refer to: www.loxocladding.co.nz

20.8 Building owners are responsible for the maintenance of the LOXO Panel Veneer Cladding System in accordance with instructions of LOXO Cladding NZ Ltd and this Appraisal Certificate.

Sources of Information

- AS 2331.3.1 Methods of test for metallic and related coatings -Corrosion and related property test
- AS 3566 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
- ASTM B117 Standard practice for operating salt spray apparatus
- ASTM C 297: Standard test method for flatwise tensile strength of sandwich constructions.
- ASTM C 1386: Standard specification for precast autoclaved aerated concrete (AAC)
- NASH 3405:2006 Steel framed buildings
- NZS 3602:2003 Timber and wood-based products for use in building.
- NZS 3603:1993 Timber structures standard
- NZS 3604:1999 Timber framed Buildings
- NZS 4211:1985 Specification for performance of windows
- Compliance Document for New Zealand Building Code External Moisture Clause E2, Department of Building and Housing, Third edition May 2008, incorporating amendments 1 to 4.
- New Zealand Building Code Handbook and Approved Documents, Building industry Authority, 1992.
- The Building Regulations 1992, up to, and including October 2004 Amendment.

Amendments

A1.0 - May 2011:

Updated appraisal document to new format and the addition of further information and limitations including

- Scope and limitations reconfigured
- Technical specifications revised and expanded
- Expansion of handling and storage conditions
- Technical literature version updated
- Design information expanded and applied
- Installation Information added
- Basis of appraisal revised and expanded
- 'Product QA information' revised and expanded under new sub heading 'Quality'
- Sources of Information updated
- Conditions of appraisal revised and updated.

A2.0 - Aug 2013:

Updated appraisal document to reflect the change from Dulux to Wattyl render and coating systems as a finishing system.

- Requirement for a Frame Protection System included
- Technical Manual version updated

Concluding statement

21.1 In the opinion of BEAL, the LOXO Panel Veneer Cladding System is fit for purpose and will comply with the NZBC to the extent specified provided that it is used, designed, installed and maintained as set out in this Appraisal Certificate.
The Appraisal Certificate is issued only to LOXO Cladding NZ Ltd, and is valid until further notification, subject to the conditions of this Appraisal.

Conditions of Appraisal

1. This Appraisal Certificate :
   - A) Relates only to the LOXO Panel Veneer Cladding System 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 BEAL

2. The Appraisal Certificate holder continues to meet the quality requirements of the LOXO Cladding NZ Ltd Building Product Quality Plan and has the appraisal re-validated and the Building Product Quality Plan audited by BEAL on an annual basis.

3. LOXO Cladding NZ Ltd, shall notify BEAL and obtain approval of any changes in suppliers, product specification or quality assurance prior to product being marketed including any trade literature, web site info or the like.

4. BEAL makes no representation 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 the Appraisal Certificate holder

5. BEAL's verification of the building product or system complying with one or more above-mentioned criteria is given on the basis that the criteria used were those that were appropriate to demonstrate compliance with the NZBC at the date of this Appraisal Certificate. In the event that the criteria is withdrawn or amended at a later date, this Appraisal may no longer remain valid.

6. Any reference in this Appraisal Certificate to any other publication shall be read as a reference to the version of publication specified in this Appraisal Certificate.

Authorised Signatory

C R Prouse - Director
[UPDATED AUG 2013]

DOCUMENTS DEMONSTRATING COMPLIANCE WITH THE NEW ZEALAND BUILDING CODE:

LOXO CLADDING SYSTEMS

BEAL BUILDING ELEMENT ASSESSMENT LABORATORY LIMITED

DATE: _____ CONSENT #_____

SUBMITTED BY: _____

OWNER/APPLICANT: _____

ARCHITECT/DESIGNER/ENGINEER: _____

CONSENT ADDRESS: _____

RELEVANT PERFORMANCE CLAUSES: **B1.3.2, B1.3.3, B2.3.1 (a), (b) & (c), E2.3.2** and **F2.3.1**.

INFORMATION DEMONSTRATING COMPLIANCE WITH THE SPECIFIED PERFORMANCE CLAUSES -

CLAUSE	REQUIREMENT/STANDARD	DOCUMENTED EVIDENCE
B1.3.2/B1.3.3	Calculations meeting AS/NZS1170	1. LOXO Wall Cladding assessment - from Kirk Roberts Consulting Engineers Ltd. Dated 11/03/2010 2. Compression testing on 50mm AAC panel – OPUS International Consultants Dated 02/03/2010
B2.3.1(a), (b) & (c),	Test Reports or Expert Opinion for components & system	1. Expert opinion on component durability from BEAL Testing Services as per BEAL Appraisal C908 2. BTS Test Report TR080829B covering water vapour transmission 3. BTS Test Report TR100128 covering durability of render adhesion
E2.3.2	Review of weathertightness design Test Report or Expert Opinion	1. Expert opinion on the design from BEAL Testing Services as per BEAL Appraisal C908 2. BTS assessment of Risk Score based on MBIE Guidance Document External Moisture – a guide to using the risk matrix.
F2.3.1	Test Report or Expert Opinion	1. Expert opinion on the design from BEAL Testing Services as per BEAL Appraisal C908.

Refer to the LOXO Technical Manual version August 2013 and BEAL Appraisal Certificate C908 Updated August 2013

BEAL Testing Services are an independent third party building product testing facility specialising in the evaluation of residential envelope products since 2004.