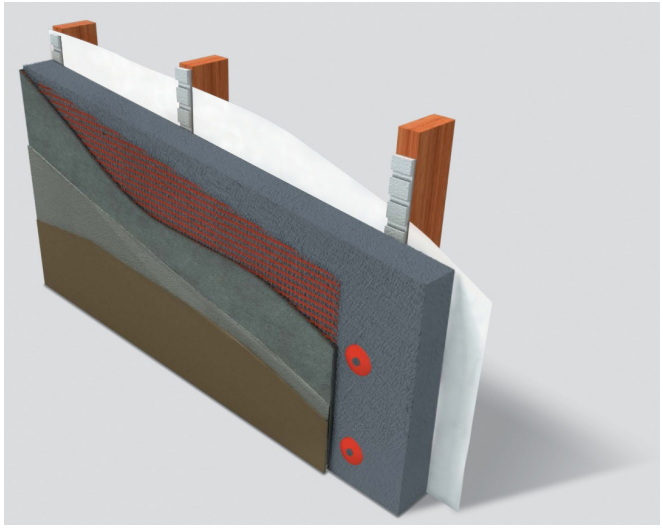
BRANZ Appraised
Appraisal No. 510 [2019]

CAVITECLAD EXTERIOR INSULATION AND FINISHING SYSTEM



Appraisal No. 510 (2019)

This Appraisal replaces BRANZ Appraisal No. 510 (2013)

Amended 02 June 2023

CaviteClad
EXTERIOR INSULATION AND FINISHING SYSTEM

BRANZ Appraisals

Technical Assessments of products for building and construction.

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Product

1.1 Caviteclad Exterior Insulation and Finishing System (EIFS) is a 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 either 50 mm (Caviteclad) expanded polystyrene (EPS) sheets, thermoset phenolic foam sheets or extruded polystyrene (XPS) sheets , or 75 mm (Thermashell) EPS sheets. These are fixed over polystyrene battens to form a cavity. The coating system consists of a 3-4 mm thickness of fibreglass mesh reinforced base coat plaster, followed by the application of 1-2 mm thick finishing plaster, which is then finished with an 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 20 mm drained cavity.

Scope

2.1 Caviteclad 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,
- constructed with timber 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,
- situated in NZS 3604 Wind Zones up to, and including, Extra High.

2.2 Caviteclad 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 with regard to building height and floor plan area; and,
- constructed with timber or steel framing complying with the NZBC; and,
- situated in areas of specific design wind pressures up to a maximum design differential ultimate limit state (ULS) of 2.5 kPa.

2.3 Caviteclad 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 has been appraised for use with aluminium window and door joinery that is installed with vertical jambs and horizontal heads and sills. *[Note: The Appraisal of Caviteclad relies on the joinery meeting the requirements of NZS 4211 for the relevant Wind Zone or wind pressure.]* The system may also be used with uPVC window and door joinery systems that hold a current BRANZ Appraisal for use with residential type construction.

2.5 Installation of components and accessories supplied by Specialized Construction Products, its certified distributors and certified plasterers must be carried out only by Specialized Construction Products certified plasterers.

Building Regulations

New Zealand Building Code (NZBC)

3.1 **In the opinion of BRANZ, Caviteclad, 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. Caviteclad meets the requirements for loads arising from self-weight, wind, impact and creep [i.e. B1.3.3 (a), (h), (j) and (q)]. See Paragraphs 8.1–8.5.

Clause B2 DURABILITY: Performance B2.3.1 (b) 15 years, B2.3.1 (c) 5 years and B2.3.2. Caviteclad meets these requirements. See Paragraphs 9.1–9.3.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. Caviteclad meets this requirement. See Paragraphs 14.1–14.5.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Caviteclad meets this requirement.

Technical Specification

4.1 System components and accessories supplied by Specialized Construction Products are as follows:

Foamed Plastic Components

- **Cavity battens** - manufactured from high density (Class H) expanded polystyrene (EPS) with a density of no less than 24 kg/m^3. The battens are 45 mm wide by 21 mm thick and are supplied in 1,200 mm lengths.
- **Caviteclad sheets** (option 1) - 50 mm thick Class S EPS (Neopor®) with a density of no less than 16 kg/m^3. The sheets are supplied in lengths ranging from 2.4 to 3.6 m x 1.2 m wide and are manufactured to meet the requirements of AS 1366.3.
- **Caviteclad sheets** (option 2) - 50 mm thick rigid thermoset phenolic insulation core, sandwiched between two layers of tissue-based facing (Kooltherm® K5). The sheets are supplied in lengths of 2.4 m x 1.2 m wide, and are manufactured to meet the requirements of AS 1366.1.
- **Caviteclad sheets** (option 3) - 50 mm thick XPS (Styroboard®) with a density of no less than 32 kg/m^3. The sheets are supplied in lengths of 2.2 m x 0.6 m wide and are manufactured to meet the requirements of AS 1366.4.
- **Thermashell sheets** - 75 mm thick Class S EPS (Neopor®) with a density of no less than 16 kg/m^3. The sheets are supplied in lengths of 2.4 m x 0.6 m wide and are manufactured to meet the requirements of AS 1366.3.

Plasters

- **Coarse Mesh Coat (cement-based mesh coat)** - a polymer-modified, Portland cement-based plaster supplied in 20 kg bags that is mixed on-site with clean water. It is applied as the base coat in a minimum 2-3 mm layer followed by the embedment of fibreglass mesh reinforcement in the outer surface.
- **Powaflex (polymer-based mesh coat)** - a fibre-reinforced acrylic plaster supplied in 20 kg bags that is mixed on-site with clean water. It is applied as the base coat in a minimum 2-3 mm layer followed by the embedment of fibreglass mesh reinforcement in the outer surface.

- **Fine Mesh Coat** - a polymer-modified, Portland cement-based plaster supplied in 20 kg bags that is mixed on-site with clean water. It is applied as the base coat around window and door penetrations in a minimum 2-3 mm layer followed by the embedment of fibreglass mesh reinforcement in the outer surface. It is also used to achieve a heavy stucco texture finish when sprayed through a hopper gun or sagola gun.
- **Float Finish** - a polymer-modified, Portland cement-based finishing plaster supplied in 20 kg bags that is mixed on-site with clean water. It is trowel-applied in two coats (1-2 mm per layer) over the mesh coat and is polished flat to achieve a fine granular finish.
- **Spanish Finish** - a polymer-modified, Portland cement-based finishing plaster supplied in 20 kg bags that is mixed on-site with clean water. It is trowel-applied to achieve an undulating style finish.
- **Dulux Acratex Acrylic Texture** - a ready-to-use, synthetic resin-based render which is polished flat to achieve a fine granular finish. It is supplied in 15 L pails.

Accessories

- **Reinforcing mesh** – alkali-resistant fibreglass mesh with a nominal mesh size of 4 mm square and a weight of 150 g/m^2 for use in domestic and light commercial situations.
- **uPVC components** – base bead, sill flashing, jamb flashing, head flashing, corner sockets, lipped L-Bead, 50 mm U-Channel, 50 mm high backed U-Channel, 70 mm U-Channel, 20 x 20 L-Bead, 50 x 20 L-Bead and flat U-Channel.
- **Caviteclad sheet nail fixings (timber frame)** – 100 x 4 mm hot-dip galvanised flat head nails with 42 mm diameter polypropylene washers. *(Note: Hot-dip galvanising must comply with AS/NZS 4680.)*
- **Caviteclad sheet screw fixings (timber frame)** - 100 mm x 10 g AS 3566 Corrosion Class 4, hot-dip galvanised, countersunk, square-drive woodscrews with 42 mm diameter polypropylene washers, or 100 mm x 10 g Grade 304 stainless steel, countersunk, square-drive woodscrews with 42 mm diameter polypropylene washers.
- **Thermashell sheet fixings (timber frame)** – 8 g x 120 mm AS 3566 Corrosion Class 4 hot-dip galvanised wood screws in NZS 3604 defined Exposure Zones B, C and D with 42 mm diameter polypropylene washers.
- **Caviteclad sheet and Thermashell sheet fixings (steel frame)** – minimum 6 g AS 3566 Corrosion Class 4 self-drilling screws in NZS 3604 defined Exposure Zones B, C and D with 42 mm diameter washers. The screw length must allow a minimum 10 mm penetration through the steel framing.
- **Cavity batten fixings** – 30 x 2.5 mm hot-dip galvanised steel flat head nails for timber frame, or construction adhesive for fixing to building underlay over timber or steel frame.
- **Thermashell joint adhesive** – EPS compatible self-expanding, moisture cure polyurethane foam adhesive for bonding Thermashell sheet joints during construction.
- **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.
- **Adhesive** – EPS compatible adhesive for adhering uPVC components to the Caviteclad sheets and Thermashell sheets as and where required.

4.2 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.
- **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.

Paint System Specification

4.3 Dulux Acratex 955 Acrashield Advance is a 100% acrylic-based exterior paint formulated for use over Specialized Construction Products cement-based finishing plasters. It is supplied in 10 L pails. At least two coats of Dulux Acratex 955 Acrashield Advance must be used over the finishing plasters to make the system weathertight and give the desired finish colour to exterior walls.

4.4 Dulux Acratex Green Render Sealer is used to seal the face of the Dulux Acratex 955 Acrashield Advance paint. It is supplied in 10 L buckets.

4.5 The Dulux Acratex 955 Acrashield Advance colours must have a light reflectance value of 40% minimum, regardless of gloss value. Other proprietary paint systems that are not supplied by Specialized Construction Products have not been assessed and are outside the scope of this Appraisal.

Handling and Storage

5.1 Handling and storage of all materials supplied by Specialized Construction Products or the certified plasterers, whether on-site or off-site, is under the control of Specialized Construction Products certified plasterers. Dry storage must be provided on-site for the fibreglass mesh and bags of plaster. EPS battens, Caviteclad sheets and Thermashell sheets, 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-site 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.

5.3 Plaster must be used within the designated shelf life from the date of manufacture.

Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for Caviteclad. 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. Reference can also be made to the BRANZ Texture Coated Claddings Good Practice Guide for general design and installation information. The Caviteclad 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

Timber Treatment

7.1 Timber wall framing behind Caviteclad 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.

7.3 For buildings situated in NZS 3604 defined Wind Zones up to, and including, Very High, studs must be at maximum 600 mm centres. For all other buildings, studs must be at maximum 400 mm centres. Dwangs must be fitted flush between the studs at maximum 800 mm centres.

7.4 Timber framing must have a maximum moisture content of 24% at the time of the cladding installation. *[Note: If Caviteclad sheets and Thermashell sheets 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 of overall section size of 75 mm web and 32 mm flange. Steel thickness must be a minimum 0.55 mm.

7.7 For steel-framed buildings situated in NZS 3604 defined Wind Zones up to, and including, Very High, studs must be at maximum 600 mm centres. For all other buildings, studs must be at maximum 400 mm centres. Dwangs must be fitted flush between the studs at maximum 800 mm centres.

EPS Sheet Conditioning

7.8 Caviteclad sheets or Thermashell sheets must be properly kiln dried or allowed to release their surface tension by sitting for 2 months prior to installation, otherwise cupping problems may occur at a later date due to excessive tension and or shrinkage within the backing substrate.

Caviteclad 50 mm Sheet Setout for EPS and Phenolic Resin Sheets

7.9 All vertical sheet edges must be supported and fixed through the cavity battens to the framing. Horizontal sheet edges must be supported at fixing locations with cavity spacers that comply with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.2 f). The detail at the base of the wall must comply with the requirements of NZBC E2/AS1 Figure 125.

7.10 Additional battens and framing will be required at soffits, internal and external corners and window and door openings for the support and fixing of sheet edges.

Caviteclad 50 mm XPS and Thermashell 75 mm Sheet Setout

7.11 Sheets must be installed horizontally. Vertical and horizontal sheet joints must be bonded with Thermashell joint adhesive during installation. Vertical sheet edges may be jointed on-stud or off-stud. Horizontal sheet edges do not require edge fixing, except at soffits and window and door openings where additional framing will be required for the support and fixing of sheet edges. Vertical sheet joints must be staggered by a minimum of 200 mm each row. Thermashell sheets must be supported at fixing locations with vertical cavity battens or cavity spacers that comply with the requirements of NZBC Acceptable Solution E2/AS1 Paragraph 9.1.8.2 f). The detail at the base of the wall must comply with the requirements of NZBC E2/AS1 Figure 125.

General

7.12 When Caviteclad 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 Caviteclad sheet and Thermashell sheet 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.

7.13 Punchings in the base bead and head flashing provide a minimum ventilation opening area of 1,000 mm^2 per lineal metre of wall, in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.3 b).

7.14 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 and Figure 65.

7.15 At balcony, deck or roof/wall junctions, the bottom edge of the Caviteclad 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.

7.16 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.

7.17 Where penetrations through the Caviteclad 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.

7.18 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

7.19 PVC sheathed electrical cables must be prevented from direct contact with the foam backing substrate that is used for the Caviteclad system. When cables must penetrate the foam sheets for exterior electrical connections, the cable must be directly supported by passing through an electrical conduit.

Control Joints

7.20 Control joints must be constructed in accordance with the Technical Literature, and be provided as follows:

- Horizontal control joints – at maximum 6 m centres.
- Vertical control joints – at maximum 20 m centres; aligned with any control joint in the structural framing; where the system abuts different cladding types, or where the system covers different structural materials.

[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 7.18.]

Inter-storey Junctions

7.21 Inter-storey junctions 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 plus a gable end or 7 m in height, in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.9.4 b). *[Note: Refer to Paragraph 12.1 for the requirements for barriers to vertical fire spread at inter-storey junctions for buildings of three or more floors.]*

Structure

Mass

8.1 The mass of the Caviteclad system incorporating Caviteclad sheets or Thermashell sheets is approximately 7 kg/m^2 at equilibrium moisture content. It is therefore considered a light wall cladding in terms of NZS 3604.

Impact Resistance

8.2 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

8.3 Caviteclad 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.

Caviteclad Sheet Fixing

8.4 Caviteclad sheets must be fixed through the cavity battens and cavity spacers to the wall framing at maximum centres specified in Table 1 and Table 3.

Thermashell Sheet Fixing

8.5 Thermashell sheets must be fixed through the cavity battens and cavity spacers to the wall framing at maximum centres specified in Table 2 and Table 3.

Table 1: Caviteclad EPS and Phenolic Resin Sheet Fixing Centres for Edges and Intermediate Studs

NZS 3604 Wind Zone with studs at maximum 600 mm centres	Maximum fixing centres (mm)
Low	300[1]
Medium	300[1]
High	300[1]
Very High	200[2]

1. One fixing is required into each dwang and top and bottom plates at mid-dwang length.

2. Fixings are also required into each dwang at 200 mm centres and top and bottom plates at mid-dwang length.

Table 2: Caviteclad XPS and Thermashell Sheet Fixing Centres for Edges and Intermediate Studs

NZS 3604 Wind Zone with studs at maximum 600 mm centres	Maximum fixing centres (mm)
Low	300[1]
Medium	300[1]
High	300[1]
Very High	200[2]

1. One fixing is required into each dwang and top and bottom plates at mid-dwang length.

2. Fixings are also required into each dwang at 200 mm centres and top and bottom plates at mid-dwang length.

Table 3: Caviteclad Sheet and Thermashell Sheet Fixing Centres for Edges and Intermediate Studs – NZS 3604 Wind Zone Extra High and Specific Design Wind Zones

NZS 3604 Wind Zone Extra High and specifically designed buildings up to 2.5 kPa ULS wind pressure with studs at maximum 400 mm centres		
Maximum vertical fixing centres (mm) along studs	Maximum horizontal fixing centres (mm) along top and bottom plates	Maximum horizontal fixing centres (mm) along dwangs
150	200	150

Durability

9.1 Caviteclad 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

9.2 Caviteclad is expected to have a serviceable life of at least 30 years provided the system is maintained in accordance with this Appraisal, and the Caviteclad sheets, Thermashell sheets, fixings and plaster are continuously protected by a weathertight coating and remain dry in service.

9.3 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 Caviteclad 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

10.1 Regular maintenance is essential to ensure the performance requirements of the NZBC are continually met and to ensure the maximum serviceability of the system.

10.2 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. Recoating of the paint system will be required throughout the life of the plaster system. The interval between recoats will depend on the paint colour, orientation, exposure to airborne contaminants and quality of the application. Recoating will be required at approximately 5-10 yearly intervals, in accordance with the instructions of the chosen paint system manufacturer and Specialized Construction Products.

10.3 Annual inspections must be made to ensure that all aspects of the cladding system, including the coating system, plaster, 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 Caviteclad system must be repaired in accordance with the instructions of Specialized Construction Products.

10.4 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 Caviteclad system.)*

Control of Internal Fire and Smoke Spread

11.1 The Caviteclad system includes EPS sheets, phenolic sheets and XPS sheets (combustible insulants), therefore the interior surface finish must achieve a Group Number of not more than 3, as per NZBC Acceptable Solution C/AS1 Section 4.3 and C/AS2 Paragraph 4.17.2. The Caviteclad system will not meet this requirement alone and will need to be enclosed by an interior surface lining so that the completed system achieves a Group Number of not more than 3.

11.2 The EPS, phenolic and XPS sheets used in the Caviteclad system have been tested and comply with the flame propagation criteria of AS 1366 as required by NZBC Acceptable Solution C/AS1 Section 4.3 and C/AS2 Paragraph 4.17.2.

Control of External Fire Spread

Vertical Fire Spread

12.1 This Appraisal only covers buildings 10 m or less in height. NZBC Functional Requirement C3.2 identifies that external vertical fire spread to upper floors only needs be considered for buildings with a building height greater than 10 m. Control of external vertical fire spread is therefore outside the scope of this Appraisal.

Horizontal Fire Spread

12.2 The EPS sheets and finishing plasters have a peak heat release rate of less than 100 kw/m^2 and a total heat released of less than 25 MJ/m^2. Testing was carried out as per Paragraph 5.4 of NZBC Acceptable Solution C/AS1 and Paragraph 5.8.1 of NZBC Acceptable Solution C/AS2, achieving a Type A performance. The Caviteclad system can therefore be used within 1 m of the relevant boundary.

12.3 The phenolic resin and XPS sheets and finishing plasters have not been tested as per Paragraph 5.4 of NZBC Acceptable Solution C/AS1 and Paragraph 5.8.1 of NZBC Acceptable Solution C/AS2, and cannot therefore be used within 1 m of a relevant boundary.

12.4 Refer to NZBC Acceptable Solutions C/AS1 and C/AS2 and Verification Method C/VM2 for fire resistance rating and control of external fire spread requirements for external walls.

Prevention of Fire Occurring

13.1 Separation or protection must be provided to the Caviteclad system from heat sources such as fireplaces, heating appliances, flues and chimneys. Part 7 of NZBC Acceptable Solutions C/AS1 and C/AS2, and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

External Moisture

14.1 Caviteclad, when installed in accordance with the requirements of this Appraisal and the Technical Literature, prevents the penetration of moisture that could cause undue dampness or damage to building elements.

14.2 The cavity must be sealed off from the roof and sub-floor space to meet the performance requirements of NZBC Clause E2.3.5.

14.3 Caviteclad allows excess moisture present at the completion of construction to be dissipated without permanent damage to building elements to meet the performance requirements of NZBC Clause E2.3.6.

14.4 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.

14.5 The use of Caviteclad 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

15.1 Caviteclad 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

15.2 Caviteclad 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.

15.3 When Caviteclad is installed over a steel frame, the EPS battens and insulated drainage cavity will act as a thermal break to the steel frame in accordance with NZBC Acceptable Solution E3/AS1.

Energy Efficiency

Building Thermal Envelope

16.1 NZBC Acceptable Solution H1/AS1 or NZBC Verification Method H1/VM1 can be used for housing, communal residential, communal non-residential and commercial buildings.

Determining Thermal Resistance

16.2 The thermal resistance (R-values) of building elements may be verified by using NZS 4214. The BRANZ House Insulation Guide provides thermal resistances of common building elements and is based on calculations from NZS 4214.

16.3 Calculations in accordance with NZS 4214 require that the ventilated air gap and the thermal resistance of each layer between the ventilated air gap and outside air be de-rated by a factor of 0.45. Therefore, in this system, unless better information is available for a specific design case, the R-value of the Caviteclad system must be taken as set out in Table 4.

16.4 Regardless of the R-value of the wall achieved using the Caviteclad or Thermashell sheets, insulation must always be installed in the framing cavity to suppress convection.

Table 4: R-value (including 0.45 de-rating for substrate)

	EPS Sheet Thickness	
	50 mm	75 mm
Caviteclad Sheet (EPS and XPS)[1]	R0.86	-
Caviteclad Sheet (Phenolic) [2]	R1.38	
Thermashell Sheet (EPS)[1]	-	R1.29

1. Based on a thermal conductivity k value of 0.032 W/m°C

2. Based on a thermal conductivity k value of 0.020 W/m°C

Installation Information

Installation Skill Level Requirement

17.1 All design and building work must be carried out in accordance with the Caviteclad Technical Literature and this Appraisal. Where the work involves Restricted Building Work this must be completed by, or under the supervision of, a Licensed Building Practitioner (LBP) with the relevant License class.

17.2 Installation and finishing of components and accessories supplied by Specialized Construction Products and the certified plasterers must be completed by trained applicators, certified by Specialized Construction Products.

System Installation

Building 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 Caviteclad system. Flexible wall underlay must be installed horizontally and be continuous around corners. Underlay must be lapped 75 mm minimum at horizontal joints and 150 mm minimum over studs at vertical joints. Generic rigid sheathing 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 building 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 in accordance with NZBC E2/AS1 Paragraph 9.1.8.5.

Joinery Installation

18.3 Joinery and associated head flashings 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 the wall frame to allow the Caviteclad flashings to be installed.

Caviteclad

18.4 The system must be installed in accordance with the Technical Literature by Specialized Construction Products certified plasterers.

18.5 The Caviteclad plaster system must only be applied when the air and substrate temperature is within the range of +5° C to +30° C.

18.6 The phenolic resin foam board has only been assessed for use with the Powaflex Mesh Coat. The EPS and XPS foam boards may be used with both the Coarse Mesh Coat and the Powaflex Mesh Coat.

Inspections

18.7 The Technical Literature must be referred to during the inspection of Caviteclad installations.

Finishing

18.8 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 Safe use and handling procedures for the components that make up Caviteclad are provided in the relevant manufacturer's Technical Literature.

Basis of Appraisal

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

Tests

The following testing has been undertaken by BRANZ:

20.2 BRANZ expert opinion on NZBC E2 code compliance for Caviteclad was based on testing and evaluation of all details within the scope and as stated within this Appraisal. Caviteclad was tested to NZBC Verification Method E2/VM1 as contained within NZBC Clause E2, Amendment 5, August 2011. 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 NZBC Acceptable Solution E2/AS1 for drained cavity claddings.

20.3 Wind face load and fastener pull through testing was carried out for the Caviteclad 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.

20.4 Testing of tensile bond strength of the Caviteclad plaster system to the EPS, phenolic resin and XPS substrates was carried out in accordance with ASTM E2134-01.

20.5 Cone calorimeter testing of the Caviteclad plaster system over 50 mm EPS was carried out in accordance with AS/NZS 3837.

Other Investigations

21.1 Structural and durability opinions have been provided by BRANZ technical experts.

21.2 Site inspections of Caviteclad installations have been carried out by BRANZ to assess the practicability of installation, and to review in-service performance.

21.3 The Technical Literature for Caviteclad has been examined by BRANZ and found to be satisfactory.

Quality

22.1 The manufacture of the plasters 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 Caviteclad sheets and Thermashell sheets 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.

22.3 The quality of materials, components and accessories supplied by Specialized Construction Products is the responsibility of Specialized Construction Products.

22.4 Quality on-site is the responsibility of the Specialized Construction Products certified plasterers.

22.5 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of framing systems and joinery, building underlays, flashing tapes and air seals, in accordance with the instructions of Specialized Construction Products.

22.6 Building owners are responsible for the maintenance of Caviteclad installations in accordance with the instructions of Specialized Construction Products.

Sources of Information

- AS 1366.1:1992 Rigid cellular plastics sheets for thermal insulation – Part 1: Rigid cellular polyurethane (RC/PUR).
- AS 1366.3:1992 Rigid cellular plastics sheets for thermal insulation – Part 3: Rigid cellular polystyrene – Moulded (RC/PS-M).
- AS 1366.4:1989 Rigid cellular plastics sheets for thermal insulation - Part 4: Rigid cellular polystyrene - Extruded (RC/PS-E)
- 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.
- AS/NZS 3837:1998 Method of test for heat and smoke release rates for materials and products using an oxygen consumption calorimeter.
- AS/NZS 4680:2006 Hot-dip galvanised (zinc) coatings on fabricated ferrous articles.
- ASTM E2134-01 Standard test method for evaluating the tensile-adhesive performance of an Exterior Insulation and Finish System (EIFS).
- BRANZ House Insulation Guide, Fifth Edition, 2014.
- BRANZ Texture Coated Cladding Good Practice Guide, Third Edition, May 2018.
- NZS 3603:1993 Timber Structures Standard.
- NZS 3604:2011 Timber-framed buildings.
- NZS 4211:2008 Specification for performance of windows.
- NZS 4214:2006 Methods of determining the total thermal resistance of parts of buildings.
- Ministry of Business, Innovation and Employment Record of Amendments – Acceptable Solutions, Verification Methods and Handbooks.
- The Building Regulations 1992.

Amendments

Amendment No. 1, dated 20 January 2023

This Appraisal has been amended to include two new foam boards, additional fixings, and to allow the use of BRANZ Appraised uPVC window and door joinery systems.

Amendment No. 2, dated 02 June 2023

This Appraisal has been amended to only allow the use of Dulux Acratex 955 Acrashield Advance as the paint coating for the system.

BRANZ

In the opinion of BRANZ, Caviteclad Exterior Insulation and Finishing 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 DuluxGroup (New Zealand) Pty Ltd T/A Specialized Construction Products, 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. DuluxGroup (New Zealand) Pty Ltd T/A Specialized Construction Products:
   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 DuluxGroup (New Zealand) Pty Ltd T/A Specialized Construction Products.
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 DuluxGroup (New Zealand) Pty Ltd T/A Specialized Construction Products or any third party.

For BRANZ

Chelydra Percy
Chief Executive

Date of Issue:
18 November 2019