



**BRANZ Appraised**

Appraisal No.772 [2012]

**BRANZ Appraisals**

**Technical Assessments of products  
for building and construction**

**BRANZ  
APPRAISAL  
No. 772 (2012)**

Amended 3 September 2013

**STOPOREN PANEL  
CLADDING SYSTEM**

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## Product

1.1 The StoPoren Panel Cladding System 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 autoclaved aerated concrete (AAC) panels (StoPoren panels) fixed over high density polystyrene battens to form a 20 or 40 mm cavity, or timber cavity spacers to form a 40 mm cavity. The coating system consists of a minimum 5 mm thickness of fibreglass mesh reinforced synthetic resin plasters and synthetic resin finishing plasters applied to the Poren panels. The plaster system is finished with Sto exterior paint system. The top coat plasters can be textured to give different finished appearances.

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 or 40 mm drained cavity.



## Scope

2.1 The StoPoren Panel Cladding 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,
- 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 The StoPoren Panel Cladding System has also been appraised for weathertightness and structural wind loading when used as an external wall cladding for buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 with regards to building height and floor plan area; and,
- constructed with timber and steel framing complying with the NZBC; and,
- situated in specific design wind pressures up to a maximum design differential ultimate limit state (ULS) of 2.5 kPa.

2.3 The StoPoren Panel Cladding 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. (*The Appraisal of the StoPoren Panel Cladding 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 Stoanz Limited and approved installers must be carried out only by Stoanz Limited approved installers.

# Building Regulations

## New Zealand Building Code (NZBC)

**3.1** In the opinion of BRANZ, the StoPoren Panel Cladding 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 StoPoren Panel Cladding 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 – 10.6.

**Clause B2 DURABILITY:** Performance B2.3.1 (b), 15 years, B2.3.1 (c), 5 years, and B2.3.2. The StoPoren Panel Cladding System meets these requirements. See Paragraphs 11.1 and 11.2.

**Clause E2 EXTERNAL MOISTURE:** Performance E2.3.2. The StoPoren Panel Cladding System meets this requirement. See Paragraphs 15.1 – 15.5.

**Clause F2 HAZARDOUS BUILDING MATERIALS:** Performance F2.3.1. The StoPoren Panel Cladding System meets this requirement and will not present a health hazard to people.

**3.2** This is an Appraisal of an **Alternative Solution** in terms of New Zealand Building Code compliance.

## Technical Specification

**4.1** System components and accessories supplied by Stoanz Limited are as follows:

### Cavity Battens

- StoTherm expanded polystyrene (EPS) cavity battens for use in the StoPoren Panel 20 and 40 mm deep cavity systems on timber and steel frame construction are manufactured from high density (Class VH) EPS with an approximate density of 28 kg/m<sup>3</sup>. The battens are 20 or 40 mm thick by 50 mm wide and are supplied in 1200 mm lengths.

### Cavity Spacers

- Timber cavity spacers for use in the StoPoren Panel 40 mm deep cavity systems on timber frame construction are minimum 200 mm long x 40 mm thick x 40 mm wide, and are treated to H3.1. Both the top and bottom surfaces are angled on a 22.5° slope. The sloping faces are parallel.

### StoPoren Panels

- StoPoren panels are 50 mm thick, manufactured from autoclaved aerated concrete with an approximate density of 31 kg/m<sup>2</sup>. StoPoren panels are supplied 2.2 m long x 600 mm wide.

### StoPoren Panel Cladding System Plasters and Primers

- *Poren Adhesive Mortar* is a polymer-modified, Portland cement-based thin section jointing plaster supplied in 25 kg bags and mixed on site with clean drinking water. It is trowel applied to the joints of the StoPoren Panels.
- *S-Protect WS205 Stay Dry* is a clear, ready to use Silane sealer available in 20 or 10 litre containers. It is low pressure spray or brush and roller applied to dry Poren panels on completion before commencing plastering.
- *StoPoren Plaster* is a polymer-modified, white cement-based plaster comprising graded sand and adhesives. The plaster is supplied in 25 kg bags and mixed on site with clean water. It is trowel applied as a base coat in a 2.5 mm thick layer, thick layer followed by the embedment of fibreglass mesh reinforcement in the outer surface. An additional 1.5 mm layer is applied to fully encase the mesh.

- *Stoplex W* is a yellow tinted, ready to use, acrylic-based primer available in 10 litre containers. It is brush and roller applied to dry StoPoren Plaster surfaces prior to the application of the finishing plaster.
- *StoArmat Classic* is a plasticiser free, tintable, ready-to-use, polymer-modified, cement free reinforcement plaster comprising granulated quartz sands, calibration grain, polypropylene fibre and additives. It is supplied in 23 kg pails, and after diluting with water as necessary and mixing, is ready for use. It is trowel-applied in a 2.5 mm thick layer followed by the embedment of fibreglass mesh reinforcement in the outer surface.
- *Stolit MP/K* is a plasticiser free, coloured, ready-to-use, polymer-modified, cement free finishing plaster with a 1, 1.5 or 2 mm grain size or MP sponge finish. It is supplied in 25 kg pails and is trowel-applied to an approximate thickness of 1 – 2 mm.
- *Sto Flexyl* is a cementitious waterproof paste. It is used as a waterproofing membrane over plastered reinforced concrete balustrades and fixing blocks. Sto Flexyl is supplied in 18 kg pails.

### StoPoren Panel Cladding System Paint

- *StoColor Maxicryl* is a ready-to-use, tintable, acrylic exterior paint system for application over finishing plasters. It is supplied in 15 litre pails, and may be brush, roller or spray applied. The paint colour selected must have a light reflectance value (LRV) of 25% minimum regardless of gloss value.
- *StoLotusan Color G* is a ready-to-use, tintable, special dirt and algae resistant mineral silicone resin exterior paint system for application over finishing plasters. It is supplied in 15 litre pails, and may be brush, roller or spray applied. The paint colour selected must have a light reflectance value (LRV) of 25% minimum regardless of gloss value.
- *StoLastic Color Maxicryl* is a ready-to-use, tintable, satin matt, acrylic exterior paint system for application over finishing plasters. It is supplied in 15 litre pails, and may be brush, roller or spray applied. The paint colour selected must have a light reflectance value (LRV) of 25% minimum regardless of gloss value.

### Accessories

- StoPoren Panel Adhesive – AAC compatible polyurethane based construction adhesive for temporarily bonding StoPoren panel joints during construction and for temporarily adhering uPVC trims to StoPoren panels until plastering is completed.
- Reinforcing mesh – alkali-resistant fibreglass mesh with a nominal mesh size of approximately 6.0 x 6.0 mm and an approximate weight of 165 g/m<sup>2</sup>, or with a nominal mesh size of approximately 4.0 x 4.0 mm and an approximate weight of 165 g/m<sup>2</sup>.
- uPVC components – Sto vented base cap, Sto sill and jamb flashing, Sto vented adjustable foot tray and control joint flashing.
- Sto pre-meshed corner beads and finishing edges – uPVC and fibreglass mesh corner and finishing mouldings.

**4.2** Accessories used with the system which are supplied by the Stoanz Limited approved installers are:

- Cavity spacer fixings (timber frame only) – 75 x 3.06 mm hot-dip galvanised D-head, ring shank gun nails in NZS 3604 defined Corrosion Zones B, C and D. (Note: the hot-dip galvanising must comply with AS/NZS 4680.)

- StoPoren fixings (timber frame) – 100 mm long (for 20 mm cavity battens) or 120 mm long (for 40 mm cavity battens) Grade 304 stainless steel wood screws or 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; 10 gauge x 75 mm long (for 40 mm cavity with timber cavity spacers) Grade 304 stainless steel wood screws or AS 3566 Corrosion Class 4 hot-dip galvanised wood screws with a head diameter of 14 mm.
- StoPoren fixings (steel frame) – 100 mm long (for 20 mm cavity battens) or 120 mm long (for 40 mm cavity battens) Type 17, AS 3566 Corrosion Class 4 self drilling screws with a head diameter of 14 mm and a shank diameter of 5.1 mm in NZS 3604 defined Corrosion Zones B and C and Grade 304 stainless steel in Corrosion Zone D.
- 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.
- 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.
- Sto steel primer – rust inhibiting primer applied to the exposed cut ends of StoPoren Panel reinforcing.

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.
- Cavity battens (where StoTherm cavity battens or cavity spacers aren't used) – nominal 50 mm wide by 25 mm thick (minimum finished size of 45 mm wide by 18 mm thick) timber treated to Hazard Class H3.1, or cavity battens covered by a valid BRANZ Appraisal for use as a cavity batten system behind wall claddings.
- Cavity batten fixings – 40 x 2.5 mm hot-dip galvanised steel flat head nails to timber frame and AS 3566 Corrosion Class 3, 30 mm screws to steel frame.
- Thermal break (steel frame) – expanded polystyrene (EPS) in accordance with the requirements of NZBC Acceptable Solution E3/AS1, Paragraph 1.1.4(d), or thermal break products covered by a valid BRANZ Appraisal for use as thermal breaks behind wall claddings.
- 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 Stoanz Limited or the approved installers, whether on or off site, are under the control of Stoanz Limited approved installers. Dry storage must be provided on site for the StoPoren 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 StoPoren Panel Cladding 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.

## Design Information

### Framing

#### Timber Treatment

7.1 Timber wall framing behind the StoPoren Panel Cladding System must be treated as required by NZBC Acceptable Solution B2/AS1.

#### Timber Framing

7.2 Timber framing must comply with NZS 3604 or 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. Dwangs must be fitted flush between the studs at maximum 800 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. (*If StoPoren 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 of 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. Dwangs must be fitted flush between the studs at maximum 800 mm centres.

## StoPoren Setout

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

## General

8.1 When the StoPoren Panel Cladding 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 StoPoren 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 base cap provide a minimum ventilation opening area of 1000 mm<sup>2</sup> 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.

8.4 At balcony, deck or roof/wall junctions, the bottom edge of the StoPoren Panel Cladding 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, or the Poren fixings are to be embedded up to a maximum of 12 mm below the panel surface to maintain a minimum 30 mm penetration into the wall frame.

8.6 Where penetrations through the StoPoren Panel Cladding 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 StoPoren panels.

## Control Joints

9.1 Control joints where StoPoren panels are used must be constructed in accordance with the Technical Literature and be provided as follows:

- Horizontal control joints – at maximum 7.0 m centres and at inter-storey floor levels where unseasoned timber floor joists are used.
- 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 to ensure the panel is adequately supported on both sides of the control joint. 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 StoPoren Panel Cladding System is approximately 34.5 kg/m<sup>2</sup>, 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 StoPoren Panel Cladding 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.

### StoPoren Panel Fixing – Timber Frame with 40 mm Cavity Spacers

10.4 For installations in NZS 3604 Wind Zones up to, and including, 'Extra High' and specific design wind pressures up to and including design differential 2.5 kPa ULS, cavity spacers must be fixed to the timber framing (studs) with two 75 x 3.06 mm hot-dip galvanised D-head, ring shank gun nails in accordance with the Technical Literature. The cavity spacers must be installed at maximum 600 mm horizontal centres along all horizontal panel joints. Additional cavity spacers may be required at corners and around openings in accordance with the Technical Literature. The StoPoren panels are fixed to the cavity spacers with 10 gauge x 75 mm long Grade 304 stainless



steel wood screws with a head diameter of 14 mm. The fixings must be positioned 50 mm up from the bottom edge and 50 mm down from the top edge of the panel and the fixing heads must finish 5 mm below the panel surface.

#### **StoPoren Panel Fixing – Timber Frame with 20 and 40 mm Cavity Battens**

10.5 For installations in NZS 3604 Wind Zones up to, and including, 'Extra High' and specific design wind pressures up to and including design differential 2.5 kPa ULS, StoPoren panels must be fixed through the 20 or 40 mm cavity battens to the wall framing at maximum 600 mm horizontal centres with 100 mm long (for 20 mm cavity battens) or 120 mm long (for 40 mm cavity battens) Grade 304 stainless steel wood screws with a head diameter of 14 mm and a shank diameter of 5.1 mm. The fixings must be positioned 150 mm up from the bottom edge and 150 mm down from the top edge of the panel giving an overall fixing layout of 300 mm centres vertically.

#### **StoPoren Panel Fixing – Steel Frame with 20 and 40 mm Cavity Battens**

10.6 For installations in NZS 3604 Wind Zones up to, and including, 'Extra High' and specific design wind pressures up to and including design differential 2.5 kPa ULS, StoPoren panels must be fixed through the 20 or 40 mm cavity battens to the wall framing at maximum 600 mm horizontal centres with 100 mm long (for 20 mm cavity battens) or 120 mm long (for 40 mm cavity battens) Type 17, AS 3566 Corrosion Class 4 self drilling screws with a head diameter of 14 mm and a shank diameter of 5.1 mm in NZS 3604 defined Corrosion Zones B and C and Grade 304 stainless steel in Corrosion Zone D. The fixings must be positioned 150 mm up from the bottom edge and 150 mm down from the top edge of the panel giving an overall fixing layout of 300 mm centres vertically.

### **Durability**

11.1 The StoPoren Panel Cladding 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 StoPoren Panel Cladding 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 StoPoren 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 StoPoren 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 StoPoren Panel Cladding System must be repaired in accordance with the instructions of Stoanz Limited.

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. (*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 StoPoren Panel Cladding System.*)

### **Control of External Fire Spread**

13.1 The StoPoren Panel Cladding System has a peak heat release rate of less than 100 kW/m<sup>2</sup> and a total heat released of less than 25 MJ/m<sup>2</sup>. In accordance with NZBC Acceptable Solution C/AS1 Table 5.1 the system is suitable for use on buildings with a SH Risk Group classification, at any distance to the relevant boundary. Refer to NZBC Acceptable Solutions C/AS2 – C/AS6 Paragraph 5.8.1 for the specific exterior surface finishes requirements for other building Risk Groups.

### **Prevention of Fire Occurring**

14.1 Separation or protection must be provided to the StoPoren Panel Cladding System from heat sources such as fire places, heating appliances, flues and chimneys. Part 7 of NZBC Acceptable Solutions C/AS1 – C/AS6 and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

### **External Moisture**

15.1 The StoPoren Panel Cladding 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 StoPoren Panel Cladding 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 StoPoren Panel Cladding 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 StoPoren Panel Cladding 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 StoPoren Panel Cladding 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 below for specific requirements for steel framed buildings.

16.3 When the StoPoren Panel Cladding System is installed over a steel frame, a thermal break must be installed **over each steel member** in accordance with the requirements of NZBC Acceptable Solution E3/AS1, Paragraph 1.1.4(d). When StoTherm EPS cavity battens are used, a 10 mm thick Class H EPS thermal break must be installed over the wall underlay over each steel member not covered by a cavity batten. StoTherm cavity battens must not be used horizontally. When timber cavity battens are used, an EPS thermal break must be installed over each steel member. The rest of the StoPoren Panel Cladding System is then installed over top of the thermal break in accordance with the Technical Literature and this Appraisal. Where thermal breaks are used in conjunction with timber cavity battens, the StoPoren panel fixing length must be increased by a minimum of the thickness of the thermal break.

## StoPoren Panel Cladding System

18.4 The system must be installed in accordance with the Technical Literature by Stoanz Limited approved installers.

18.5 The StoPoren Panel Cladding 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 StoPoren Panel Cladding System installations.

## Health and Safety

19.1 Cutting of StoPoren 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 StoPoren Panel Cladding System are provided in the relevant manufacturer's Technical Literature.

## Installation Information

### Installation Skill Level Requirements

17.1 Installation and finishing of components and accessories supplied by Stoanz Limited and its approved applicators must be completed by trained applicators, approved by Stoanz Limited.

17.2 Installation of the accessories supplied by the building contractor must be completed by tradespersons with an understanding of cavity construction, in accordance with instructions given within the StoPoren Panel Cladding System Technical Literature and this Appraisal.

## System Installation

### Wall Underlay and Flexible Sill and Jamb Tape Installation

18.1 The selected building 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 spacers or cavity battens and the rest of the StoPoren Panel Cladding System. Flexible wall underlay must be installed horizontally and be continuous around corners. Underlay must be lapped 75mm minimum at horizontal joints and 150mm 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 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 wall frame to allow the StoPoren Panel Cladding System flashings to be installed.

## 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 StoPoren Panel Cladding System was based on testing and evaluation of all details within the scope and as stated within this Appraisal. The StoTherm Cavity System was tested to E2/VM1 (as contained within NZBC Clause E2, Amendment 4). 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 joints, internal and external corners. 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.
- Wind face load and small-scale fastener withdrawal testing for the StoPoren Panel Cladding System was completed by BRANZ. BRANZ determined design wind suction pressures, and by comparing these 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 StoPoren Panel Cladding System to determine the system's ability to resist its self-weight.
- A racking test was completed to examine the performance of the StoPoren Panel Cladding System when the system was subjected to both serviceability level and ultimate level seismic racking deflections, taken to be  $\pm 8$  mm and  $\pm 36$  mm respectively. The plaster system did not crack or show signs of damage for the entire test program.
- Durability testing of the StoPoren 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 StoPoren Panel Cladding 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 StoPoren Panel Cladding System has been examined by BRANZ and found to be satisfactory.

## Quality

- 22.1 The manufacture of the plasters and paints has not been examined by BRANZ, but details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory.
- 22.2 The quality management system of the plaster and paint manufacturer, Sto AG, has been assessed and registered as meeting the requirements of ISO 9001: 2008.
- 22.3 Sto External Wall Insulation Systems are the subject of a current British Board of Agrément (BBA) Certificate No 95/3132 and the manufacture of the systems continues to be checked by the BBA during the validity period of the Certificate. Plasters and paints used within the StoPoren Panel Cladding System and imported by Stoanz Limited are covered by the BBA Certificate.
- 22.4 The manufacture of the Poren 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.
- 22.5 The quality of materials, components and accessories supplied by Stoanz Limited are the responsibility of Stoanz Limited.
- 22.6 Quality on site is the responsibility of the Stoanz Limited approved applicators.
- 22.7 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, air seals and joinery head flashings in accordance with Stoanz Limited's instructions.
- 22.8 Building owners are responsible for the maintenance of the StoPoren Panel Cladding System in accordance with Stoanz Limited's instructions.

## Sources of Information

- AS 3566 – 2002 Self-drilling screws for the building and construction industries.
- 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.
- Compliance Document for New Zealand Building Code External Moisture Clause E2, Department of Building and Housing, Third Edition July 2005 (Amendment 5, 1 August 2011).
- Ministry of Business, Innovation and Employment Record of Amendments for Compliance Documents and Handbooks.
- The Building Regulations 1992.

## Amendment No. 1, dated 3 September 2013.

This Appraisal has been amended to update clause changes as required by the introduction of NZBC Fire Clauses C1 – C6 Protection from Fire and A3 Building Importance Levels.



**BRANZ**

In the opinion of BRANZ, the **StoPoren Panel Cladding 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 **Stoanz Limited**, 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. **Stoanz Limited**:
  - 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 **Stoanz Limited**.
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 **Stoanz Limited** or any third party.

For BRANZ

P Burghout  
Chief Executive

Date of issue: 28 September 2012