



BRANZ Appraised

Appraisal No.456 [2005]

BRANZ Appraisals

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

**BRANZ
APPRAISAL
No. 456 (2005)**

This Appraisal replaces BRANZ
Appraisal No. 456 (2004) issued
18 June 2004

Amended 30 August 2013

**NU-THERM
CAVITY
SYSTEM**

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Product

1.1 NU-THERM is a cavity-based Exterior Insulation and Finishing System (EIFS) wall cladding. It is an external wall cladding system for residential and light commercial type buildings where domestic construction techniques are used.

1.2 The system consists of expanded polystyrene (EPS) sheets fixed over polystyrene battens to form the cavity. The coating system consists of 8 mm thickness of fibreglass mesh reinforced polymer-modified cement-based plaster. The plaster finish can be textured to give either a sponge or adobe appearance. The plaster system is finished with an acrylic exterior coating 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 NU-THERM 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 'Very High'.

2.2 NU-THERM has also been appraised as an external wall cladding system for steel framed buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, with regards to building height and floor plan area; 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,
- situated in NZS 3604 Wind Zones up to, and including 'Very High'.

2.3 NU-THERM 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 NU-THERM relies on the joinery meeting the requirements of NZS 4211 for the relevant Building Wind Zone.*)

2.5 Installation of components and accessories supplied by Nu-Age Plaster Limited and approved applicators must be carried out only by Nu-Age Plaster Limited approved applicators.

Building Regulations

New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, the NU-THERM Cavity System if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet or contribute to meeting the following provisions of the NZBC:

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

Clause B2 DURABILITY: Performance B2.3.1 (b), 15 years and B2.3.1 (c), 5 years. NU-THERM meets these requirements. See Paragraphs 11.1 and 11.2.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. NU-THERM meets this requirement. See Paragraphs 16.1 - 16.5.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. NU-THERM 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 Nu-Age Plaster Limited are as follows:

Polystyrene

- Polystyrene cavity battens are manufactured from high density (Class H) expanded polystyrene (EPS) with an approximate density of 24 kg/m³. The battens are 20 mm thick by 50 mm wide.
- EPS sheets are 40 or 60 mm thick Class S with an approximate density of 16 kg/m³, or 40 or 60 mm thick (Class H) with an approximate density of 24 kg/m³. The sheets are supplied in lengths ranging from 2.4 to 3.6 m x 1.2 m wide and must be manufactured to meet the requirements of AS 1366 Part 3.

Plasters

- *Adhesive Mortar* is a polymer-modified Portland cement-based plaster comprising a fine or very fine sand and additives. It is supplied in 25 kg bags and mixed on site with clean water. It is trowel or pump applied as a scratch coat in a 5 mm thick layer followed by the embedment of fibreglass mesh reinforcement in the outer surface.
- *Adobe Finish* is a polymer-modified Portland cement-based plaster comprising a fine or very fine sand and additives. It is supplied in 25 kg bags and is mixed on site with clean water. It is trowel applied to give a sculptured undulating finish, 3-5 mm in thickness.
- *Sponge Finish* is a polymer-modified Portland cement-based plaster comprising a fine sand, hydrated lime and additives. It is supplied in 25 kg bags and is mixed on site with clean water. It can be trowel or pump applied to a thickness of 3 mm.

Accessories

- Reinforcing mesh - alkali-resistant fibreglass mesh with a nominal mesh size of approximately 4 mm square and a weight of 150 g/m², or alkali-resistant fibreglass mesh with a nominal mesh size of approximately 6 mm square and a weight of 150 g/m² for use in domestic and light commercial situations.

- uPVC components - sill flashing, jamb flashing and head flashing, base caps, corner beads, vermin tray/ventilated cavity closure, Z-flashing and horizontal and vertical control joint flashings.
- Cavity batten fixings (timber frame) - 30 x 2.5 mm hot-dipped galvanised flat head nails.
- EPS sheet fixings (timber frame) - 90 x 3.55 mm (for 40 mm thickness) and 115 x 4.0 mm (for 60 mm thickness) hot-dip galvanised flat head nails with 43 mm diameter washers, or 90 x 3.6 mm (for 40 mm EPS) and 110 x 4.0 mm (for 60 mm EPS) hot-dip galvanised flat head nails with 40 mm diameter washers.
- Washers - 43 mm diameter high density polyethylene washers, or 40 mm diameter polypropylene washers.

4.2 Accessories used with the system which are supplied by the applicator are:

- Waterproof membrane tapes - tapes covered by a valid BRANZ Appraisal for use as waterproofing membranes over 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 gluing uPVC components to the EPS sheets as and where required.
- Cavity batten and EPS sheet fixings (steel frame) - Self-drilling AS 3566 Corrosion Class 3 6-gauge screws in mild or moderate industrial or marine environments and Corrosion Class 4 6-gauge screws in severe marine environments, with 43 mm diameter washers. The screw length must allow a 10 mm minimum penetration through the steel framing.

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 building underlay support - polypropylene strap, 75 mm galvanised mesh, galvanised wire, or additional vertical battens for securing the flexible building 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 flashing 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.
- Timber cavity battens - 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.
- Window and door trim cavity airseal - 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 suitable for use around window, door and other wall penetration openings.
- Joinery head flashings - as supplied by the joinery manufacturer or contractor.

Paint System Specification

4.4 Paint system components supplied by Wattyl (N.Z.) Limited are as follows:

- GranoPrime® is an acrylic primer sealer, supplied in 15 litre containers. It is brush, roller or spray applied as a primer between the NU-THERM finishing plasters and GranolImpact®.

- GranolImpact® is a pure acrylic, elastomeric coating, supplied in 15 litre containers. It is roller or spray applied in a variety of styles. GranolImpact® colours must have a light reflectance value of 40% minimum regardless of gloss value.

Handling and Storage

5.1 Handling and storage of all materials supplied by Nu-Age Plaster Limited, Wattyl (N.Z.) Limited or the approved applicator, whether on or off site, is under the control of Nu-Age Plaster Limited approved applicators. Dry storage must be provided on site for the fibreglass mesh and bags of plaster. EPS sheets and battens, uPVC flashings and profiles must be protected from direct sunlight and physical damage, and should be stored flat and under cover.

5.2 Handling and storage of all materials supplied by the building contractor, whether on or off site, is under the control of the building contractor. Materials must be handled and stored in accordance with the relevant manufacturer's instructions.

5.3 Bags of Nu-Age plaster must be used within the designated shelf life of six months from date of manufacture.

Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for the NU-THERM Cavity 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 NU-THERM must be treated as required by NZBC Acceptable Solution B2/AS1.

Timber Framing

7.2 Timber framing must comply with NZS 3604 for buildings or parts of buildings within the scope limitations of NZS 3604. Buildings or parts of buildings outside the scope of NZS 3604 must be to a specific design in accordance with NZS 3603 and AS/NZS 1170. Where specific design is required, the framing must be of at least equivalent stiffness to the framing provisions of NZS 3604. In all cases studs must be at maximum 600 mm centres. Dwangs must be fitted flush between the studs at maximum 800 mm centres.

7.3 Timber framing must have a maximum moisture content of 24% at the time of the cladding application. *(If EPS 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

7.4 Steel framing must be to a specific design meeting the requirements of the NZBC.

7.5 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 minimum 0.55 mm.

7.6 Studs must be at maximum 600 mm centres. Dwangs must be fitted flush between the studs at maximum 800 mm centres.

EPS Sheet Setout

7.7 All vertical EPS 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 100 mm long maximum in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.2(f). At the base of the wall, the EPS sheets must hang 50 mm below the supporting framing.

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

General

8.1 Punchings in the vermin tray/ventilated cavity closure provide a minimum ventilation opening area of 1000 mm² per lineal metre of wall in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.3(b).

8.2 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.

8.3 At balcony, deck or roof/wall junctions, the bottom edge of the NU-THERM 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.

8.4 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. Unlined gables and walls must incorporate a rigid sheathing or an air barrier which meets the requirements of NZBC Acceptable Solution E2/AS1, Table 23. For attached garages, wall underlays must be selected in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.3.4. Where rigid underlays are used, the fixing lengths must be increased by a minimum of the thickness of the underlay.

8.5 Where penetrations through the NU-THERM Cavity 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.

8.6 Where the system abuts other cladding systems, designers must detail the junction to meet their own requirements and the performance requirements of the NZBC. These details are outside the scope of this Appraisal.

Electrical Cables

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

Control Joints

9.1 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 design of vertical control joints where the system abuts different cladding types is outside the scope of this Appraisal and is the responsibility of the designer - see Paragraph 8.5.)

Inter-storey Junctions

9.2 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 or 7 metres in height, in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.9.4(b).

(Note: Refer to Paragraph 14.2 for the requirements for barriers to vertical fire spread at inter-storey junctions for buildings of three floors.)

Structure

Mass

10.1 The mass of the NU-THERM system is approximately 9 kg/m², therefore it is considered a light 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 NU-THERM Cavity System is suitable for use in all Wind Zones of NZS 3604, up to, and including Very High where buildings are designed to meet the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 1.1.

Polystyrene Sheet Fixing

10.4 EPS sheets must be fixed through the cavity battens and cavity spacers to the wall framing at centres specified in Table 1.

Table 1: EPS Sheet Fixing Centres for Edges and Body of the Sheet

NZS 3604 Building Wind Zone	Fixing Centres (mm)
Low ¹	300
Medium ¹	300
High ¹	300
Very High ²	200

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.

Durability

11.1 NU-THERM meets code compliance with NZBC Clause B2.3.1 (b), 15 years for the cavity system and plaster finish, and code compliance with NZBC Clause B2.3.1 (c), 5 years for the exterior paint system.

Serviceable Life

11.2 NU-THERM is expected to have a serviceable life of at least 30 years provided the system is maintained in accordance with this Appraisal, and the EPS sheets, 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 Nu-Age NU-THERM 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 5-10 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, plaster, flashings and any sealed joints remain in a weatherproof condition. Any cracks, damaged areas or areas showing signs of deterioration which would allow water ingress, must be repaired immediately. Sealant, coatings and the like must be repaired in accordance with the instructions of Nu-Age Plaster 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. *(Failing to adhere to the minimum ground clearances given in this Appraisal and the Technical Literature will adversely affect the long term durability of the NU-THERM system.)*

Control of Internal Fire and Smoke Spread

13.1 Polystyrene used with the system must meet the flame propagation criteria of AS1366 as specified in NZBC Acceptable Solution C/AS1 Paragraph 4.2.2 or NZBC Acceptable Solutions C/AS2 to C/AS6 Paragraph 4.17.2. The completed wall system, including the surface lining product enclosing the polystyrene sheet from the adjacent occupied space, must achieve the Group Number for internal surface finish requirements as specified in the relevant NZBC Acceptable Solutions C/AS1 to C/AS6.

Control of External Fire Spread

14.1 NU-THERM is suitable for use on buildings with an SH Risk Group classification, a building height of ≤ 10 m and at a distance of ≥ 1.0 m 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.

(Note: The scope of this Appraisal limits building heights to 10 m in accordance with the limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1(a). The building heights referenced in Paragraph 14.1 above are as defined in the Definitions Sections of NZBC Clauses C1 - C6 Protection from Fire.)

14.2 When buildings in all Risk Groups, apart from SH and VP are of the three storeys maximum permitted by NZBC Acceptable Solution E2/AS1, Paragraph 1.1 (a), and when the cladding system extends to cover the walls of all three floors, the requirements for barriers to vertical fire spread in accordance with NZBC Acceptable Solutions C/AS2 to C/AS6 Paragraph 5.7.17 must be met. NZBC Acceptable Solution C/AS2 – C/AS6, Figure 5.8 gives an acceptable detail for barriers, however these do not consider NZBC Clause E2 requirements. Design of the barrier joint must be specifically detailed by the designer to meet the NZBC, including blocking of the cladding cavity and wall framing cavity, and installation of flashing and sealing systems to collect and direct any moisture to the outside of the cladding system at this point. These joints are not covered by the Technical Literature, and therefore are outside the scope of this Appraisal.

Prevention of Fire Occurring

15.1 Separation or protection must be provided to NU-THERM 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

16.1 NU-THERM, 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.

16.2 The cavity must be sealed off from the roof and sub-floor space to meet code compliance with Clause E2.3.5.

16.3 NU-THERM allows excess moisture present at the completion of construction to be dissipated without permanent damage to building elements to meet code compliance with Clause E2.3.6.

16.4 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.

16.5 The use of NU-THERM 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

17.1 Nu-Age NU-THERM 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.

17.2 The EPS cavity battens will act as a thermal break to steel framing in accordance with NZBC Acceptable Solution E3/AS1.

Water Vapour

17.3 NU-THERM 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.

Energy Efficiency

18.1 The thermal performance of NU-THERM, and any additional insulation provided within the wall can be calculated in accordance with NZS 4214. 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 polystyrene layers must be taken as half of the actual value, and are as set out in Table 2.

Table 2: Board R-values (including 0.45 de-rating)

Polystyrene Type	Thickness	
	40 mm	60 mm
EPS Class S ¹	R0.54	R0.80
EPS Class H ²	R0.57	R0.87

1. Based on a thermal conductivity k value of 0.041 W/m°C.

2. Based on a thermal conductivity k value of 0.038 W/m°C.

Installation Information

Installation Skill Level Requirements

19.1 Installation and finishing of components and accessories supplied by Nu-Age Plaster Limited and the approved applicators must be completed by trained applicators, approved by Nu-Age Plaster Limited.

19.2 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 NU-THERM Cavity System Technical Literature and this Appraisal.

System Installation

Building Underlay and Flexible Sill and Jamb Tape Installation

20.1 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 battens and the rest of the Nu-Age NU-THERM Cavity System. Flexible building 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 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.

20.2 Where studs are at greater than 450 mm centres and a flexible wall underlay is being used, a building underlay support must be installed over the underlay at maximum 300 mm centres horizontally.

Aluminium Joinery Installation

20.3 Aluminium 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.

NU-THERM System

20.4 The system must be installed in accordance with the Technical Literature by Nu-Age Plaster Limited approved applicators.

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

Inspections

20.6 The Technical Literature must be referred to during the inspection of NU-THERM installations.

Finishing

20.7 The paint manufacturers' instructions must be followed at all times for application of the paint finish. The plaster must be cured a minimum of 7 days before commencing painting.

Health and Safety

21.1 Safe use and handling procedures for the components that make up the NU-THERM Cavity System are provided in the relevant manufacturer's Technical Literature.

Basis of Appraisal

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

Tests

22.1 The following testing has been completed by BRANZ:

- BRANZ expert opinion on NZBC E2 code compliance for NU-THERM was based on testing and evaluation of all details within the scope and as stated within this Appraisal. The NU-THERM system and EIFS balustrade to wall junction details were tested to AS/NZS 4284 with a BRANZ-designed extension which became the basis of the E2/VM1 test. The testing was completed in three stages; the first being the standard AS/NZS 4284 test, the second being the modified AS/NZS 4284 test with defects introduced in the test panel, and the third being the modified AS/NZS 4284 test with the internal linings and building wrap removed. The testing assessed the performance of the foundation detail, window head, jamb and sill details, vertical and horizontal control joints, internal and external corners and balustrade to wall junction with a plastered cap. In addition to the weathertightness test, the details contained within the Technical Literature have been reviewed, and an opinion has been given by BRANZ technical experts that the system will meet the performance levels of Acceptable Solution E2/AS1 for EIFS drained cavity claddings.
- Wind face load and fastener pull through testing for EIFS cladding systems. BRANZ determined design wind suction pressures, and by comparing these pressures with the NZS 3604 design wind speeds and AS/NZ 1170 pressure coefficients, the fixing requirements were determined for timber and steel framed walls.
- Tests to determine the bond strength of Adhesive Mortar to EPS sheet.

Other Investigations

23.1 The performance of exterior insulation and finishing systems in New Zealand has been considered.

23.2 Structural and durability opinions have been given by BRANZ technical experts.

23.3 Site visits have been carried out by BRANZ to assess the practicability of installation, and to examine completed installations.

23.4 The manufacturer's Technical Literature has been examined by BRANZ and found to be satisfactory.

Quality

24.1 The manufacture of the plasters has been examined by BRANZ, including methods adopted for quality control. Details regarding the quality and composition of the components and accessories used with the system were obtained by BRANZ and found to be satisfactory.

24.2 The quality system of Nu-Age Plaster Limited has been assessed and registered as meeting the requirements of the Telarc Q-Based Code by Telarc Limited, Registration Number 631.

24.3 The quality of materials, components and accessories supplied by Nu-Age Plaster Limited is the responsibility of Nu-Age Plaster Limited.

24.4 The quality of materials supplied by Wattyl (N.Z.) Limited is the responsibility of Wattyl (N.Z.) Limited.

24.5 Quality on site is the responsibility of the Nu-Age Plaster Limited approved applicator.

24.6 Designers are responsible for the building design, and building contractors are responsible for the quality of installation of framing systems and joinery, building wraps, flashing tapes, airseals and joinery head flashings in accordance with the instructions of Nu-Age Plaster Limited.

24.7 Building owners are responsible for the maintenance of NU-THERM installations in accordance with the instructions of Nu-Age Plaster Limited.

Sources of Information

- AS/NZS 1170: 2002 Structural design actions.
- AS 1366.3 - 1992 Rigid cellular plastic sheets for thermal insulation - Rigid cellular polystyrene - Moulded (RC/PS-M)
- AS 3566 - 2002 Self-drilling screws for the building and construction industries.
- AS/NZS 4284: 1995 Testing of building facades.
- 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.
- NZS 4214: 2006 (INT) Methods of determining the total thermal resistance of parts of buildings.
- 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.



BRANZ

In the opinion of BRANZ, the Nu-Therm Cavity 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 the Appraisal Holder, Nu-Age Plaster Limited, and is valid until further notice, subject to the Conditions of Certification.

Conditions of Certification

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. The Appraisal Holder:
 - 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.
3. The product and the manufacture are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ.
4. BRANZ 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 Holder.
5. 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.

For BRANZ

P Robertson
Chief Executive

Date of issue: 28 November 2005

Amendment No. 1, dated 31 January 2012.

This Appraisal has been amended to update clause changes as required by the introduction of NZS 3604: 2011 and NZBC Acceptable Solution E2/AS1 Third Edition, Amendment 5.

Amendment No. 2, dated 30 August 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.