



BRANZ Appraised
Appraisal No.508 [2006]

BRANZ Appraisals

Technical Assessments of products
for building and construction

**BRANZ
APPRAISAL
No. 508 (2006)**

Amended 27 May 2008

THE HYDESTONE® SCHIST WALL CLADDING SYSTEM

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Product

1.1 The Hydestone® Schist Wall Cladding System consists of Hyde Brown or Hyde Grey schist stone, installed over a 40 mm, vented, wet cavity system. It can be installed on residential and light commercial buildings where domestic construction techniques are used.



Scope

2.1 The Hydestone® Schist Wall Cladding System has been appraised for use as a veneer wall cladding system for buildings within the following scope:

- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 in terms of floor area; and,
- with a risk score of 0-20, calculated in accordance with NZBC Acceptable Solution E2/AS1, Table 2; and,
- the scope limitations of NZS 3604 Section 11.7; and,
- on slab on ground and foundation walls constructed in accordance with NZS 3604, and as modified in the Technical Literature; and,
- constructed with timber framing complying with the NZBC; and,
- situated in NZS 3604 Building Wind Zones up to, and including, 'Very High'.

2.2 The Hydestone® Schist Wall Cladding System must only be installed on vertical surfaces.

2.3 The Hydestone® Schist Wall Cladding 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 Hydestone® Schist Wall Cladding system relies on the joinery meeting the requirements of NZS 4211 for the relevant Building Wind Zone.*)

2.4 The Hydestone® Schist Wall Cladding System must only be installed by approved Stone Masons documented in the Technical Literature.

Building Regulations

New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, The Hydestone® Schist Wall 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 Hydestone® Schist Wall Cladding System meets the requirements for loads arising from self-weight, earthquake, wind, impact and creep and shrinkage [i.e. B1.3.3 (a), (f), (h), (j) and (q)]. See Paragraphs 8.1 – 8.4.

Clause B2 Durability: Performance B2.3.1 (a), not less than 50 years. The structural support elements and hidden flashings meet this requirement. Performance B2.3.1(b), 15 years. The veneer wall cladding meets this requirement. See Paragraphs 9.1 and 9.2.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. The Hydestone® Schist Wall Cladding System meets this requirement. See Paragraphs 13.1 – 13.5.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. The Hydestone® Schist Wall 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 Hydestone Limited are:

- Schist Stone - Quarried stone is supplied pre-dressed to a maximum depth of 150 mm front to back and is available in two grades being Hyde Brown and Hyde Grey. The stone is supplied stacked on a wooden pallet weighing approximately 1 tonne. The stone varies in thickness and length and can be laid in various styles with the mortar being visibly raked or recessed. One tonne of dressed stone will cover approximately 5 m².
- Cavity Battens - Nominal 45 x 40 mm minimum (45 mm x 70 mm maximum) timber treated to Hazard Class H4. The battens are grooved with 20 mm wide by 15 mm deep grooves at maximum 150 mm centres along the length of the batten to provide free air movement within the cavity.

4.2 Accessories used with the Hydestone® Schist Wall Cladding System which are supplied by the Stone Mason are:

- Mortar - composed of Portland cement, sand, hydrated lime and water complying to NZS 4210, Section 2.2.
- Masonry Ties and Fixings - **Eagle Wire 135 mm "King Ties"** manufactured in accordance with AS/NZS 2699: Part 1. Fixings are 14g x 35 mm long Tek screws. Ties and fixings are either hot-dipped galvanised or grade 316 stainless steel to meet the durability requirements of NZS 4210 Table 2.E1. Ties and fixings must be selected to comply with the classification of exposure zones in NZS 3604.
- Steel lintels and fixings – complying with AS/NZS 2699.3 and the Hydestone® Schist Installation Guide.
- Fibre cement sheet and fixings - 4.5 mm thick fibre cement sheet manufactured in accordance with AS/NZS 2908.2 with fixings of 40 x 2.8 mm hot-dipped galvanised flat head fibre cement nails
- Damp Proof Course - 50 mm wide bituminous damp proof course complying with NZBC Acceptable Solution E2/AS1 Paragraph 4.3.10 or damp proof courses covered by a valid BRANZ Appraisal.
- Cavity batten fixings – 100 x 4.0 mm hot-dipped galvanised flat head nails for attaching the batten to the bottom plate and 100 x 4.0 mm bright steel nail **for temporary nailing the batten to the top plate.**
- First course waterproof membrane – Specified width by foundation design bituminous damp proof course complying with NZBC Acceptable Solution E2/AS1 Paragraph 4.3.10 or damp proof courses covered by a valid BRANZ Appraisal.

4.3 Accessories used with The Hydestone® Schist Wall Cladding system which are supplied by the building contractor are :

- Building wrap – papers or synthetic wrap complying with NZBC Acceptable Solution E2/AS1, Table 23 or breather-type membranes covered by a valid BRANZ Appraisal for use as wall wraps.
- Where the studs are installed at greater than 450 mm centres, the building wrap must be supported between the studs to prevent the wrap bulging into the cavity space when bulk insulation is installed in the wall frame cavity. Acceptable means of support include polypropylene strap or galvanised wire.
- 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 seals - 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 and door penetration openings.

Handling and Storage

5.1 Hydestone® Schist is packaged and delivered on pallets. The stone must be handled with care to avoid physical damage, and must be stored so that they are protected from dust and contamination.

5.2 Components such as masonry ties and lintels must be handled so as to avoid damage. They must also be stored in dry locations protected from the weather.

5.3 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 Hydestone® Schist Wall 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 Hydestone® Schist Wall Cladding System must be treated as required by NZS 3602.

Timber Framing

7.2 Due to the mass of the Hydestone® Schist veneer system loading, the timber wall studs will be required to resist greater inertia face loads in an earthquake. These loads are greater than allowed for by NZS 3604. To allow for this additional loading, the timber studs must be selected from NZS 3604 Stud Tables using the greater of actual Building Wind Zones or Building Wind Zone 'High' in seismic Zone A and Building Wind Zone 'Medium' in seismic Zone B. Stud selection need not consider the additional veneer weight in seismic Zone C.

General

7.3 The Hydestone® Schist Wall Cladding System consists of Hyde Brown or Hyde Grey schist stone mortared in arranged patterns and laid against a fibre cement sheet which is used as a permanent former. Masonry ties penetrate through the fibre cement sheet and are fixed into the external wall framing studs.

7.4 The 40 mm minimum (maximum 70 mm) vented wall cavity construction consists of 45 mm wide grooved battens with DPC attached to the rear of the batten where the batten contacts the top and bottom plates and dwang timbers. The batten fixings are designed to allow for seismic movement and must be offset 100 mm from the external framing studs to allow for movement between the stone cladding and the external wall framing.

7.5 Building designers incorporating The Hydestone® Schist Cladding System into their design must ensure that the design information referenced in the Technical Literature is adhered to.

7.6 Where the building specifier has the requirement for vertical expansion joints, these must comply with NZBC Acceptable Solution E2/AS1 Paragraph 9.2.

Structure

Mass

8.1 For structural design purposes, Hydestone® Schist has a mass of approximately 360 kg/m² as a total system including mortar.

Impact Resistance

8.2 The Hydestone® Schist Wall Cladding System has good resistance to human and hard body impacts likely to be encountered in normal residential use. Some chipping of the finish could occur with hard impacts.

Wind Zones

8.3 The Hydestone® Schist Wall Cladding System is suitable for use in all Building Wind Zones of NZS 3604, up to, and including 'Very High'.

Foundations

8.4 Foundation systems supporting the schist veneer must be designed and constructed in accordance with NZS 3604 and the Technical Literature to cater for the total veneer system mass.

Masonry Ties

8.5 The mass of the veneer system results in maximum specifications for tie spacings. Ties must be fixed to the wall framing at maximum centres as specified in Table 1 of the Technical Literature.

Wall Bracing Requirements

8.6 The mass of the veneer system results in a greater wall bracing demand. A minimum bracing demand of 15 bracing units/m is required. The Bracing Table in the Technical Literature must be used for calculating the bracing demand requirements.

Steel Lintel Angles

8.7 Lintel angle sizes and support details must be taken from NZS 3604 Table 11.4 and modified as required by the Technical Literature.

Durability

9.1 Assessment of durability to meet the NZBC is based on difficulty of access and replacement, and the ability to detect failure of The Hydestone® Schist Wall Cladding System both during normal use and maintenance of the building.

9.2 Masonry ties, fixings and lintels must meet the durability requirements of NZS 3604 Paragraph 4.5 and Table 4.4.

Serviceable Life

9.3 The Hydestone® Schist Wall Cladding System will have a serviceable life of at least the life of the building and in excess of 50 years.

Maintenance

10.1 An inspection of the Hydestone® Schist Wall Cladding System must be carried out at least annually. Weep holes must be kept clear of dust, dirt, spider webs and the like to ensure that moisture can continue to drain from the cavity. Any cracks that develop in the mortar or stone must be investigated (this may require a structural engineer's assessment).

Control of External Fire Spread

11.1 The Hydestone® Schist Wall Cladding System is suitable for use as an external wall cladding on all buildings in accordance with NZBC Acceptable Solution C/AS1 Part 7, Paragraph 7.11.2(a).

Outbreak of Fire

12.1 Natural stone is considered a non-combustible material and need not be separated from flues and chimneys. However, when used in conjunction with, or attached to heat sensitive materials, the heat sensitive material must be separated from chimneys and flues in accordance with the requirements of NZBC Acceptable Solution C/AS1 Part 9 for the protection of combustible materials.

External Moisture

13.1 The Hydestone® Schist Wall 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.

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

13.3 The Hydestone® Schist Wall Cladding System allows excess moisture present at the completion of construction to be dissipated without permanent damage to building elements to meet compliance with Clause E2.3.6.

13.4 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.

Installation Information

Installation Skill Level Requirements

14.1 Installation of components and accessories supplied by Hydestone Limited must be installed by Stone Masons approved by Hydestone Limited.

14.2 Installation of accessories supplied by the building contractor must be completed by tradespersons with an understanding of masonry cavity wall construction in accordance with the instructions given with the Hydestone® Schist Wall Cladding System Technical Literature.

The Hydestone® Schist Wall Cladding System Installation

15.1 This section must be read in conjunction with the Technical Literature. All framing and foundation requirements must be met prior to the installation of the cladding system.

Building Wrap and Flexible Sill and Jamb Tape Installation

15.2 The selected building wrap and flexible sill and jamb tape system must be installed in accordance with the manufacturer's instructions prior to the installation of the cavity battens. The building wrap must be installed horizontally and be continuous around corners. Wrap must be lapped 75 mm minimum at horizontal joints and 150 mm minimum over studs at vertical joints. Particular attention must be paid to the installation of the building wrap and sill and jamb tapes around window and door openings to ensure a continuous seal is achieved and all exposed timber wall framing in the opening is protected. All penetrations through the building wrap must be sealed and joints sealed or lapped 150 mm.

15.3 When the studs are installed at greater than 450 mm centres, the building wrap must be supported between the studs to prevent the wrap bulging into the cavity space when bulk insulation is installed in the wall frame cavity. Acceptable means of support include polypropylene strap or galvanised wire.

Aluminium Joinery Installation

15.4 The aluminium joinery and associated head flashings must be installed in accordance with the window manufacturer's instructions. 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.

Hydestone® Schist System

15.5 The 45 x 40 mm minimum (45 mm x 70 mm maximum) cavity battens are installed after the wall wrap has been secured to the framing. A 50 mm wide DPC must be nailed to the batten where the batten contacts the wall framing. The battens are to be fixed in accordance with the Technical Literature.

15.6 The fibre cement sheet can be installed horizontally or vertically and fixed at 150 mm centres to the battens. The fibre cement sheet does not require any additional moisture protection as the sheet acts as a 'former' only.

15.7 The stud centre lines must be clearly marked to allow for the accurate positioning and cutting of the holes required to enable the installation of the masonry ties back onto the wall framing studs. The masonry ties are installed in accordance with the Technical Literature.

15.8 The installation of the schist stone must be carried out by a Hydestone Limited approved Stone Mason. All masonry construction methods and techniques must comply with NZS 4210.

15.9 During the construction of the schist stone wall, it is important that all residue mortar is cleaned from the masonry ties and all residue mortar is removed from the wet wall cavity. Removal of any surplus material out from the cavity weepholes can be achieved by raking out with a fabricated wire scraper.

15.10 The lintels and flashings must be installed in accordance with the Technical Literature.

Inspections

15.11 The Hydestone® Schist Wall Cladding System incorporates a batten fixing method which allows the masonry ties to perform their function and accommodate lateral movement during an earthquake. The Technical Literature must be referred to during the inspection of The Hydestone® Schist Wall Cladding System installations by the Building Consent Authorities and Territorial Authorities.

Health and Safety

16.1 Hearing and eye and foot protection must be worn while installing the Hydestone® Schist Wall Cladding System.

Basis of Appraisal

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

Tests

17.1 The following testing has been completed by BRANZ:

- Durability testing of The Hydestone® Schist Wall Cladding System to AS/NZS 4456: Part 10.
- Masonry tie testing for ties used in The Hydestone® Schist Wall Cladding System to AS/NZS 2699.1.

17.2 BRANZ expert opinion on NZBC code compliance for The Hydestone® Schist Wall Cladding System was based on design and evaluation of all details within the scope and as stated within this Appraisal. BRANZ experts reviewed the performance of the foundation detail, window head, jamb and sill details, meter box head, jamb and sill details, internal and external corner detail. 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 expected performance levels of NZBC Clause E2, External Moisture.

Other Investigations

18.1 Durability, structural and weathertightness opinions have been provided by BRANZ.

18.2 Site inspections were carried out to examine the practicability of installation.

18.3 The Technical Literature for The Hydestone® Schist Wall Cladding System has been reviewed by BRANZ and found to be satisfactory.

Quality

19.1 The manufacturing process of The Hydestone® Schist Wall Cladding System has been examined by BRANZ, and the details of the quality and composition of the materials used were obtained and found to be satisfactory.

19.2 The quality of materials, components and accessories supplied by Hydestone Limited is the responsibility of Hydestone Limited.

19.3 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 and jamb flashings in accordance with the instructions of the designer.

19.4 Stone Masons are responsible for the installation of the cladding system.

19.5 The quality of installation, handling and storage on site is the responsibility of the installer.

19.6 Building owners are responsible for the maintenance of the Hydestone® Schist Wall Cladding System in accordance with the instructions of Hydestone Limited.

Sources of Information

- AS/NZS 2699.1:2000 Built-in components for masonry construction – Wall ties.
- AS/NZS 2699.3:2002 Built-in components for masonry construction – Lintels and shelf angles (durability requirements).
- NZS 3602:2003 Timber and wood-based products for use in building.
- NZS 3604:1999 Timber framed buildings.
- NZS 4210:2001 Masonry construction: Materials and workmanship.
- NZS 4211: 1985 Specification for performance of windows.
- Compliance Document for New Zealand Building Code External Moisture Clause E2, Department of Building and Housing, Third Edition, July 2005.
- New Zealand Building Code Handbook and Approved Documents, Building Industry Authority, 1992.
- The Building Regulations 1992, up to, and including October 2004 Amendment.



BRANZ

In the opinion of BRANZ, The Hydestone® Schist Wall 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 the Appraisal Holder, Hydestone 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. 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

Amendment No. 1, dated 27 May 2008

The Appraisal has been amended to update current BRANZ Logos, and to add Trademark.

Amendment No. 2, dated 29 May 2009

The Appraisal has been amended to add a Registered Trademark.

Date of issue: 1 June 2006