



## BRANZ Appraised

Appraisal No. 621 [2020]

## THE MARSHALL WEATHERIZATION SYSTEM

Appraisal No. 621 [2020]

This Appraisal replaces BRANZ Appraisal No. 621 [2014]



### BRANZ Appraisals

Technical Assessments of products for building and construction.



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### Product

1.1 The Marshall Weatherization System consists of Tekton® Building Wrap, HYDRA Wall Underlay, HYDRA Roof Underlay, Super Stick Tape or Protecto Sill System (flexible flashing tapes), Tekton Seam Tape and TRADE-SEAL. The system is used behind wall cladding systems, under roof claddings and around framed joinery openings as a secondary weather resistant barrier for walls.

### Scope

2.1 The Marshall Weatherization System has been appraised for use on buildings within the following scope:

- constructed with timber framing in accordance with the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; or,
- constructed with steel framing in accordance with NASH Building Envelope Solutions, Paragraph 1.1 for steel framed buildings; and,
- with absorbent wall claddings directly fixed to the framing complying with NZBC Acceptable Solution E2/AS1 or NASH Building Envelope Solutions or covered by a valid BRANZ Appraisal that specifies a flexible wall underlay and a flexible flashing system; or,
- with absorbent and non-absorbent wall claddings installed over an 18 mm minimum drained cavity complying with NZBC Acceptable Solution E2/AS1 or NASH Building Envelope Solutions or covered by a valid BRANZ Appraisal that specifies a flexible wall underlay or a rigid wall underlay with flexible underlay over and flexible flashing system; or,
- with masonry tile roof cladding; and,
- with metal tile and profiled metal roof cladding; and,
- with masonry veneer in accordance with NZBC Acceptable Solution E2/AS1 for timber framed buildings or NASH Building Envelope Solutions for steel framed buildings; and,
- situated in NZS 3604 Wind Zones up to and including Very High where the flexible wall underlay is directly fixed to the frame, and up to and including Extra High where the underlay is used over rigid wall underlays.

## Building Regulations

### New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, The Marshall Weatherization 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 B2 DURABILITY:** Performance B2.3.1 (a) not less than 50 years, B2.3.1 (b) 15 years and B2.3.2. The Marshall Weatherization System meets this requirement. See Paragraphs 10.1 - 10.3.

**Clause E2 EXTERNAL MOISTURE:** Performance E2.3.2. The Marshall Weatherization System contributes to exterior walls and roof cladding systems meeting this requirement. See Paragraphs 13.1 and 13.2.

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

## Technical Specification

4.1 System components supplied by Marshall Innovations Limited are as follows:

- **Flexible wall underlay** - Tekton® Building Wrap is a synthetic breather-type building membrane available in rolls 2740 mm wide and 37 m long or 1370 mm wide and 37 m long. The product is manufactured from coated spun bonded polypropylene.
- **Flexible wall underlay** - HYDRA Wall Underlay is a synthetic building underlay for use under wall claddings. The product consists of a plain non-woven top scrim and a woven bottom scrim with a polymeric laminated facer supplied in rolls 1.37 m wide x 36.5 m long or 2.74 m wide x 37.0 m long.
- **Flexible Roof Underlay** - HYDRA Roof Underlay is a heavy duty, spun-bonded, non-woven fabric laminated breathable coating, coloured blue and is supplied in rolls 1.25 m wide x 20 m or 40 m long.
- **Flexible flashing tape [1]** - Super Stick is a multi-layered, silver, polyester-faced, copolymer self-adhesive tape. The tape is supplied in rolls of 75 mm x 22.86 m, 150 mm x 22.86 m and 200 mm x 22.86 m.
- **Flexible flashing tape [2]** - Protecto Sill System comprises Protecto Wrap Detail Tape, Protecto Wrap Sill Tape and Protecto Tak spray on primer. Both the tapes are based on modified SBS rubberised asphalt and Protecto Tak is a solvent based spray-on adhesive primer. Protecto Wrap Detail Tape is supplied as a 150 mm wide, 15 m long and 1.0 mm thick roll, Protecto Wrap Sill Tape is supplied as a 75, 150 and 200 mm wide, 30 m long and 0.5 mm thick roll and Protecto Tak is supplied in a 369 g can.
- **Pipe and Services Penetration Seal** - TRADE-SEAL is an EPDM sleeve bonded to a carrier material of spun-bonded high density polyethylene film 150 micron thick. The carrier material is backed with a self-adhesive layer. TRADE-SEAL is available with various diameter EPDM sleeve sizes to accommodate different size wall penetrations.
- **Adhesive tape** - Tekton® Seam Tape is a thin polypropylene joining adhesive tape, available in rolls 48 mm wide and 50 m long.

## Handling and Storage

5.1 All products must be kept clean and dry at all times prior to use by storing under cover so that they are protected from the weather and damage. Rolls of Tekton® Building Wrap, HYDRA Wall Underlay and HYDRA Roof Underlay must be stored on end.

## Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for The Marshall Weatherization 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

### Timber and Steel Framing

- 7.1 Studs must be provided at maximum 600 mm centres. Dwangs must be fitted flush between studs at maximum 1200 mm centres.
- 7.2 Timber and steel roof framing must be provided in accordance with the requirements of the NZBC and the roof cladding manufacturer.

### General

- 8.1 The Marshall Weatherization System is intended for use behind wall cladding systems and at joinery openings as a secondary defence against water penetration into framing cavities and is intended for use as an alternative to conventional wall underlays.
- 8.2 HYDRA Roof Underlay is intended for use as an alternative to conventional kraft paper roof underlays, which are fixed over timber or steel framed roofs in order to limit the entry of wind into the roof cavity, and to assist in the moisture management of the roof cladding system.
- 8.3 The system will provide a degree of temporary weather protection during construction. However, it will not make the building weathertight and some wetting of the underlying structure is always possible before the building is closed-in. The building must be closed-in and made weatherproof before moisture sensitive materials such as wall or ceiling linings and insulation materials are installed.
- 8.4 The Marshall Weatherization System is suitable for use as an air barrier to walls that are not lined, such as attic spaces at gable ends, in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.4 [c]. Refer to Table 1.
- 8.5 HYDRA Roof Underlay is suitable for use under roof claddings on buildings as a roof underlay in accordance with NZBC Acceptable Solution E2/AS1, Table 23 or NASH Building Envelope Solutions Table 23. Refer to Table 2 for the material properties of HYDRA Roof Underlay.
- 8.6 TRADE-SEAL when used with Tekton® Building Wrap or HYDRA Wall Underlay, provides an alternative solution to the pipes and services penetrations specified in NZBC Acceptable Solution E2/AS1, Paragraph 9.1.9.3 and Figure 68, or NASH Building Envelope Solutions Paragraph 9.1.10.3 and Figure 63.

**Table 1: Material Properties**

NZS 2295 Property	Property Performance Requirement	Actual Property - Tekton Building Wrap	Actual Property - HYDRA Wall Underlay
Absorbency	≥ 100 g/m <sup>2</sup>	Classified as non-absorbent	Pass
Vapour Resistance	≤ 7 MN s/g	1.15 MN s/g	Pass
Water Resistance	≥ 20 mm	Pass	Pass
pH of Extract	≥ 6 and ≤ 9	9.78 [Note 1]	Pass
Shrinkage	≤ 0.5%	0.10%	Pass
Mechanical	Edge tear and tensile strength	Edge tear: Machine direction = 228 N Cross direction = 186 N Tensile strength: Machine direction = 4.4 kN/m Cross direction = 3.9kN/m	Edge tear: Machine direction = 191.3 N Cross direction = 145.6 N Tensile strength: Machine direction = 4.53 kN/m Cross direction = 3.32kN/m
Air Barrier	Air resistance: ≥0.1 MN s/m <sup>3</sup>	Pass	Pass

*Note 1: Further testing of Tekton® Building Wrap was completed to determine the effect of the high pH level on the wall underlay and materials it is likely to come into contact with during its serviceable life. The testing confirmed that the high pH had no adverse effects on the wall underlays performance, or the performance of other materials.*

**Table 2: Material Properties**

NZS 2295 Property	Property Performance Requirement	Results
Absorbency	≥ 150 g/m <sup>2</sup>	Pass
Vapour Resistance	≤ 0.5 MN s/g	Pass
Water Resistance	≥ 100 mm	Pass
pH of Extract	≥ 5.5 and ≤ 9	Pass
Shrinkage	≤ 0.5%	Pass
Mechanical	Edge tear and tensile strength	Edge tear [Average] Machine Direction > 166 N Cross Direction > 117 N Tensile Strength [Average] Machine Direction > 6.1kN/m Cross Direction > 4.3kN/m

- 8.7 The Marshall Weatherization System is suitable for use under wall cladding as a wall underlay system in accordance with NZBC Acceptable Solution E2/AS1, Table 23 on timber framed buildings, except that it cannot be used with non-absorbent wall claddings in direct fixed installations. The Marshall Weatherization System is also suitable for use under wall cladding as a wall underlay system as called up in NASH building envelope solutions, Table 23 on steel framed buildings, except that it cannot be used with non-absorbent wall claddings in direct fixed installations.
- 8.8 In cavity installations where the cavity battens are installed at greater than 450 mm centres, the wall underlay must be supported between the battens. This is to prevent the wall underlay bulging into the cavity space when bulk insulation is installed in the wall frame cavity, in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.5 or NASH Building Envelope Solutions, Paragraph 9.1.9.5.
- 8.9 When The Marshall Weatherization System is used in conjunction with LOSP (light organic solvent preservative) treated timber, the solvent from the timber treatment must be allowed to evaporate [generally at least one week] prior to the installation of the system.

### Structure

- 9.1 The Marshall Weatherization System is suitable for use in all Wind Zones of NZS 3604 and NASH Standard Part 2 up to, and including Very High when used as a flexible building underlay, and all Wind Zones of NZS 3604 and NASH Standard Part 2 up to, and including Extra High when used as an overlay for rigid building underlays.



## Durability

### Serviceable Life

- 10.1 The Marshall Weatherization System meets code compliance with NZBC Clause B2.3.1 [a], not less than 50 years where the cladding durability requirement or expected serviceable life is not less than 50 years, e.g. behind masonry veneer, and code compliance with NZBC Clause B2.3.1 [b], 15 years where the cladding durability requirement is 15 years. This is provided the system is not exposed to the weather for a total time of more than 60 days. The products also must not be exposed to the weather or ultra-violet [UV] light at any time in service.
- 10.2 Provided it is not exposed to the weather or UV light for a total of more than 14 days, and provided the roof cladding is maintained in accordance with the cladding manufacturer's instructions and the roof cladding remains weather resistant, HYDRA Roof Underlay is expected to have a serviceable life equal to that of the roof cladding.
- 10.3 The exterior cladding must be maintained weathertight at all times for The Marshall Weatherization System to have a serviceable life equal to that of the cladding.

## Control of Internal Fire and Smoke Spread

- 11.1 The Marshall Weatherization System has an AS 1530 Part 2 flammability index of 0 and therefore meets the requirements of NZBC Acceptable Solution C/AS2, Paragraph 4.17.8 [b], for the surface finish requirements of suspended flexible fabric used as an underlay to exterior cladding that is exposed to view in occupied spaces. It may therefore be used with no restrictions in all buildings.

## Prevention of Fire Occurring

- 12.1 Separation or protection must be provided to The Marshall Weatherization System from heat sources such as fire places, heating appliances, flues and chimneys. Part 7 of NZBC Acceptable Solutions C/AS1 and C/AS2, and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

## External Moisture

- 13.1 The system is used to assist the control of moisture behind wall claddings by ensuring moisture which may occasionally penetrate the wall cladding is directed back to the exterior of the building.
- 13.2 The system is suitable for use with wall claddings complying with NZBC Acceptable Solution E2/AS1 or a valid BRANZ Appraisal, and where exposed up to, and including Extra High winds as defined by NZS 3604.

## Installation Information

### Installation Skill Level Requirements

- 14.1 All design and building work must be carried out in accordance with The Marshall Weatherization System Technical Literature and this Appraisal by competent and experienced tradespersons conversant with wall underlays and weatherization system installation. Where the work involves Restricted Building Work [RBW] this must be completed by, or under the supervision of, a Licensed Building Practitioner [LBP] with the relevant License class.

### System Installation

- 15.1 The system must be installed in accordance with NZBC Acceptable Solution E2/AS1, or when used with BRANZ Appraised wall claddings, in accordance with any instructions given in the Appraisal, along with the instructions given in the Technical Literature.
- 15.2 Tekton® Building Wrap and the Hydra Wall Underlay must be fixed first to the external face of the timber or steel wall framing over all openings in the framing, then cut and dressed into all sides of the openings.



- 15.3 Openings are dressed with lengths of Super Stick or Protecto Sill System Tapes where required and adhered to the Tekton® Building Wrap or HYDRA Wall Underlay. The tape is 'fanned' around the corners onto the face of the Tekton® Building Wrap or HYDRA Wall Underlay and folded over the outside edge of the opening framing. All surfaces must be clean and dry prior to the installation. *[Note: Super Stick requires two layers on the sill.]*
- 15.4 HYDRA Roof Underlay must be fixed at maximum 300 mm centres to all framing members with large-head clouts 20 mm long, 6-8 mm stainless steel staples, self drilling screws or proprietary underlay fixings. The membrane must be pulled taut over the framing before fixing.
- 15.5 HYDRA Roof Underlay may be run horizontally or vertically. The roof underlay must extend from the ridge and overhang the fascia board by 20-25 mm.
- 15.6 Vertical laps must be no less than 150 mm wide. Horizontal laps must also be no less than 150 mm, with the direction of the lap ensuring that water is shed to the outer face of the underlay. End laps must be made over framing and be no less than 150 mm wide.
- 15.7 Any other components of the cladding system or joinery installation, such as sill trays, other flashings or seals should be installed as instructed by the cladding or joinery manufacturer. Note that these components, including cladding systems and joinery have not been assessed and are outside the scope of this Appraisal.

#### **Inspections**

- 15.8 The Technical Literature must be referred to during the inspection of The Marshall Weatherization System installations.

## **Basis of Appraisal**

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

#### **Tests**

- 16.1 The following tests have been carried out on Tekton® Building Wrap by Scion: Folding strength of paper in accordance with AS/NZS 1301.423; edge tear resistance and tensile strength in accordance with AS/NZS 4200.1 and air resistance in accordance with BS 6538-3.
- 16.2 The following tests have been carried out on Tekton® Building Wrap by BRANZ: Absorbency in accordance with AS/NZS 4201.6, Vapour transmission in accordance with ASTM E 96B, Shrinkage in accordance with AS/NZS 4201.3, Water barrier in accordance with AS/NZS 4201.4 and pH of extract in accordance with AS/NZS 1301.421.
- 16.3 Tests have been carried out on Protecto Wrap Detail Tape, Super Stick and Protecto Wrap Sill Tapes in accordance with ICC Evaluation Service Criteria for Flashing Materials, AC148 [2001]. The results have been reviewed by BRANZ experts and found to be satisfactory.
- 16.4 Peel adhesion testing of Protecto Wrap Detail Tape, Super Stick and Protecto Wrap Sill Tapes, Tekton Seam Tape and TRADE-SEAL on the Tekton® Building Wrap has been completed by BRANZ.
- 16.5 The following tests have been carried out on HYDRA Roof Underlay and Wall Underlay in accordance with NZBC Acceptable Solution E2/AS1, Table 23: tensile strength, edge-tear resistance and resistance to water vapour transmission in accordance with AS/NZS 4200.1, shrinkage in accordance with AS/NZS 4201.3, resistance to water penetration in accordance with AS/NZS 4201.4, surface water absorbency in accordance with AS/NZS 4201.6 and pH of extract in accordance with AS/NZS 1301.421s. A range of these tests were completed before and after HYDRA Roof Underlay and Wall Underlay was exposed to ultra-violet light.
- 16.6 The Flammability Index of HYDRA Roof Underlay and Wall Underlay has been evaluated in accordance with AS 1530.2.



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### Other Investigations

- 17.1 Durability opinions have been given by BRANZ technical experts.
- 17.2 Practicability of installation has been assessed by BRANZ and found to be satisfactory.
- 17.3 The Technical Literature from Marshall Innovations Ltd has been examined by BRANZ and found to be satisfactory.

### Quality

- 18.1 The manufacture of products covered by this Appraisal 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. BRANZ has taken note of product certifications covering quality aspects associated with these products.
- 18.2 The quality of supply to the market is the responsibility of Marshall Innovations Limited.
- 18.3 Building designers are responsible for the design of the building, and for the incorporation of The Marshall Weatherization System into their design in accordance with the instructions of Marshall Innovations Limited.
- 18.4 Quality of installation is the responsibility of the installer in accordance with the instructions of Marshall Innovations Limited.

### Sources of Information

- AC 148 (2001) Acceptance criteria for flashing materials ICBO Evaluation Service Inc. July 2001
- AS 1530.2: 1993 Test for flammability of materials.
- AS/NZS 1301.421s: 1998 Determination of the pH value of aqueous extracts of paper, board and pulp - cold extraction method.
- AS/NZS 4200.1: 1994 Pliable building membranes and underlays - materials.
- AS/NZS 4201.3: 1994 Pliable building membranes and underlays - Methods of test - Shrinkage.
- BS 6538-3: 1987 Method for determination of air permeance using the Garley apparatus.
- NASH Building Envelope Solutions: 2019 Light steel framed buildings.
- NASH Standard Part Two: 2019 Light Steel Framed Buildings.
- NZS 2295: 2006 Pliable, Permeable Building Underlays.
- NZS 3604: 2011 Timber-framed buildings.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.





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**BRANZ**

In the opinion of BRANZ, **The Marshall Weatherization 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 **Marshall Innovations 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. **Marshall Innovations 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 **Marshall Innovations 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 **Marshall Innovations Limited** or any third party.

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**For BRANZ**

**Chelydra Percy**

Chief Executive

Date of Issue:

15 May 2020