



BRANZ Appraised

Appraisal No. 962 [2023]

THE THERMAKRAFT ONE WRAP SYSTEM

Appraisal No. 962 [2023]

This Appraisal replaces BRANZ Appraisal No. 962 [2017]



BRANZ Appraisals

Technical Assessments of products for building and construction.



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Product

- 1.1 The Thermakraft One Wrap System consists of Watergate Plus, Thermakraft 220 and Thermakraft Covertek 403 Roof and Wall Underlay; Aluband and ThermoFlash flexible flashing tapes, and OneSeal Multi-Fit Pipe and Cable Penetration Seals.
- 1.2 The system is used behind wall cladding systems and around framed joinery openings as a secondary weather resistant barrier for walls.

Scope

- 2.1 The Thermakraft One Wrap System has been appraised for use as a flexible wall underlay system for buildings within the following scope:
 - the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1 for timber-framed buildings; or,
 - the scope limitations of NASH Building Envelope Solutions, Paragraph 1.1 for steel-framed buildings; or,
 - with direct fixed absorbent and non-absorbent wall claddings; or,
 - with absorbent and non-absorbent wall claddings installed over an 18 mm minimum drained cavity; or,
 - 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 and NASH Standard Part 2 Wind Zones up to, and including, Very High; or,
 - situated in NZS 3604 and NASH Standard Part 2 Wind Zones up to, and including, Extra High when used over a rigid wall underlay in accordance with NZBC Acceptable Solution E2/AS1 or NASH Building Envelope Solutions Paragraph 9.1.7.2.

Building Regulations

New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, the Thermakraft One Wrap 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 Thermakraft One Wrap System meets these requirements. See Paragraphs 9.1-9.2.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. When used as part of the wall cladding system, the Thermakraft One Wrap System will contribute to meeting this requirement. See Paragraphs 12.1 and 12.2.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. The Thermakraft One Wrap System meets this requirement.

Technical Specification

4.1 System components and accessories supplied by Kingspan Insulation NZ Limited are as follows:

Flexible Wall Underlays

- **Watergate Plus** is a white, 105 g/m² non-woven, micro-porous polyolefin fabric underlay. The product is supplied in rolls 1.37 m wide x 54.8 and 30 m long, 2.74 m wide x 30 m and 18.5m long and 3 m wide x 30 m long. The product is printed with the Watergate Plus logo repeated along the length of the roll and can also be co-branded with custom printing. The rolls are wrapped in clear polythene film.
- **Thermakraft 220 Synthetic Underlay** is a white, 95 g/m² spun-bonded polypropylene, non-woven membrane. The product is supplied in rolls 1.37 m wide x 55 m long and 2.74 m wide x 36.5 m long. The product is printed with the Thermakraft 220 logo repeated along the length of the roll and can also be co-branded with custom printing. The rolls are wrapped in clear polythene film.
- **Thermakraft Covertex 403** is a white synthetic underlay consisting of a micro-porous water-resistant film laminated between two layers of non-woven, spun-bonded polyolefin. The product is supplied in rolls 1.35 m wide x 18.6 m, 37 m and 55 m long. The product is printed with the Thermakraft Covertex 403 logo repeated along the length of the roll. The rolls are wrapped in clear polythene film.

Wall Underlay Support

- **Stud Strap** – black, woven and coated polypropylene strapping, 25 mm thick and supplied in a roll length of 250 m.
- **Thermastrap** – blue, embossed polythene strapping, 19 mm thick and supplied in a roll length of 300 m.

Accessories [supplied by the installer]

- **Fixings** – staples, clouts, screws or proprietary underlay fixings, or other temporary fixings to attach the wall underlay to the framing.
- **Wall underlay support** [where Stud Strap or Thermastrap is not used] – polypropylene strap, 75 mm galvanised mesh or galvanised wire, or vertical cavity battens where required to support the wall underlay in accordance with NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.5 or NASH Building Envelope Solutions Paragraph 9.1.9.5
- **Thermal break sheathing [steel framing]** – in accordance with NASH Building Envelope Solutions, Paragraph 11.4.3.2.



Flexible Flashing Tapes and Accessories

- **Thermakraft Aluband Window Flashing Tape** is a polymeric-faced, bituminous-modified, self-adhesive tape with a release backing paper. The tape is supplied in rolls 200, 150 and 75 mm wide x 25 m long. The rolls are wrapped in clear polythene film.
- **Thermaflash Flashing Tape** is a self-adhering flexible flashing tape. It is coloured white on the top surface and printed with the name Thermaflash. The tape incorporates a clear release liner. The tape is available in rolls 75, 150 and 200 mm wide x 23 m long. The rolls are supplied individually shrink wrapped.
- **Thermakraft Corner Moulds** are made from polyethylene and are coloured orange. They can be used at the lower corners of joinery openings instead of 'butterflies' of flashing tape.
- **Thermakraft White General Purpose Tape** is used for sealing laps and repairing tears. The tape is supplied in rolls 60 mm wide x 66 m long.
- **Scotch® Super 77™ Multi purpose Adhesive** is a clear spray adhesive primer.

Penetration Seals

- **OneSeal Multi-Fit Pipe and Cable Penetration Seals** are manufactured with a black, soft and flexible 1.2 mm thick EPDM fabric supplied with pre-punched markings. The perimeter of the seal is coated with an acrylic adhesive, which is bonded to the wall underlay. OneSeal Multi-Fit Pipe and Cable Penetration Seals are available in the sizes below:

OneSeal Multi-Fit Cable Seals

- 55 mm Ø to 80 mm Ø
- 4 x 7 mm Ø to 10 mm Ø
- 2 x 10 mm Ø to 22 mm Ø

OneSeal Multi-Fit Pipe Seals

- 15 mm Ø to 25 mm Ø
- 40 mm Ø to 60 mm Ø
- 60 mm Ø to 90 mm Ø
- 90 mm Ø to 110 mm Ø

Handling and Storage

- 5.1 Handling and storage of all materials supplied by Kingspan Insulation NZ Limited, whether on-site or off-site, is under the control of the installer. The materials must be protected from damage and weather. The products must be stored under cover, in clean, dry conditions, away from direct exposure to sunlight.

Technical Literature

- 6.1 This Appraisal must be read in conjunction with:
- Product Data Sheet, One Wrap System, Issue 8.0, dated September 2022.
 - Product Data Sheet, White General Purpose Tape, Issue 5.0, dated September 2022.
 - Install Guide, White General Purpose Tape, Issue 5.0, dated September 2022.
 - Product Data Sheet, Stud Strap, Issue 3.0, dated September 2022.
 - Install Guide, Stud Strap, Issue 3.0, dated September 2022.
 - Product Data Sheet, Thermastrap, Issue 3.0, dated September 2022.
 - Install Guide, Thermastrap, Issue 3.0, dated September 2022.
- 6.2 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

General

7.1 The BRANZ Appraisals covering each of the Thermakraft One Wrap System components must be referred to for full design information. The relevant BRANZ Appraisals are:

Flexible Wall Underlays

- Appraisal No. 695 Watergate Plus Wall Underlay.
- Appraisal No. 912 Thermakraft 220 Synthetic Wall Underlay.
- Appraisal No. 917 Thermakraft Covertex 403 Roof and Wall Underlay.

Flexible Flashing Tapes

- Appraisal No. 878 Thermakraft Aluband Window Flashing Tape.
- Appraisal No. 1122 Thermaflash Flashing Tape.

Penetration Seals

- Appraisal No. 942 OneSeal Multi-Fit Pipe and Cable Penetration Seals.

7.2 The Thermakraft One Wrap System is intended for use behind wall cladding systems, at joinery openings and pipe and cable penetrations as a secondary defence against water penetration into framing cavities.

7.3 The system will also 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.

7.4 Watergate Plus Wall Underlay and Thermakraft Covertex 403 are 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 or NASH Building Envelope Solutions, Paragraph 9.1.4 (c). Thermakraft 220 Synthetic Underlay is not suitable for use as an air barrier.

7.5 The flexible flashing tapes used with the Thermakraft One Wrap System meet the requirements of AC148:2001, which is an alternative solution to the version of AC148 referenced by NZBC Acceptable Solution E2/AS1 or NASH Building Envelope Solutions, Paragraph 9.1.5 (b). The installation method for the flashing tapes is an alternative solution to the installation method shown within NZBC Acceptable Solution E2/AS1, Figures 72A and 72B and NASH Building Envelope Solutions, Figures 67A and 67B.

7.6 Two layers of Thermaflash Flashing Tape must be used on the horizontal sill surface [a single layer is used in all other locations]. Thermakraft Aluband Window Flashing Tape only requires one layer on the horizontal sill surface.

7.7 OneSeal Multi-Fit Pipe and Cable Penetration Seals provide an alternative solution to the pipe and service penetration detailing specified in NZBC Acceptable Solution E2/AS1, Paragraph 9.1.9.3 and Figure 68, and NASH Building Envelope Solutions, Paragraph 9.1.10.3 and Figure 63.

7.8 In cavity installations where the cavity battens are installed at greater than 450 mm centres, the wall underlay must be restrained between the battens to prevent the wall underlay bulging into the cavity space when bulk insulation is installed in the wall frame cavity. Refer to NZBC Acceptable Solution E2/AS1, Paragraph 9.1.8.5 for timber frame or NASH Building Envelope Solutions, Paragraph 9.1.9.5 for steel frame. Wall underlay support options include Stud Strap, Thermastrap, polypropylene strap, 75 mm galvanised mesh or galvanised wire, vertical cavity battens or thermal break sheathing [steel frame only].

7.9 The Thermakraft One Wrap System is suitable for use under wall cladding as a wall underlay as specified in NZBC Acceptable Solution E2/AS1 or NASH Building Envelope Solutions, Table 23.



- 7.10 The Thermakraft One Wrap System is not designed to overcome poor detailing and workmanship of the wall cladding or window or door joinery. The system must not be considered in isolation, but be considered as part of the wall cladding system. The Thermakraft One Wrap System is designed to be used in conjunction with air seals and flashing systems, not as a substitute.
- 7.11 When the Thermakraft One Wrap 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

- 8.1 The Thermakraft One Wrap 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 stand-alone flexible wall underlay system, and all Wind Zones of NZS 3604 and NASH Standard Part 2 up to, and including, Extra High when used as an overlay system for rigid wall underlays.

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 Thermakraft One Wrap System both during normal use and maintenance of the building.

Serviceable Life

- 9.2 Provided the selected wall underlay, flexible flashing tape and penetration seal is not exposed to the weather or ultraviolet [UV] light for longer than stated in the relevant Appraisal, and provided the exterior cladding is maintained in accordance with the cladding manufacturer's instructions and the cladding remains weather resistant, the Thermakraft One Wrap System is expected to have a serviceable life equal to that of the cladding.

Control of Internal Fire and Smoke Spread

- 10.1 The flexible wall underlays used with the Thermakraft One Wrap System have an AS 1530 Part 2 flammability index of not greater than 5 and therefore meet 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.

Prevention of Fire Occurring

- 11.1 Separation or protection must be provided to the Thermakraft One Wrap System from heat sources such as fireplaces, heating appliances, flues and chimneys. Part 7 of NZBC Verification Method C/VM1 and Acceptable Solution C/AS1, and NZBC Acceptable Solution C/AS2 provide methods for separation and protection of combustible materials from heat sources.

External Moisture

- 12.1 The Thermakraft One Wrap System must be used behind claddings that meet the requirements of the NZBC, such as those covered by NZBC Acceptable Solution E2/AS1, NASH Building Envelope Solutions, or claddings covered by a valid BRANZ Appraisal.
- 12.2 The Thermakraft One Wrap System, when installed in accordance with the Technical Literature and this Appraisal will assist in the total cladding systems compliance with NZBC Clause E2.

Installation Information

Installation Skill Level Requirement

- 13.1 All design and building work must be carried out in accordance with the Thermakraft One Wrap System's Technical Literature and this Appraisal by competent and experienced tradespersons conversant with the Thermakraft One Wrap System. 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

Flexible Wall Underlays

- 14.1 The wall underlay must be fixed to all framing members at maximum 300 mm centres with large-head clouts 20 mm long, 6-8 mm staples, self-drilling screws or proprietary underlay fixings. The underlay must be pulled taut over the framing before fixing.
- 14.2 The wall underlay must be run horizontally and must extend from the upper-side of the top plate to the under-side of the bearers or wall plates supporting ground floor joists, or below bottom plates on concrete slabs. Horizontal laps must be no less than 150 mm wide, 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.
- 14.3 The wall underlay should be run over openings and these left covered until windows and doors are ready to be installed. Openings are formed in the underlay by cutting on a 45 degree diagonal from each corner of the penetration. The flaps of the cut underlay must be folded inside the opening and stapled to the penetration framing. Excess underlay may be cut off flush with the internal face of the wall frame.
- 14.4 The wall underlay can be added as a second layer over head flashings in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.1.10.3 or NASH Building Envelope Solutions, Paragraph 9.1.11.3. Alternatively, the head flashing upstand may be taped to the wall underlay with Aluband Window or Thermaflash Flashing Tape.
- 14.5 When fixing the product in windy conditions, care must be taken due to the large sail area created.
- 14.6 Any damaged areas of the wall underlay, such as tears, holes or gaps around service penetrations, must be repaired. Small tears can be taped, and damaged areas can be repaired by covering with new material lapping the damaged area by at least 150 mm and taping with Thermakraft White General Purpose Tape.
- 14.7 If the wall underlay is exposed to the weather or UV light for more than the maximum exposure period detailed within the relevant BRANZ Appraisal, then it must be replaced with new material.

Flexible Flashing Tapes

- 14.8 Before the flashing tape is applied, the substrate surfaces must be clean, dry and free from any surface contaminants such as dust and grease that may cause loss of adhesion. When installing Aluband Window or Thermaflash Flashing Tapes on difficult to bond substrates, Scotch® Super 77™ Spray Adhesive may be used. Ensure that the wall underlay/substrate is dry and free of dirt before applying the spray adhesive. Wait for a minute to allow the spray adhesive to become tacky. When tacky to the touch apply the flashing tape in the normal manner.
- 14.9 Fit a Thermakraft Corner Mould into each of the bottom corners to create a seal at the corner junction. The corner piece must be fixed to the framing with staples or clouts.
- 14.10 A length of 150 or 200 mm wide flashing tape must be cut to the length of the sill plus 400 mm. The tape is installed flush with the interior face of the opening and is applied along the entire length of the sill and 200 mm up each jamb. The overhanging tape is cut at the corner of the opening to allow the tape to be folded onto the face of the wall underlay.
- 14.11 When Thermaflash Flashing Tape is being used, a second layer of 75 mm wide tape must then be installed along the entire length of the sill. The tape is installed flush with the exterior face of the opening. This is a mandatory requirement for horizontal surfaces to ensure nail penetrations self-seal. *[Note: A second layer is not required when Thermakraft Aluband Window Flashing Tape is being used.]*
- 14.12 A 400 mm length of flashing tape must be installed 200 mm down the jamb and 200 mm along the lintel at each of the top corners of the window or door joinery opening. A 75 mm wide x 100 mm long sealing tape 'butterfly' must be installed at 45° across the corner of the head/jamb junction overlapping the corner by 3 mm to create a seal at the corner junction.



- 14.13 The flashing tapes must not be stretched. To avoid wastage, the tapes can be lapped 100 mm minimum onto themselves without reducing the performance of the flashing tape system.
- 14.14 If the flashing tape is exposed to the weather or UV light for more than the maximum exposure period detailed within the relevant BRANZ Appraisal, then it must be replaced with new material.

Penetration Seals

- 14.15 The OneSeal Multi-Fit Pipe and Cable Penetration Seal must create a tight seal around the pipe or cable penetration. The appropriate OneSeal Multi-Fit Pipe and Cable Penetration Seal must be used based on the diameter of the pipe or cable penetration.
- 14.16 The wall underlay must be clean, dust free and dry prior to adhering the OneSeal Multi-Fit Pipe and Cable Penetration Seal.
- 14.17 The OneSeal Multi-Fit Pipe and Cable Penetration Seal must be installed in a diamond pattern, which will assist with moisture run-off.
- 14.18 If the OneSeal Multi-Fit Pipe and Cable Penetration Seal is exposed to the weather or UV light for more than the maximum exposure period detailed within the relevant BRANZ Appraisal, then it must be replaced with a new seal.

Inspections

- 14.19 The Technical Literature must be referred to during the inspection of Thermakraft One Wrap System installations.

Basis of Appraisal

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

Tests

- 15.1 The following tests have been carried out on the flexible wall underlays 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, pH of extract in accordance with AS/NZS 1301.421s and air resistance to BS 6538.3. A range of these tests were completed before and after the underlays were exposed to UV light.
- 15.2 The flammability index of the flexible wall underlays has been evaluated in accordance with AS 1530.2.
- 15.3 Testing of the flexible flashing tapes has been completed by BRANZ to the requirements of ICC Evaluation Service Acceptance Criteria for Flashing Materials AC148:2001. The adhesion of the flashing tapes to black bituminous Kraft building paper complying with the requirements of NZBC Acceptable Solution E2/AS1, Table 23 and selected other synthetic wall underlays has been tested and found to be satisfactory.
- 15.4 Testing after various forms of accelerated aging has confirmed the adhesion of OneSeal Multi-Fit Pipe and Cable Penetration Seals to a range of flexible and rigid wall underlays. The results have been reviewed by BRANZ experts and found to be satisfactory.

Other Investigations

- 16.1 Durability opinions have been given by BRANZ technical experts.
- 16.2 Practicability of installation has been assessed by BRANZ and found to be satisfactory.
- 16.3 The Technical Literature, including installation instructions, has been examined by BRANZ and found to be satisfactory.



Quality

- 17.1 The manufacture of Thermakraft wall underlays has been examined by BRANZ, including methods adopted for quality control. BRANZ also undertakes an ongoing review of product quality on an inwards goods basis. Details of the quality and composition of the materials used within the Thermakraft One Wrap System were obtained and found to be satisfactory.
- 17.2 The quality of supply to the market is the responsibility of Kingspan Insulation NZ Limited.
- 17.3 Building designers are responsible for the design of the building, and for the incorporation of the Thermakraft One Wrap System into their design in accordance with the instructions of Kingspan Insulation NZ Limited.
- 17.4 Quality of installation is the responsibility of the installer in accordance with the instructions of Kingspan Insulation NZ 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 Appraisal
Appraisal No. 962 [2023]
22 February 2023

THE THERMAKRAFT ONE WRAP
SYSTEM



In the opinion of BRANZ, the **Thermakraft One Wrap 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 **Kingspan Insulation NZ 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. **Kingspan Insulation NZ 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 **Kingspan Insulation NZ 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 **Kingspan Insulation NZ Limited** or any third party.

For BRANZ

Chelydra Percy

Chief Executive

Date of Issue:

22 February 2023