



BRANZ Appraised
Appraisal No. 912 [2016]

THERMAKRAFT 220 SYNTHETIC WALL UNDERLAY

Appraisal No. 912 [2016]

Amended 01 September 2020



BRANZ Appraisals

Technical Assessments of
products for building and
construction.

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Product

- 1.1 Thermakraft 220 Synthetic Underlay is a flexible synthetic wall underlay for use under direct fixed and cavity wall claddings on timber and steel-framed buildings. The product is manufactured from non-woven, spun-bonded polypropylene and is coloured white.

Scope

Flexible Wall Underlay

- 2.1 Thermakraft 220 Synthetic Underlay has been appraised for use as a flexible wall underlay for timber and steel-framed 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; and,
 - 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 to NASH Building Envelope Solutions for steel-framed buildings; and,
 - situated in NZS 3604 Wind Zones up to, and including, Very High.

Use over Rigid Wall Underlay

- 2.2 Thermakraft 220 Synthetic Underlay has been appraised for use as a flexible wall underlay over rigid wall underlays on timber and steel-framed 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; and,
 - with absorbent and non-absorbent wall claddings installed over an 18 mm minimum drained cavity; 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, Extra High.

Specific Design

- 2.3 Thermakraft 220 Synthetic Underlay has also been appraised for use on buildings subject to specific weathertightness design. Building designers are responsible for the building design and for the incorporation of Thermakraft 220 Synthetic Underlay into their design in accordance with the declared properties and the instructions of Thermakraft Limited.

Building Regulations

New Zealand Building Code (NZBC)

- 3.1 In the opinion of BRANZ, Thermakraft 220 Synthetic Underlay, if used, designed, 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. Thermakraft 220 Synthetic Underlay meets these requirements. See Paragraphs 9.1 and 9.2.

Clause C3 FIRE AFFECTING AREAS BEYOND THE FIRE SOURCE: Performance C3.4 [c]. Thermakraft 220 Synthetic Underlay meets this requirement. See Paragraph 10.1.

Clause E2 EXTERNAL MOISTURE: Performance E2.3.2. When used as part of the cladding system, Thermakraft 220 Synthetic Underlay will contribute to meeting this requirement. See Paragraphs 12.1 and 12.2.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Thermakraft 220 Synthetic Underlay meets this requirement and will not present a health hazard to people.

Technical Specification

- 4.1 Thermakraft 220 Synthetic Underlay is a white, 95 g/m² spun-bonded polypropylene, non-woven membrane.
- 4.2 The product is supplied in standard roll sizes of 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 is labelled with the marketing or construction company's name. The rolls are wrapped in clear polythene film. *[Note: The product is also available in custom lengths and custom printing [subject to minimum quantities]. Contact Thermakraft Limited for further information.]*

Accessories

- 4.3 Accessories used with Thermakraft 220 Synthetic Underlay which are supplied by the installer are:
- **Fixings** - staples, clouts, screws or proprietary underlay fixings, or other temporary fixings to attach the wall underlay to the framing.
 - **Wall underlay restraint [timber frame]** - 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.
 - **Wall underlay restraint [steel frame]** - polypropylene strap, 75 mm galvanised mesh or galvanised wire, vertical cavity battens or thermal break sheets where required to restrain the wall underlay in accordance with NASH Building Envelope Solutions Paragraph 9.1.9.5.

Handling and Storage

- 5.1 Handling and storage of the product, whether on-site or off-site, is under the control of the installer. The rolls must be protected from damage and weather. They must be stored on end, under cover, in clean, dry conditions and must not be crushed.

Technical Literature

- 6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for Thermakraft 220 Synthetic Underlay. 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

General

- 7.1 Thermakraft 220 Synthetic Underlay is intended for use as an alternative to conventional building papers which are fixed over timber or steel-framed walls in order to limit the entry of wind into building cavities, and to act as a secondary barrier to wind-driven rain. Refer to Table 1 for material properties.
- 7.2 The material also provides a degree of temporary weather protection during early construction. However, the product will not make the building weathertight and some wetting of the underlying structure is always possible before the building is closed in. Hence, the building must be closed-in and made weatherproof before moisture sensitive materials such as wall or ceiling linings and insulation materials are installed.
- 7.3 Thermakraft 220 Synthetic Underlay must not be exposed to the weather or ultraviolet (UV) light for a total of more than 42 days before being covered by the wall cladding.
- 7.4 In cavity installations where the cavity battens are installed at greater than 450 mm centres, the wall underlay must be supported between the battens to prevent the 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 for timber frame or NASH Building Envelope Solutions, Paragraph 9.1.9.5 for steel frame. Wall underlay support options include polypropylene strap, 75 mm galvanised mesh or galvanised wire, or vertical cavity battens or thermal break sheathing [steel frame only].

Table 1: NZBC Acceptable Solution E2/AS1, Table 23 [NZS 2295] Requirements

NZBC E2/AS1, Table 23 [NZS 2295] Wall Underlay Properties	Property Performance Requirement	Actual Property Performance
Absorbency	$\geq 100 \text{ g/m}^2$	Pass
Vapour Resistance	$\leq 7 \text{ MN s/g}$	Pass
Water Resistance	$\geq 20 \text{ mm}$	Pass
pH of Extract	≥ 5.5 and ≤ 8	Pass
Shrinkage	$\leq 0.5\%$	Pass
Mechanical	Edge tear and tensile strength	Edge tear [Average]: Machine direction = 87 N Cross direction = 57 N Tensile strength [Average]: Machine direction = 2.5 kN/m Cross direction = 2.1 kN/m
Air Barrier	Air resistance: $\geq 0.1 \text{ MN s/m}^3$	Thermakraft 220 Synthetic Underlay cannot be used as an air barrier.

Claddings

- 7.5 Thermakraft 220 Synthetic Underlay is suitable for use under wall claddings as a wall underlay as called up in NZBC Acceptable Solution E2/AS1, Table 23 on timber-framed buildings and NASH Building Envelope Solutions Table 23 on steel-framed buildings. Thermakraft 220 Synthetic Underlay is suitable for use under cavity based wall claddings as an absorbent synthetic wall underlay as called up in NZS 2295, Table 2.4 on steel-framed buildings.

Stucco Plaster

- 7.6 Thermakraft 220 Synthetic Underlay is suitable for use as a non-rigid backing material for stucco plaster in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.3.5.1 for timber framing or NASH Building Envelope Solutions Paragraph 9.3.5.1 for steel framing. The underlay must be supported with 75 mm galvanised mesh or plastic tape or wire at 150 mm centres run across the cavity battens to limit deflection to a maximum of 5 mm.
- 7.7 Thermakraft 220 Synthetic Underlay may also be used as a slip layer over rigid backings for stucco plaster in accordance with the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 9.3.3.1 b) for timber framing or NASH Building Envelope Solutions Paragraph 9.3.3.1 b) for steel framing.

Structure

- 8.1 Thermakraft 220 Synthetic Underlay 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, 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 wall underlays.

Durability

- 9.1 Thermakraft 220 Synthetic Underlay meets code compliance with NZBC Clause B2.3.1 [a], not less than 50 years for wall underlays used 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 for wall underlays used where the cladding durability requirement is 15 years.

Serviceable Life

- 9.2 Provided it is not exposed to the weather or UV light for a total of more than 42 days, and provided the exterior cladding is maintained in accordance with the cladding manufacturer's instructions and the cladding remains weather resistant, Thermakraft 220 Synthetic Underlay is expected to have a serviceable life equal to that of the cladding.

Control of Internal Fire and Smoke Spread

- 10.1 Thermakraft 220 Synthetic Underlay has an AS 1530 Part 2 Flammability Index of not greater than 5 and therefore meets the requirements of NZBC Acceptable Solutions 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 Thermakraft 220 Synthetic Underlay from heat sources such as fireplaces, heating appliances, flues and chimneys. Part 7 of NZBC Acceptable Solution C/AS1, C/AS2 and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.



External Moisture

- 12.1 Thermakraft 220 Synthetic Underlay must be used behind claddings that meet the requirements of the NZBC, such as those covered by NZBC Acceptable Solution E2/AS1 or NASH Building Envelope Solutions, or claddings covered by a valid BRANZ Appraisal.
- 12.2 Thermakraft 220 Synthetic Underlay, 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 Requirements

- 13.1 All design and building work must be carried out in accordance with the Thermakraft 220 Synthetic Wall Underlay Technical Literature and this Appraisal by competent and experienced tradespersons conversant with wall underlays. 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.

Underlay Installation

- 14.1 Thermakraft 220 Synthetic 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 or rigid wall underlay before fixing.
- 14.2 Thermakraft 220 Synthetic 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 Thermakraft 220 Synthetic 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 for timber frames or NASH Building Envelope Solutions Paragraph 9.1.11.3 for steel framing.
- 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 Thermakraft 220 Synthetic Underlay, such as tears, holes or gaps around service penetrations, must be repaired. Damaged areas can be repaired by covering with new material lapping the damaged area by at least 150 mm and taping, or by taping small tears.

Inspections

- 14.7 The Technical Literature must be referred to during the inspection of Thermakraft 220 Synthetic Underlay 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 Thermakraft 220 Synthetic 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 Thermakraft 220 Synthetic Underlay was exposed to UV light.
- 15.2 The flammability index of Thermakraft 220 Synthetic Underlay has been evaluated in accordance with AS 1530.2.

Other Investigations

- 16.1 A durability opinion has been given by BRANZ technical experts.
- 16.2 The practicability of installation of Thermakraft 220 Synthetic Underlay 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 220 Synthetic Underlay has not been examined by BRANZ. Details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory. BRANZ undertakes an ongoing review of product quality on an inwards goods basis.
- 17.2 The quality of supply to the market is the responsibility of Thermakraft Limited.
- 17.3 Building designers are responsible for the design of the building, and for the incorporation of the wall underlay into their design in accordance with the instructions of Thermakraft Limited.
- 17.4 Quality of installation is the responsibility of the installer in accordance with the instructions of Thermakraft Limited.



Sources of Information

- 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 4201.1: 1994 Pliable building membranes and underlays - Methods of test - Resistance to dry delamination.
- AS/NZS 4201.2: 1994 Pliable building membranes and underlays - Methods of test - Resistance to wet delamination.
- AS/NZS 4201.3: 1994 Pliable building membranes and underlays - Methods of test - Shrinkage.
- AS/NZS 4201.4: 1994 Pliable building membranes and underlays - Methods of test - Resistance to water penetration.
- AS/NZS 4201.6: 1994 Pliable building membranes and underlays - Methods of test - Surface water absorbency.
- 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.

Amendments

Amendment No. 1, dated 23 February 2017.

This Appraisal has been amended to update the Appraisal Holder.

Amendment No. 2, dated 31 August 2017.

This Appraisal has been amended to update the cover image.

Amendment No. 3, dated 09 September 2019.

The Appraisal has been amended to update the product name, product weight and properties listed in Table 1. The Appraisal has also been amended to update wording in sections 10.1, 11.1 and 13.1.

Amendment No. 4, dated 01 September 2020.

This Appraisal has been amended to update the scope, to include custom roll sizes and update NZBC reference documents.



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22 April 2016

THERMAKRAFT 220 SYNTHETIC
UNDERLAY



In the opinion of BRANZ, **Thermakraft 220 Synthetic Underlay** 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 **Thermakraft 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. **Thermakraft 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 **Thermakraft 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 **Thermakraft Limited** or any third party.

For BRANZ

Chelydra Percy

Chief Executive

Date of Issue:

22 April 2016