



**BRANZ Appraised**

Appraisal No.682 [2010]

BRANZ Appraisals

Technical Assessments of products  
for building and construction

**BRANZ  
APPRAISAL  
No. 682 (2010)**

Amended 30 January 2014

**TERRA LANA WOOL  
INSULATION**

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## Product

1.1 Terra Lana Wool Insulation is a wool and polyester fibre blend thermal insulation for use in ceilings, walls and underfloors of buildings.



## Scope

2.1 Terra Lana Wool Insulation has been appraised as a thermal insulation material for ceilings, walls and under floors of buildings within the following scope:

- framed or part-framed domestic and commercial buildings where the insulation remains dry during its serviceable life.

2.2 Terra Lana Wool Insulation must be installed in accordance with the manufacturer's Technical Literature to meet the stated thermal performance rating of the insulation. See Paragraph 6.1.

## Building Regulations

### New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, Terra Lana Wool Insulation 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 and B2.3.1(b) 15 years and B2.3.2. Terra Lana Wool Insulation will meet these requirements. See Paragraph 8.1.

**Clause E3 INTERNAL MOISTURE:** Performance E3.3.1. Terra Lana Wool Insulation will contribute to meeting this requirement. See Paragraphs 12.1 and 12.2.

**Clause F2 HAZARDOUS BUILDING MATERIALS:** Performance F2.3.1. Terra Lana Wool Insulation meets this requirement and will not present a health hazard to people.

**Clause H1 ENERGY EFFICIENCY:** Performance H1.3.2. E. Terra Lana Wool Insulation will contribute to meeting these requirements. See Paragraphs 13.1 – 13.8.

3.2 This is an Appraisal of an **Acceptable Solution** in terms of New Zealand Building Code Compliance. Terra Lana Wool Insulation thermal resistance (R-value) has been determined by testing to AS/NZS 4859.1 which is an acceptable method.

Table 1

R Value	Nominal Thickness (mm)	Width (mm)	Length (mm)	Pieces per Bale	Nett Area per Bale	Nett Weight (kg)
<b>Walls</b>						
2.2	90	370	2600	8	7.7	15.4
2.2	90	570	2600	6	8.9	17.7
2.4	90	370	2600	7	6.7	17.1
2.4	90	570	2600	5	7.4	18.8
3.2	140	370	2600	7	6.7	17.5
3.2	140	570	2600	5	7.4	19.4
<b>Ceiling</b>						
1.4	85	870	6000	1	5.2	4.6
1.6	100	870	5000	1	4.4	4.5
1.9	105	870	5000	2	8.7	10.7
2.6	145	570	4000	4	9.1	15.9
2.6	145	870	4000	2	7.0	12.2
3.2	165	570	4000	4	9.1	20.4
3.2	165	870	4000	2	7.0	15.6
3.2	140	570	2600	5	7.4	19.2
3.6	180	570	3500	4	8.0	21.0
3.6	180	870	3500	2	6.1	16.1
<b>Underfloor</b>						
1.4	88	460	5500	2	5.1	4.6
1.4	88	580	5500	2	6.4	5.8
1.8	100	460	4000	2	3.7	5.1
1.8	100	580	4000	2	4.6	6.4

Note 1. Insulation must not be fitted into sealed cavities that are less than the labelled insulation nominal thickness.

Note 2. Special sizes can be supplied on request.

## Technical Specification

4.1 Terra Lana Wool Insulation is manufactured from a minimum of 50% recycled and natural wool fibres and polyester fibre. The fibres are blended, carded and thermally bonded to produce blankets.

4.2 Terra Lana Underfloor Laminate (TLUFL) comprises two thermally bonded layers:

- A bonded wool upper layer.
- A semi-rigid polyester outer surface, for stapling.

4.3 The products are available as set out in Table 1.

4.4 Terra Lana Wool Insulation is grey in colour and is compression packaged in clear pre-printed poly bags. Each package is supplied with attached labelling in compliance with AS/NZS 4859.1.

4.5 Accessories used with Terra Lana Wool Insulation which are supplied by the Insulation Installer are :

- Underfloor fixings – Zinc plated or stainless steel in coastal areas staples that meet the requirements of NZBC Clause B2 Durability: Performance B2.3.1(a) not less than 50 years.

## Handling and Storage

5.1 Terra Lana Wool Insulation must be stored under cover and in dry conditions. Heavy objects must not be stacked on the packs. The packs must be stored in an orientation that avoids excessive compression of the product.

5.2 Compression packaged wool is subjected to a maximum combination of compression density and storage time after which the product may not loft to its nominal thickness and therefore may not achieve its designed thermal performance.

5.3 Terra Lana Wool Insulation has a shelf life of twelve months. The manufacturer's advice must be sought if the material to be used has been packaged for more than twelve months.

## Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for Terra Lana Wool Insulation. 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 Terra Lana Wool Insulation is designed to be used as thermal insulation to increase the energy efficiency of existing dwellings and can also be used to meet the NZBC requirements for new housing.

7.2 Mechanical fixing is required for the underfloor product under suspended timber floors.

7.3 The building envelope must be constructed to ensure the insulation remains dry during installation and throughout the life of the building.

7.4 Subject to the maximum compression density and storage conditions not being exceeded, all products covered by this Appraisal should recover to their nominal thickness within 3 months after being removed from their compressed bales.

7.5 Terra Lana Wool Insulation may increase in thickness due to high temperatures. To prevent moisture transfer to Terra Lana Wool Insulation in confined situations in ceilings and at external eaves, a separation (minimum 25 mm) is required between Terra Lana Wool Insulation and any rigid or flexible roof underlay. Terra Lana Wool Insulation must not be subjected to long term exposure of temperatures in excess of 60°C.

7.6 NZS 4246 requires a minimum separation of 50 mm from metal chimneys and flues where they penetrate a wall or ceiling. The separation requirements of heat appliances and Terra Lana Wool Insulation technical literature must be followed.

7.7 Where the insulation material is not laid directly on a ceiling lining or over ceiling battens or rafters, it must be adequately supported by galvanised wire netting or some other suitable corrosion resistant material.

7.8 Only the Underfloor Laminate product is suitable for installing under suspended timber floors. The manufacturer's instructions must be followed to ensure correct performance and durability.

#### **Recessed Downlights**

7.9 Installing RDLs in a ceiling or roof forms a gap in the thermal envelope, reducing the overall thermal performance.

7.10 Compensation for the loss of insulation due to the presence of RDLs must be made, to meet the requirements of NZBC Clause H1. One RDL per square metre can be responsible for the loss of 10% of the insulation value of the ceiling. NZS 4246 and the BRANZ House Insulation Guide provide further guidance.

7.11 When installing RDLs in a skillion roof, the RDL must not protrude into the ventilation gap required between the insulation and the roof substrate or cladding.

7.12 For Prevention of Fire Occurring see Paragraph 10.2.

## **Durability**

### **Serviceable Life**

8.1 Where the building is maintained so that provisions of the NZBC E2 and E3 Clauses are met, and where the insulation is not crushed or exposed to conditions that will diminish its thermal performance, (e.g. moisture), then it can be expected to have a serviceable life of at least 50 years. Terra Lana Wool Insulation must be installed in a dry, protected location.

## **Maintenance**

9.1 The building must be maintained weatherproof at all times. If, during normal routine maintenance it is discovered that moisture has entered the building envelope, or that dampness has occurred because of leaking plumbing or some other source, then that source must be repaired immediately. Wet or damp insulation must be removed and then replaced with new insulation of an equivalent thermal rating. Framing spaces must be clean, dry and free of all contaminants and mould before fitting new insulation. NZS 4246 Paragraph 3.3 gives guidance on thermal insulation maintenance due to water damage.

## **Prevention of Fire Occurring**

10.1 Separation or protection must be provided to Terra Lana Wool Insulation 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. Terra Lana Wool Insulation must not be used on the wall, roof and/or ceiling of buildings as the exposed surface in occupied spaces. Refer to the relevant NZBC Acceptable Solutions C/AS1 to C/AS6 for specific internal surface finish requirements. See Paragraph 7.6.

10.2 The requirements for downlights are given in NZBC Acceptable Solutions C/AS1 - C/AS7 Paragraph 7.4. Regardless of the downlight type specified, a 100 mm separation between Terra Lana Wool Insulation and recessed downlights (RDLs) must be maintained.

## **External Moisture**

11.1 The total building envelope must comply with the requirements of NZBC Clause E2 to ensure that the insulation remains dry in use.

11.2 The moisture content of the construction materials at the time of installing and enclosing the insulation must meet the requirements of NZBC Acceptable Solution E2/AS1, Paragraph 10.2(a), or a lower moisture content if required by the lining manufacturer.

## **Internal Moisture**

12.1 Buildings other than Communal Non-residential, Commercial, Industrial, Outbuildings or Ancillary buildings, must be constructed with an adequate combination of thermal resistance, ventilation, and space temperature provided to all habitable spaces, bathrooms, laundries and other spaces where moisture may be generated or may accumulate.

12.2 Roofs and walls of housing complying with the Schedule Method for Compliance with Clause H1.3.2 E will have adequate thermal resistance. Other buildings may require more thermal insulation to satisfy the requirements of NZBC Acceptable Solution E3/AS1 than that to satisfy the energy efficiency provisions alone.

## **Energy Efficiency**

### **Building Thermal Envelope**

13.1 NZBC Verification Method H1/VM1 can be used for housing, Communal Residential, Communal Non-residential and Commercial Buildings.

### **Modelling of Housing and Smaller Buildings**

13.2 The modelling method described in NZS 4218 Section 3.3 (as modified by NZBC Verification Method H1/VM1 Paragraphs 1.1.2 and 1.1.3) is a Verification Method for NZBC Clause H1.3.1(a) for the following types of buildings:

- a) Housing, regardless of total floor area (the method is also a means of compliance with H1.3.2 E, which applies only to housing); and,
- b) Small buildings other than housing having a net lettable area no greater than 300 m<sup>2</sup>.

### **Building Performance Index for Housing**

13.3 Compliance with NZBC Clause H1.3.2 E (Building Performance Index or BPI) satisfies Clause H1.3.1(a).

### **Modelling of Large Buildings Other Than Housing**

13.4 The modelling method described in NZS 4243.1 Section 4.4 is a Verification Method for NZBC Clause H1.3.1(a) for buildings other than Housing having a net lettable area greater than 300 m<sup>2</sup>.

## Determining Thermal Resistance

13.5 The thermal resistance (R-values) of building elements may be verified by using NZS 4214. The BRANZ 'House Insulation Guide' Third Edition provides thermal resistances of common building elements and is based on calculations from NZS 4214.

## Building Thermal Envelope

13.6 NZBC Acceptable Solution H1/AS1 can be used for Housing, Communal Residential, Communal Non-Residential and Commercial buildings.

## Housing and Small Buildings

13.7 Construction in accordance with NZS 4218 Sections 3.1 or 3.2 (as modified by NZBC Acceptable Solution H1/AS1 Paragraphs 2.1.3 and 2.1.4) satisfies NZBC H1.3.1 (a) for housing of any size and all buildings having a net lettable area no greater than 300 m<sup>2</sup>.

13.8 Construction in accordance with NZS 4218 sections 3.1 or 3.2 (as modified by NZBC Acceptable Solution H1/AS1 Paragraphs 2.1.3 and 2.1.4) satisfies NZBC H1.3.2E. for housing of any size, including the external walls of multi-unit dwellings. (Note that common walls between household units of multi-unit dwellings need not comply with NZS 4218.)

15.7 The insulation must be continuous across the entire roof or ceiling plane between top plates of external walls, and fitted either between or over rafters, ceiling joists or truss chords.

15.8 Wherever possible the insulation should be fitted beneath wiring or plumbing.

## Recessed Downlights

15.9 Regardless of the downlight type specified in C/AS1 – C/AS7 a 100 mm separation between Terra Lana Wool Insulation and recessed downlights (RDL's) must be maintained.

15.10 When installing insulation prior to the luminaries, gaps in the insulation must be provided to allow for the subsequent installation of the RDL, driver/controller and wiring.

## Inspections

16.1 The Technical Literature and NZS 4246 must be referred to during the inspection of Terra Lana Wool Insulation installations.

## Health and Safety

17.1 Terra Lana Wool Insulation is easy to handle and has no known health hazards and may be handled without any protective equipment.

## Installation Information

### Installation Skill Level Requirements

14.1 Installation of Terra Lana Wool Insulation must be completed by an installer with an understanding of insulation installation, in accordance with the instructions given within the Technical Literature, Installation Instructions and this Appraisal.

### General

15.1 Installation of Terra Lana Wool Insulation must be in accordance with the manufacturer's Technical Literature, Installation Instructions and this Appraisal. NZS 4246 should be used as a guide for installing insulation in residential buildings.

15.2 The product must be installed only when the building is enclosed and when the construction materials have achieved the required maximum moisture content or less, to ensure the insulation does not become wet.

15.3 Terra Lana Wool Insulation must be released from the packaging and allowed to re-loft prior to installation. The time to loft will depend upon the length of time the product has been packaged and stored. The product can be shaken to speed up the recovery process.

15.4 Terra Lana Wool Insulation is manufactured in roll form and can be cut to suit framing spaces.

15.5 Terra Lana Underfloor Laminate is supplied in 460 mm wide rolls and is suitable for fitting between floor joists at approximately 450 mm centres (18 inches). The product is fitted between joists, hard up against the flooring. The insulation is mechanically fixed to the floor joists. End joins in the rolls must be butted tightly together. Extreme care must be taken to avoid any electrical cables from being penetrated by the staples.

15.6 Ceiling insulation must either be neatly friction fitted between framing members and over linings, or fitted over framing members and butted tightly so that the potential for gaps and convective heat loss is reduced. The material must not be folded, tucked or compressed. A close, even fit provides the most efficient thermal performance.

## Basis of Appraisal

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

### Tests

18.1 BRANZ has carried out thermal resistance testing of Terra Lana Wool Insulation in accordance with AS/NZS 4859.1.

### Other Investigations

19.1 An assessment of the durability of Terra Lana Wool Insulation has been made by BRANZ technical experts.

19.2 The manufacturer's Technical Literature and Installation Instructions have been reviewed by BRANZ and found to be satisfactory.

### Quality

20.1 The manufacture of Terra Lana Wool Insulation has been examined by BRANZ, including methods adopted for quality control. Details of the manufacturing processes, and quality and composition of the raw materials used were obtained and found to be satisfactory.

20.2 Terra Lana Products Ltd is responsible for the quality of the product supplied.

20.3 Quality of installation of the product on site is the responsibility of the installer.

20.4 Quality of maintenance of the building to ensure the insulation material remains in place and dry is the responsibility of the building owner.

## Sources of Information

- AS/NZS 4859.1: 2002 Materials for the thermal insulation of buildings.
- BRANZ House Insulation Guide, Third Edition 2007.
- NZS 4214: 2006 Method of determining the total thermal resistance of parts of buildings.
- NZS 4218: 2004 Energy efficiency – housing and small building envelope.
- NZS 4243: 1996 Energy efficiency – large buildings.
- NZS 4246: 2006 Energy efficiency – Installing Insulation In Residential Buildings.
- Compliance Document for New Zealand Building Code Energy Efficiency Clause H1, Department of Building and Housing, Third Edition, August 2007.
- Ministry of Business, Innovation and Employment Record of Amendments for Compliance Documents and Handbooks.
- The New Zealand Building Regulations 1992.

### Amendment No. 1, dated 21 April 2011.

This Appraisal has been amended to include an R2.8 ceiling product and an R2.2 wall product (available in two widths).

### Amendment No. 2, dated 30 January 2014.

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, the Product Table, table 1 and External Moisture paragraph 11.2.



# BRANZ

**In the opinion of BRANZ, Terra Lana Wool Insulation 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 Terra Lana Products Ltd, 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. Terra Lana Products Ltd:
  - 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 Terra Lana Products Ltd.
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 Terra Lana Products Ltd or any third party.

For BRANZ

P Burghout  
Chief Executive

Date of issue: 1 June 2010