



BRANZ Appraised

Appraisal No.301 [2008]

BRANZ Appraisals

Technical Assessments of products
for building and construction

**BRANZ
APPRAISAL
No. 301 (2008)**

This Appraisal replaces Appraisal No.
301 (2005) issued 22 August 2005.
Amended 17 May 2011.

**BRADFORD
INSULATION -
THERMAL INSULATION**

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Product

1.1 Bradford Insulation is a range of insulation materials manufactured from resin bonded mineral wool fibres and pre-cut to suit a wide range of thermal insulation requirements and framing set-outs in walls, roofs and ceilings of buildings.

1.2 Bradford Gold™ is manufactured from glasswool and Bradford SoundScreen™ is manufactured from rockwool.



Scope

2.1 Bradford Insulation has been appraised as a thermal insulation material for walls, ceilings and roofs 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 Bradford 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, Bradford 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. Bradford Insulation will meet this requirement. See Paragraph 8.1.

Clause E3 INTERNAL MOISTURE: Performance E3.3.1. Bradford Insulation will contribute to meeting this requirement. See Paragraphs 12.1 – 12.2.

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

Clause H1 ENERGY EFFICIENCY: Performance H1.3.1(a) and H1.3.2 E. Bradford 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. Bradford Insulation thermal resistance (R-Value) has been determined by AS/NZS 4859.1 which is an acceptable method.

4.3 Bradford Insulation glasswool standard insulation is yellow in colour and is packaged in yellow and green compression packaging or gold and green compressive packaging for the Bradford Gold™ High Performance range. Bradford SoundScreen™ is brown in colour and packaged in blue and white compression packaging. Each packet is supplied with labelling in compliance with AS/NZS 4859.1

4.4 Accessories used with Bradford Insulation which are supplied by the insulation installer are :

- Plastic strapping – Where plastic strapping is used to control the insulation material from movement that would affect the performance of the thermal or acoustic insulation performance, strapping that meets the requirements of NZBC Clause B2 Durability Performance B2.3.1(a) 50 years, must be used.
- Plastic strapping fixings – Plastic strapping fixings such as hot dipped galvanised clouts or zinc plated staples that meet the requirements of NZBC Clause B2 Durability Performance B2.3.1(a) 50 years.

Technical Specification

Mineral Wool Insulation

4.1 Bradford Insulation range is a resin bonded fibrous mineral wool insulation.

The main ingredients of Bradford Insulation are:

Bradford Gold™ and Bradford Gold™ High Performance

- Glasswool - Recycled and or virgin glass
- Phenol formaldehyde resin

Bradford SoundScreen™

- Rockwool - Fibrous volcanic rock
- Phenol formaldehyde resin
- Iron and or steel Slag

4.2 The product is available as set out in Table 1.

Table 1: Product Range

Product	R Value	Nominal Thickness (mm) **	Size	Density (kg/m ³)	Pieces per Bale	Nett Area per Bale (m ²)
Bradford Gold™						
Wall Segments	1.8	90	1160 mm x 580 mm	8.4	22	14.8
Wall Segments	2.2	90	1160 mm x 580 mm	12.6	16	10.8
Wall Segments	2.4	90	1160 mm x 580 mm	18.9	10	6.7
Wall Segments	2.6	90	1160 mm x 580 mm	24	8	5.4
Wall Segments	2.8	90	1160 mm x 580 mm	34	5	3.4
Ceiling Segments	1.8	95	1160 mm x 430 mm	7.1	24	12.0
Ceiling Segments	2.2	115	1160 mm x 430 mm	7.8	24	12.0
Ceiling Segments	2.7	145	1160 mm x 430 mm	7.3	20	9.98
Ceiling Segments	3.2	165	1160 mm x 430 mm	7.8	16	8
Ceiling Segments	3.6	185	1160 mm x 430 mm	8.0	14	7.0
Ceiling Segments	4.0	215	1160 mm x 430 mm	7.3	12	6
Blanket	1.3	60	30 m x 1200 mm	9.8	1	36
Blanket	1.8	80	15 m x 1200 mm	11.25	1	18
Blanket	2.2	90	15 m x 1200 mm	11.3	1	18
Blanket	2.3	100	15 m x 1200 mm	11.3	1	18
Blanket	2.6	120	10 m x 1200 mm	10.1	1	12
Blanket	2.8	130	10 m x 1200 mm	10.8	1	12
Blanket	3.2	145	10 m x 1200 mm	10.8	1	12
Blanket	3.2	145	6m x 1200 mm	10.8	1	7.2
Bradford Gold™ High Performance						
Ceiling Segments	5.0	210	1160 mm x 430 mm	13.3	8	4.0
Ceiling Segments	6.0	260	1160 mm x 430 mm	12.6	6	3.0
Bradford SoundScreen™						
Wall segment	2.6	88	1350 mm x 580 mm	65.0	5	3.9

** Insulation must not be fitted into sealed cavities that are less than the labeled insulation nominal thickness.

Handling and Storage

5.1 Bradford 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 glasswool 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.

Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for Bradford 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 Bradford Insulation is designed to be used as thermal insulation to meet the energy efficiency and other NZBC insulation requirements, or to provide greater ratings when required by the designer, when installed in building walls, roofs and ceilings.

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

7.3 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 24 hours after being removed from their compressed bales.

7.4 To prevent moisture transfer to Bradford Insulation, a separation (minimum 25 mm) is required between Bradford Insulation and any flexible roof underlay. Where there is a rigid sheathing or roofing substrate such as plywood, provided there is no design requirement for roof space ventilation, a separation between Bradford Insulation and the sheathing or substrate is not required.

7.5 The clearances specified in the Installation Instructions, or specified by the manufacturer of heating appliances and recessed light fittings must be met. The use of recessed light fittings may, therefore, reduce the thermal performance of insulated ceilings. This factor must be taken into account in the assessment of compliance with NZBC Clause H1 Energy Efficiency.

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

7.7 When the insulation is installed in a wall with a drained cavity where the stud spacings are greater than 450 mm, an intermediate means of restraining the insulation from bulging into the cavity must be installed in accordance with NZBC Acceptable Solution E2/AS1 Paragraph 9.1.8.5.

7.8 Where the insulation is installed in exterior walls, it is preferable for the insulation material nominal thickness to be selected to provide a snug close fit of the insulation between building wrap and the interior wall lining. High density wall products cannot be compressed into enclosed framed cavities. (See Paragraph 15.10 for rockwool wall insulation details.)

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 expect to have a serviceable life of at least 50 years. Bradford Insulation must be installed in a dry, protected construction cavity.

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, repair must be undertaken immediately. Wet or damp insulation must be removed and then replaced with new insulation of an equivalent thermal rating. Cavities 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.

Outbreak of Fire

10.1 Bradford Insulation must be separated or protected from sources of heat such as chimneys, fireplaces, flues and fuel burning appliances in accordance with the requirements of NZBC Acceptable Solution C/AS1 Part 9.

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 enclosing the insulation must meet the requirements of NZBC Acceptable Solution E2/AS1, 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 and ventilation, and space temperature must be 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 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 Clause 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 m².

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 m².

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 m².

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 H1.3.2 E 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 either be neatly friction fitted between framing members and 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.

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

15.9 Where recessed light fittings are used, installation of the insulation material and the light fittings must be in accordance with NZBC Acceptable Solution C/AS1 Paragraph 9.4. If a gap in the insulation material is required around light fittings, the effectiveness of the thermal envelope will be diminished when the insulation does not form a continuous envelope.

High Density Rockwool

15.10 Where nominal 88 mm high density Rockwool products are used in 90 mm framing cavities, care must be taken to cut the insulation to exact cavity dimensions. High density products will not compress and it is preferable to cut the size up to 2 mm undersize to prevent bulging into the exterior wall cavity or bulging of the interior wall lining. Overall thermal performance will not be detrimentally affected by this small undersize tolerance.

Inspections

15.11 The Technical Literature must be referred to during the inspection of Bradford Insulation installations.

Health and Safety

16.1 Bradford Insulation is easy to handle. NZS 4246 gives guidance for health and safety requirements such as personal protective clothing and installation hazard assessment.

Installation Information

Installation Skill Level Requirements

14.1 Installation of Bradford 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 Bradford 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.

Glasswool Installation

15.3 Bradford 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.

15.4 Bradford Insulation is manufactured in segment and roll sizes to allow cutting to suit wall and ceiling framing spaces. (See Table 1.)

15.5 Bradford Insulation must be cut to fit into cavities where required.

15.6 Where Bradford Insulation is cut to fit wall cavities, the wall cavities must be completely filled to prevent sagging and thermal convection.

Basis of Appraisal

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

Tests

17.1 BRANZ has carried out thermal resistance testing of Bradford Insulation in accordance with AS/NZS 4859.1: 2002.

Other Investigations

18.1 An assessment of the durability of Bradford Insulation has been made by BRANZ technical experts.

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

18.3 Site inspections have been undertaken by BRANZ to assess the practicability of installation.

Quality

19.1 The manufacture of Bradford 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.

19.2 The quality control systems of CSR Bradford Insulation glasswool have been assessed and registered by Global-mark as meeting the requirements of AS/NZS ISO 9001: 2000, client number 100109. The quality control systems of CSR Bradford Insulation rockwool manufacturing have been assessed and registered by SAI Global as meeting the requirements of AS/NZS ISO 9001: 2000, certificate QEC0964.

19.3 CSR Bradford Insulation is responsible for the quality of the product supplied.

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

19.5 Quality of maintenance of the building to ensure the insulation material remains 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.
- New Zealand Building Code Handbook, Department of Building Housing, Third Edition, May 2007.
- The New Zealand Building Regulations 1992, up to, and including August 2008 Amendment.

Amendment No. 1, dated 26 May 2008.

The Appraisal has been amended to update the Product Table.

Amendment No. 2, dated 1 October 2008.

The Appraisal has been amended to update reference to NZBC Clause H1 made effective 30 September 2008.

Amendment No. 3, dated 11 May 2010.

The Appraisal has been amended to update the Product Table, and to remove floors.

Amendment No. 4, dated 17 May 2011.

The Appraisal has been amended to update the Product Table.



BRANZ

In the opinion of BRANZ, **Bradford Insulation Mineral 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 **Bradford Insulation**, 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. **Bradford Insulation:**
 - 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 **Bradford Insulation**.
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 **Bradford Insulation** or any third party.

For BRANZ

C Preston
Chief Executive

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