



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 5 July 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.



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.

4.4 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

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	2.9	115	8 m x 1200 mm	13.5	1	9.6
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

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

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. Each packet is supplied with labelling in compliance with AS/NZS 4859.1

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, ceilings and roofs.

7.2 Bradford Insulation is designed to be friction-fitted between wall, ceiling or roof framing. They are supplied in a range of R-values that with NZS 4214 are able to meet the minimum requirements of NZS 4218 for walls, ceilings and roofs.

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 The building envelope must be constructed to meet the requirements of the NZBC. The insulation must remain dry during installation and throughout the life of the building.

7.5 To prevent moisture transfer in skillion roof applications, a separation (minimum of 25mm) is required between the insulation and any rigid substrate or flexible roof underlay.

7.6 The clearances specified in the Technical Literature, or specified by the manufacturer of heating appliances and ventilation systems, must be met.

7.7 When the insulation is installed in a wall with a drained cavity it is recommended that specific wall products with a controlled nominal thickness be used. For products that are over lofting and 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, the insulation material nominal thickness must be selected to provide a snug close fit which touches all sides of the insulation cavity between the building underlay and the interior wall lining.

7.9 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.

Recessed Lights

7.10 Installing recessed downlights (RDLs) in a ceiling or roof forms a gap in the thermal envelope, reducing the overall thermal performance.

7.11 The overheating risk to the RDL is also affected by the surrounding materials.

7.12 Designers need to confirm that the specified lights are suitable for the specific application and that sufficient ventilation is available for cooling of the RDL as specified by the manufacturer, AS/NZS60598-2.2 Amendment A, and as required by AS/NZS3000 (Wiring Rules).

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

7.14 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.

7.15 Bradford Insulation is suitable for use with RDLs rated as CA80, CA135 (abutted) and IC, IC-F (abutted and covered) in line with the requirements of AS/NZS 60695-2.2 Amendment A.

7.16 During insulation installation in a skillion roof, gaps in the insulation must be provided to allow the subsequent installation of the RDL, driver/controller and wiring.

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.

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

Energy Efficiency

13.1 The Performance Requirement NZBC Clause H1.3.1 (a) and H1.3.2 E can be met by using the following methods.

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 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.

Building Thermal Envelope

13.5 NZBC Acceptable Solution H1/AS1 can be used for housing, communal residential, communal non-residential and commercial buildings.

Housing and Small Buildings

13.6 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.

13.7 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 H1.3.2 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.)*

Large Buildings other than Housing

13.8 Construction in accordance with NZS 4243.1 part 4.2 or 4.3, NZS 4243.1 part 4.3, NZS 4218 part 3.1 or 3.2 satisfies the requirements of NZBC H1.3.1(a) for the thermal resistance of the building envelope in large buildings other than housing having a net lettable area greater than 300 m².

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.

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 are manufactured in segment and roll sizes to suit framing layouts. (See Table 1.)

Walls

15.5 The product's nominal thickness must suit the cavity depth, to ensure that the product doesn't move or create thermal convection contributing to a loss in the system's performance. Compressing product no less than its nominal thickness will decrease the product's stated thermal performance.

15.6 A good friction fit with no tucks and folds must be achieved to ensure the product's stated thermal performance (R-value) is maintained.

15.7 When installing in wall framing with a drainage cavity the installers must ensure that the product does not bulge into the drainage cavity. Selecting specifically designed wall product with a controlled nominal thickness can assist with this requirement.

15.8 Insulation must be fitted around plumbing, wiring and services in the wall. Compression of the product will affect the stated thermal performance.

Ceilings and Roofs

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

15.10 Where Bradford Insulation is installed in ceilings and roofs the insulation must either be neatly friction fitted between framing members and linings, or where segments are adequately supported, fitted over framing members and butted tightly so that the potential for gaps and convective heat loss is eliminated. The material must not be folded, tucked or compressed. A close, even fit provides the most efficient thermal performance.

15.11 The insulation must be continuous across the entire ceiling or roof plane and installed over the top plates of external walls.

15.12 Care must be taken to ensure the 25 mm gap between the insulation and the roof underlay is maintained. Wherever possible the insulation should be fitted beneath wiring or plumbing.

Recessed Downlights

15.13 When retrofitting insulation into ceilings with existing RDL's, the installer must establish the RDL's rating prior to installation. If the RDL's rating cannot be established clearances in line with NZS 4246 must be maintained. Consideration that the gaps have on the overall thermal performance must be considered.

15.14 When installing insulation prior to the luminaires, consideration should be given to the gaps required for the subsequent installation of the RDL, driver/controller and wiring.

Inspections

15.15 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.

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 3000:2007 Wiring rules and companions.
- AS/NZS 4859.1: 2002 Materials for the thermal insulation of buildings.
- AS/NZS 60598.2.2: 2001 AA Luminaires - Particular requirements - Recessed luminaires.
- BRANZ House Insulation Guide, Fourth Edition 2010.
- BRANZ Bulletin Number 525 Preventing moisture problems in timber-framed skillion roofs.
- 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 incorporating amendment No 1 – 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 and Housing, Third Edition (Amendment 12, 10 October 2011).
- The Building Regulations 1992.



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

Date of issue: 7 May 2008

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.

Amendment No. 5, dated 5 July 2011.

The Appraisal has been amended to update the Product Range and include Recessed Lights.