



BRANZ Appraised

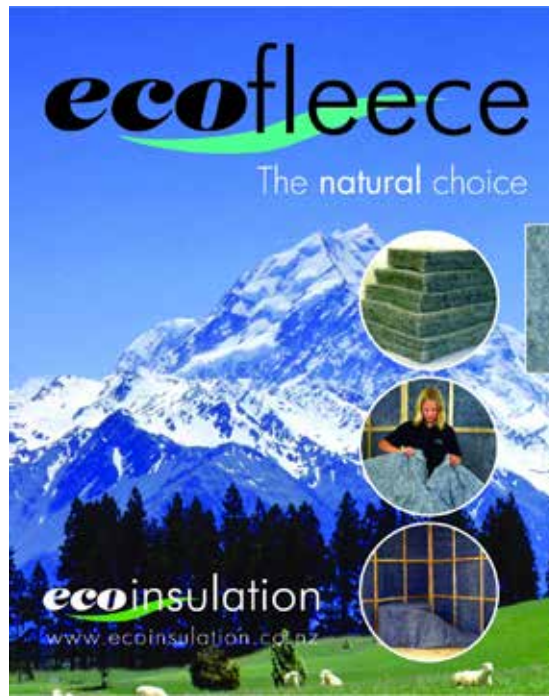
Appraisal No. 464 [2012]

ECOFLEECE INSULATION

Appraisal No. 464 [2012]

This Appraisal replaces BRANZ
Appraisal No. 464 [2008].

Amended 29 May 2014.



BRANZ Appraisals

Technical Assessments of products
for building and construction.

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Product

- 1.1 Ecofleece Insulation is a blend of sheep's wool and polyester fibre used as a thermal insulation material for use in walls, ceilings and roofs of buildings.

Scope

- 2.1 Ecofleece 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 Ecofleece Insulation must be installed in accordance with the 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, Ecofleece 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. Ecofleece Insulation meets these requirements. See Paragraph 8.1.
 - Clause E3 INTERNAL MOISTURE:** Performance E3.3.1. Ecofleece Insulation will contribute to meeting this requirement. See Paragraphs 12.1 and 12.2.
 - Clause F2 HAZARDOUS BUILDING MATERIALS:** Performance F2.3.1. Ecofleece 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. Ecofleece Insulation will contribute to meeting these requirements. See Paragraphs 13.1 – 13.18.
- 3.2 This is an Appraisal of an **Acceptable Solution** in terms of New Zealand Building Code compliance. Ecofleece Insulation thermal resistance (R-Value) has been determined by testing to AS/NZS 4859.1 which is an acceptable method.

Technical Specification

Wool Blend Insulation

- 4.1 Ecofleece Insulation is a thermally bonded mixture of 60% coloured sheep's wool fibres sourced from manufacturers of woollen products, and 40% thermally bonded polyester fibres. The product is grey in colour.
- 4.2 The wool and polyester fibres are blended, carded and thermally bonded to produce blankets which are then slit to the required width, compressed and packaged.
- 4.3 The product is available as set out in Table 1.

Table 1: Product Range

Product	R-value	Length [mm]	Width [mm]	Nominal thickness [mm]	Pieces / pack	g/sqm	Area [m ²]	Pack weight [kg]
Ceiling / Wall	R2.6	8620	580	140	3	1750	15	26.25
	R2.6	8620	870	140	2	1750	15	26.25
Ceiling	R2.9	6890	580	180	3	1850	12	22.2
	R2.9	6890	870	180	2	1850	12	22.2
Ceiling	R3.2	6890	580	185	3	2050	12	24.6
	R3.2	6890	870	185	2	2050	12	24.6
Wall	R2.2	7895	380	90	4	2100	12	25.2
	R2.2	6890	580	90	2	2100	12	25.2
Wall / Ceiling	R1.8	13150	380	95	4	1100	20	22.0
	R1.8	11490	580	95	3	1100	20	22.0
Ceiling	R1.8	11490	870	95	2	1100	20	22.0
Ceiling – Double Layer	R1.8/R3.5	6890	870 / 580	190	2/3	1100/ 2200	20/10	25.2
Ceiling – Double Layer	R2.2/R4.3	6890	870 / 580	180	2/3	2100/ 4200	12/6	25.2
Ceiling – Double Layer	R2.6/R5.1	6890	870 / 580	290	2/3	1750/ 3500	15/7.5	26.25

* Insulation must not be fitted into fully enclosed cavities that are less than the labelled insulation nominal thickness.

- 4.4 Ecofleece Insulation is compression packed in a combination green and clear polythene bag. Each pack contains installation instructions. Each package is supplied with attached labelling in compliance with AS/NZS 4859.1.
- 4.5 Plastic strapping and associated fixings supplied and used by the insulation installer to control the insulation material from movement that would affect the thermal or acoustic insulation performance, must meet NZBC B2 Performance Requirement B2.3.1 (a) 50 years for components that are enclosed and not accessible, and Performance Requirement B2.3.1 (b) 15 years, for components that are accessible and can be inspected and replaced.

Handling and Storage

- 5.1 Ecofleece 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 In general, insulation products are sensitive to the length of time they are stored under compression packaging. The longer they are stored, the longer it will take for them to recover to their natural loft after unpacking.

Technical Literature

- 6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for Ecofleece 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 Ecofleece 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 Ecofleece 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 Ecofleece Insulation blanket has been designed for commercial and residential applications. Installation must be completed in accordance with NZS 4246.
- 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 72 hours after being removed from their compressed bales.
- 7.5 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.
- 7.6 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.
- 7.7 The clearances specified in the Technical Literature, or specified by the manufacturer of heating appliances and ventilation systems, must be met.
- 7.8 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.
- 7.9 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.
- 7.10 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

- 7.11 Installing recessed downlights (RDLs) in a ceiling or roof forms a gap in the thermal envelope, reducing the overall thermal performance.
- 7.12 The overheating risk to the RDL is also affected by the surrounding materials.
- 7.13 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/NZS 60598-2.2 amendment A, and as required by AS/NZS 3000 [Wiring Rules].
- 7.14 When installing RDLs in skillion roofs, the RDL must not protrude into the ventilation gap required between the insulation and roof substrate or any rigid substrate or flexible roof underlay.
- 7.15 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.
- 7.16 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 Ecofleece Insulation meets code compliance with NZBC Clause B2.3.1 [a] 50 years where the insulation is installed in a dry, protected construction space and is difficult to access, e.g. skillion roofs.
- 8.2 Ecofleece Insulation meets code compliance with NZBC Clause B2.3.1 [b], 15 years where the insulation can be accessed, e.g. ceilings.

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, damp or damaged 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 Ecofleece 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 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

Energy Efficiency

- 13.1 Performance Requirements 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 Information

Installation Skill Level Requirements

- 14.1 Installation of Ecofleece 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 Ecofleece 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 Ecofleece 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 Ecofleece Insulation is manufactured in 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 to 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 Ecofleece Insulation must be cut to fit into cavities where required.
- 15.10 Where Ecofleece Insulation is installed in ceilings and roofs, 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 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 luminaries, consideration should be given to the gaps required for the subsequent installation of the RDL, driver/controller and wiring.

Inspections

- 15.15 The manufacturer's Technical Literature, this Appraisal and NZS 4246 must be referred to during the inspection of Ecofleece Insulation installations.
- 15.16 Installations with tucks, folds or gaps will compromise the product's claimed performance.
- 15.17 Confirmation that the specified products have been installed can be achieved by inspecting packaging and labelling. Additional material checks against the specified nominal thickness and g/m² will assist with this requirement.

Health and Safety

- 16.1 Ecofleece 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 Ecofleece Insulation in accordance with AS/NZS 4859.1: 2002.

Other Investigations

- 18.1 An assessment of the durability of Ecofleece 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 Ecofleece 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 Eco Insulation Systems Ltd is responsible for the quality of the product supplied.
- 19.3 Quality of installation of the product on site is the responsibility of the installer.
- 19.4 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 - Installing Insulation In Residential Buildings.
- Compliance Document for New Zealand Building Code External Moisture Clause E2, Department of Building and Housing, Third Edition July 2005 (including Amendment 5, 1 August 2011).
- 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.



Amendments

Amendment No. 1, dated 29 May 2014.

This Appraisal has been amended to update the Appraisal Holder details and to remove abutted and covered recess downlights compliance clause.



In the opinion of BRANZ, **Ecofleece 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 **Eco Insulation Systems 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. **Eco Insulation Systems 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 **Eco Insulation Systems 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 **Eco Insulation Systems Ltd** or any third party.

For BRANZ



Pieter Burghout

Chief Executive

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02 July 2012