



**BRANZ Appraised**

Appraisal No.380 [2008]

BRANZ Appraisals

Technical Assessments of products  
for building and construction

**BRANZ  
APPRAISAL  
No. 380 (2008)**

This Appraisal replaces Appraisal No.  
380 (2000) dated 3 July 2000.

**AUTEX GREENSTUF®  
POLYESTER THERMAL  
INSULATION**

**Autex Industries Limited**

Private Bag 19988

Avondale

Auckland

Tel: 09 828 9179

Fax: 09 828 4049

Freeph: 0800 4 28839

(4 AUTEX)

Web: [www.autex.co.nz](http://www.autex.co.nz)



**BRANZ**

BRANZ Limited  
Private Bag 50 908  
Porirua City  
New Zealand  
Tel: +64 4 237 1170  
Fax: +64 4 237 1171  
[www.branz.co.nz](http://www.branz.co.nz)

BRANZ Pty Ltd  
P O Box 830  
Brookvale  
NSW 2100  
Australia  
Tel: +61 2 9938 6011  
Fax: +61 2 9938 6911  
[www.branz.com.au](http://www.branz.com.au)



## Product

Autex Greenstuf® is a range of polyester fibre insulation used as thermal and acoustic insulating material in walls, roofs, floors and ceilings of buildings.



## Scope

2.1 Autex Greenstuf® has been appraised as a thermal insulation material for walls, ceilings, roofs, 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 Autex Greenstuf® must be installed in accordance with the manufacturers Technical Literature to meet the stated thermal performance rating of the insulation. see Paragraph 6.1.

## Building Regulations

### 3.1 New Zealand Building Code (NZBC)

In the opinion of BRANZ, Autex Greenstuf® if 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. Autex Greenstuf® will meet this requirement. See Paragraphs 8.1 and 8.2.

**Clause E3 INTERNAL MOISTURE:** Performance E3.3.1. Autex Greenstuf® will contribute to meeting this requirement. See Paragraphs 12.1 and 12.2.

**Clause F2 HAZARDOUS BUILDING MATERIALS:** Performance F2.3.1. Autex Greenstuf® will not present a health hazard to people.

**Clause H1 ENERGY EFFICIENCY:** Performance H1.3.1 (a), H1.3.2 (A and B) up to the close of 29 June 2008. Autex Greenstuf® will contribute to meeting this requirement. See Paragraphs 13.1 - 13.10.

3.2 This is an Appraisal of an Acceptable Solution in terms of New Zealand Building Code Compliance. Autex Greenstuf® thermal resistance (R-Value) has been determined by AS/NZS 4859.1 which is an acceptable method.

## Technical Specification

### Polyester Insulation

4.1 Autex Greenstuf® is manufactured from thermally-bonded polyester fibres. The fibres are blended, carded and thermally bonded to produce segments and blankets. The segments and blankets are cut to the required size, compressed and packaged. The product is a distinctive green colour. The standard product range is as described in Table 1. Non-standard widths are also available from the manufacturer upon request. Autex Industries Limited will manufacture Non-standard widths with respect to all other property specifications as those listed in Table 1.

**Table 1. Product Range**

Product	R-Value	Nominal Thickness (mm)	Size (mm)	Density (kg/m <sup>3</sup> )	gms/m <sup>2</sup>	Pieces per pack	Coverage per pack (m <sup>2</sup> )
Segments							
GS Ceiling	2.9	175	1220 x 430	8.86	1550	8	4.7
	3.2	180	1220 x 430	10.58	1700	8	4.7
	3.4	190	1220 x 430	10.53	1950	6	3.5

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

4.2 Autex Greenstuf® products are compression packed into green polythene bags (packs). A colour-coded adhesive label on each pack records the R-Value, product size, number of pieces in each pack and total coverage. A bar code on the label and a batch number recorded on a reference slip enclosed in each pack uniquely identifies each pack and provides a reference to the manufacturing information.

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

4.3 Accessories used with Autex Greenstuf® 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.

### Handling and Storage

5.1 Autex Greenstuf® must be stored under cover and in dry conditions. Heavy objects must not be stacked onto the Autex Greenstuf® packs.

5.2 When Autex Greenstuf® is held in stock for up to 6 months its recovery to the nominal thickness will be achieved in 7 days.

## Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for Autex Greenstuf®. 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 Autex Greenstuf® is designed to be used as thermal insulation to meet energy efficiency needs and the NZBC requirements when installed in building walls, roofs, ceilings and under floors.

7.2 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.

7.3 To prevent moisture transfer to Autex Greenstuf®, a separation (minimum 25 mm) is required between Autex Greenstuf® 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 Autex Greenstuf® and the sheathing or substrate is not required.

7.4 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 must be taken into account in the assessment of compliance with NZBC H1.

7.5 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.

7.6 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.

7.7 Where the insulation is installed in exterior walls, the insulation material nominal thickness must be selected to provide a snug close fit of the insulation between building wrap and the interior wall lining.

## 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. Autex Greenstuf®, must be installed in a dry, protected construction cavity.

8.2 Autex Greenstuf® is naturally resistant to biological attack.

## 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. 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 Autex Greenstuf® 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 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 must be provided to all habitable spaces, bathrooms, laundries and other spaces where moisture may be generated or may accumulate.

12.2 Housing complying with NZBC Clause H1.3.2 (A and B) 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 H1.3.2 (A and B), 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 (A and B) (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 based on calculations using 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 H1.3.2 (A and B) 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.)*

### Climate Zones 1 and 2

13.9 A building envelope meeting the requirements of one of the compliance methods of NZS 4218 will be acceptable for Housing.

13.10 For buildings other than Housing, and of less than 300 m<sup>2</sup>, a building envelope meeting the requirements of one of the compliance methods of NZS 4218 will be acceptable. For buildings larger than 300 m<sup>2</sup>, reference should be made to NZS 4243 for energy efficiency in non-residential buildings.

## Installation Information

### Installation Skill Level Requirements

14.1 Installation of Autex Greenstuf® must be completed by an installer with an understanding of insulation installation, in accordance with NZS 4246 and this Appraisal.

### General

15.1 Autex Greenstuf® is comfortable to handle. No protective clothing or special equipment is required for handling or installation.

15.2 Autex Greenstuf® must be installed in accordance with the installation instructions. The product must only be installed when the building is enclosed and when the framing has achieved the required moisture content to ensure that the insulation will not become wet. Autex Greenstuf® must be released from the packaging and allowed to recover, prior to installation.

15.3 Autex Greenstuf® is manufactured in sizes to suit standard framing spacings. The size of the segments or blankets must be selected to minimise the number of butt joints and to suit the spacing of framing members (refer to Table 1).

15.4 Autex Greenstuf® must be neatly friction fitted between framing members and the lining so that the potential for gaps and convective heat loss is reduced. The segments or blankets must not be squeezed, folded or tucked. A close, even fit provides the most efficient thermal performance and the most effective sound control. Autex Greenstuf® must be torn or cut to fit into small and irregular cavities. The segments and blankets are easily torn across the width. If it is necessary to cut the Autex Greenstuf® lengthways, the best method is to compress the product with a straight edge (a piece of timber) and cut it using a firm trimming knife.

15.5 Roof insulation must be continuous across the entire ceiling between the top plates of the external walls. Wherever possible, Autex Greenstuf® must be installed beneath electrical wiring. The insulation must not be packed tightly around electrical cables.

15.6 Segments installed into steel framed wall cavities must fill the steel channel as well as the cavity. A thermal break must be used between the steel framing and exterior cladding, to reduce the effects of thermal bridging in accordance with NZBC E3/AS1 Paragraph 1.1.4(d).

15.7 Where recessed light fittings are fitted, installation of the insulation material and the light fittings must be in accordance with NZBC 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.

#### **Inspections**

15.8 The Technical Literature must be referred to during the inspection of Autex Greenstuf® installations.

#### **Health and Safety**

16.1 Autex Greenstuf® is safe to handle without protective clothing. However, it is recommended that a dust mask be worn when installing the product to provide protection from dust that may be disturbed.

## **Basis of Appraisal**

The following is a summary of the technical investigations undertaken.

#### **Tests**

17.1 The following tests were carried out by BRANZ:

- Thermal resistance testing on Autex Greenstuf® products, in accordance with AS/NZS 4859.1:2002.

#### **Other Investigations**

18.1 The manufacturers Technical Literature and installation instructions have been reviewed by BRANZ and found to be satisfactory.

18.2 Site inspections were carried out by BRANZ to assess the practicability of the installation.

18.3 An assessment was made of the durability of Autex Greenstuf® by BRANZ technical experts.

#### **Quality**

19.1 The manufacture of Autex Greenstuf® has been examined by BRANZ. Details of the manufacturing processes, quality and composition of the materials used were obtained and found to be satisfactory.

19.2 The quality control systems for the manufacture of Autex Greenstuf® have been assessed and registered by Bureau Veritas as meeting the requirements of ISO9001, Certificate No 201307.

19.3 Autex Industries Limited 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.
- Compliance Document for New Zealand Building Code External Moisture Clause E2, Department of Building and Housing, Third Edition July 2005.
- New Zealand Building Code Handbook Department of Building and Housing, Third Edition May 2007.
- The Building Regulations 1992, up to, and including June 2007 Amendment.



**BRANZ**

In the opinion of BRANZ, **Autex Greenstuf®** 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 **Autex Industries 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. **Autex Industries 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.
3. 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.
4. 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 **Autex Industries Limited**.
5. 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.
6. BRANZ provides no certification, guarantee, indemnity or warranty, to **Autex Industries Limited** or any third party.

For BRANZ

C Preston  
Chief Executive

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