BRANZ Appraised
Appraisal No.256 [2009]

BRANZ Appraisals

Technical Assessments of products for building and construction

BRANZ APPRAISAL No. 256 (2009)

This Appraisal replaces Appraisal No. 256 (2006) issued 24 August 2006.

EXPOL UNDER FLOOR INSULATION

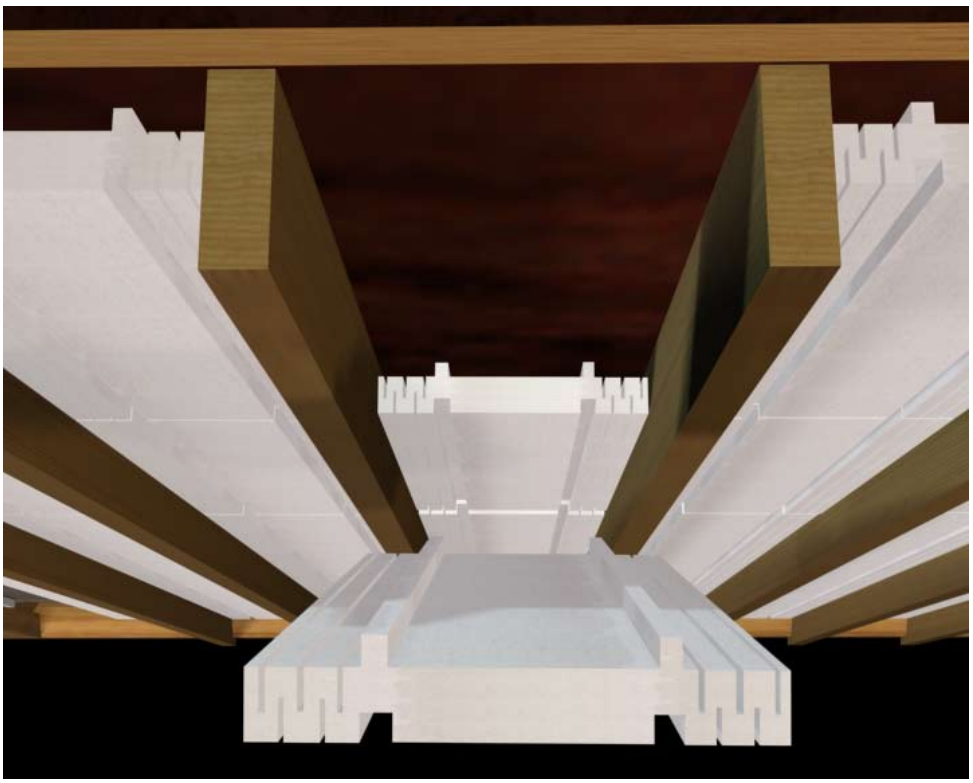
Expol Ltd
P O Box 13560
Onehunga
Auckland

Tel: 09 634 3449
Fax: 09 634 0756
Web: www.expol.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

Product

1.1 Expol Under Floor Insulation is an Expanded Polystyrene (EPS) foam board for use as thermal insulation for timber frame floors.



Scope

2.1 Expol Under Floor Insulation has been appraised for use as thermal insulation material in New Zealand buildings within the following scope:

- timber framed floors in new and existing domestic and commercial buildings; and,
- installed in buildings where the insulation remains dry during its serviceable life.

2.2 Expol Under Floor Insulation has also been appraised for use as thermal insulation material in Australian houses within the following scope:

- timber framed floors in new and existing houses; and,
- installed in buildings where the insulation remains dry during its serviceable life; and,
- in bushfire areas the provisions of BCA 2008 Part 3.7.4 are complied with.

2.3 Expol Under Floor 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, Expol Under Floor 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. Expol Under Floor Insulation will meet these requirements. See Paragraphs 8.1 and 8.2.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. Expol Under Floor 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. Expol Under Floor Insulation will contribute to meeting these requirements. See Paragraphs 12.1 - 12.8.

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

Building Code of Australia (BCA 2008)

3.3 In the opinion of BRANZ, Expol Under Floor Insulation, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will contribute to meeting the following provisions of the BCA:

BCA 2008 Volume 2 – Class 1 and Class 10 Buildings

Part 2.6 Energy Efficiency: Performance Requirement P2.6.1 Expol Under Floor Insulation will contribute to meeting this requirement.

3.4 This is an Appraisal of an Acceptable Construction Practice through compliance with AS/NZS 4859.1: 2002 as required by BCA 2008 Volume 2 Part 3.12.1.1. See Paragraphs 13.1 and 13.2.

Technical Specification

Description

4.1 Expol Under Floor Insulation is a pre-cut rigid Expanded Polystyrene (EPS) foam board with pre cut concertina cuts to both edges for a compression fit.

4.2 Expol Under Floor is 55 mm thick 1200mm long and comes in 360, 410, 470, 560mm widths.

Handling and Storage

5.1 On site, Expol Under Floor Insulation must be stored out of sunlight, under dry cover until installed.

Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for Expol Under Floor 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 Expol Under Floor Insulation has a material R-value of R1.4. Each packet is supplied with labelling in compliance with AS/NZS 4859.1

7.2 Expol Under Floor 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 under floors of buildings. It is also designed for use as under floor thermal insulation to meet the energy efficiency requirements of the BCA and to improve the energy efficiency of existing houses.

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

7.4 Expol Under Floor Insulation installed without perimeter walls requires the use of the Expol nylon support brackets or the underside of the floor must be lined.

7.5 The product is intended to be compression fitted between the floor framing members of buildings, and the boards are normally supplied in size for this purpose. However, boards of other dimensions may be supplied to meet the specific requirements of a building.

Electrical Cables

7.6 PVC cables must be prevented from direct contact with Expol Under Floor Insulation. Contact must be avoided by either a physical separation, by running cables around the insulation boards, or by wrapping the cables with separating material supplied by Expol Ltd.

Construction R-values

7.7 The Table 1 R-values have been calculated in accordance with NZS 4214 and based on a material R-value of R1.4 per layer. The R-values listed are suitable for use in New Zealand and Australia.

7.8 The system must be installed in accordance with this Appraisal and the manufacturers' instructions.

Table 1 Construction R-values

Expol Construction R-values		Floor area divided by Perimeter length (m^2/m)				
		1.0	**2.0**	**3.0**	**4.0**	**5.0**
Exposed floor (without a perimeter wall) (unenclosed)	Single layer	1.6	1.6	1.6	1.6	1.6
	Double layer	2.7	2.7	2.7	2.7	2.7
Continuous perimeter wall exposed to wind	Single layer	1.6	1.7	1.7	1.8	1.9
	Double layer	2.7	2.8	2.8	2.9	3.0
Continuous perimeter wall sheltered from wind (enclosed)	Single layer	1.7	1.8	1.9	2.0	2.1
	Double layer	2.8	2.9	3.0	3.1	3.2

Durability

Serviceable Life

8.1 Where the building is maintained so that provisions of the NZBC E2 Clauses are met, and where the insulation is not crushed or exposed to conditions that will diminish its thermal performance, (e.g. moisture and direct sunlight), then it can expect to have a serviceable life of at least 50 years. Insulation must be installed in accordance with the scope of this Appraisal.

8.2 Expol Under Floor Insulation is generally resistant to vermin attack as EPS is not a food source.

Maintenance

9.1 The building must be maintained weatherproof at all times. Under floor insulation should be occasionally checked to ensure it has not become dislodged or damaged.

Outbreak of Fire

10.1 Expol Under Floor Insulation must be separated from sources of heat such as chimneys, flues and fuel burning appliances. In New Zealand this must be in accordance with NZBC Acceptable Solution C/AS1 Part 9 for the protection of combustible materials.

Bushfire Areas (Australia)

10.2 Expol Under Floor Insulation is classified as combustible. When its use is being considered in bushfire areas, the provisions of BCA 2008 Part 3.7.4 must be complied with.

Internal Moisture

11.1 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.

Energy Efficiency New Zealand

Building thermal envelope

12.1 NZBC Verification Method H1/VM1 can be used for housing, communal residential, communal non-residential and commercial buildings.

Modelling of housing and smaller buildings

12.2 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^2.

Building performance index for housing

12.3 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

12.4 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^2.

Determining thermal resistance

12.5 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

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

Housing and small buildings

12.7 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^2.
12.8 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.

Energy Efficiency Australia

13.1 Expol Under Floor Insulation has a material R-value of R1.4 (single layer) and R2.8 (double layer) and can be used to satisfy the minimum total R-value for suspended floors as required by BCA 2008 Table 3.12.1.4.
13.2 The protocol for thermal calculation methods is detailed in ABCB Protocol for House Energy Rating Software which includes NatHERS.
13.3 For details of State and Territory Variations refer to the BCA.

Installation Information

Installation Skill Level Requirements

14.1 Installation of Expol Under Floor Insulation must be completed by persons with an understanding of insulation installation, in accordance with the instructions given within the Technical Literature, Installation Instructions and this Appraisal.

General

15.2 Installation must be carried out according to the manufacturer's Installation Instructions.
15.3 It is important to achieve a tight friction fit between the edge of the board and the joist; this is achieved by the compression of the pre-cut concertina cuts to the edges of the boards.
15.4 It is important that all gaps are filled and a tight fit on butt joins be achieved and that the ends on a run of boards are capped. Gaps will compromise the performance of the air space and diminish the overall performance of the system.
15.5 Small gaps can be sealed with extra material, polyester insulation or a water-based sealant.
15.6 Expol Under Floor Insulation installed without a perimeter wall requires the use of the Expol nylon support brackets, or the underside of the floor must be lined.
15.7 For installations prior to the building being fully enclosed an inspection must be made to insure that no water is trapped in the cavity between the insulation and the floor.
15.8 Expol Under Floor Insulation must be separated from all sources of heat and naked flame.
15.9 **PVC cables must be prevented from direct contact with any Expol Under Floor Insulation.** A physical separation must be provided by running cables around the insulation boards, or by wrapping the cables with separating material supplied by Expol Ltd.

Inspections

15.10 The Technical Literature must be referred to during the inspection of Expol Under Floor Installations.

Health and Safety

16.1 Expol Under Floor Insulation is easy to handle. There are no special safety requirements for installing Expol Under Floor Insulation. Care must be taken in cutting Expol Under Floor Insulation.

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 Expol Insulation in accordance with ASTM C518 as part of the material test evaluation to AS/NZS 4859.1.

Other Investigations

18.1 A durability opinion has been provided by BRANZ technical experts.

18.2 Site inspections have been undertaken to assess installation methods and to examine completed installations.

18.3 The Installation Instructions and other supporting data have been reviewed by BRANZ and found to be satisfactory.

Quality

19.1 The manufacture of Expol Under Floor Insulation by Expol Ltd, who is responsible for quality assurance of product, has been examined by BRANZ and found to be satisfactory.

19.2 Details have been obtained of the methods adopted for quality control of manufacture, and the quality and composition of the materials used.

19.3 Quality of installation on site is the responsibility of the installer.

Sources of Information

- AS 1366.3-1992 Rigid cellular plastics sheets for thermal insulation – Rigid cellular polystyrene – Moulded.
- AS/NZS 4859.1: 2002 Materials for the thermal insulation of buildings.
- BCA 2008 Volume Two: Building Code of Australia Class 1 and 10 Buildings.
- BRANZ House Insulation Guide, Third Edition 2007.
- NZS 4218: 1996 Energy efficiency – Housing and small building envelope.
- NZS 4218: 2004 Energy efficiency – Small building envelope.
- NZS 4243: 1996 Energy efficiency – Large buildings.
- NZS 4246: 2006 Energy efficiency – Installing insulation in residential buildings
- NZS 4214: 2006 Methods of determining the total thermal resistance of 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 and Approved Documents, Department of Building and Housing May 2007.
- The New Zealand Building Regulations 1992, up to, and including August 2008 Amendment.

BRANZ

In the opinion of BRANZ, Expol Under Floor 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 Expol 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. Expol 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.
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 Expol Ltd.
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 Expol Ltd or any third party.

For BRANZ

P Burghout
Chief Executive

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