



# Wool Bloc Insulation

# Appraisal

This **Appraisal** relates to Wool Bloc Insulation made from resin-bonded natural wool fibre by New Wool Products with R-ratings from R1.7 to R3.0.

The product has been appraised for use as a thermal insulating material in walls, floors, ceilings and roofs of new and existing buildings.

## Building Regulations

### New Zealand Building Code (NZBC)

In the opinion of Opus International Consultants (Opus), if Wool Bloc Insulation is used in accordance with the conditions of this **Appraisal**, the relevant provisions of the following NZBC clauses will be met:

- B2 Durability
- E3 Internal Moisture
- F2 Hazardous Building Materials
- H1 Energy Efficiency

## Product Information

### General

Wool Bloc Insulation is made predominantly from natural wool blended with other natural and synthetic fibres into a matrix that is bonded with acrylic resin. The product is supplied in either slabs or blankets and can be customised to suit customers' requirements. Table 1 shows the properties of standard Wool Bloc Insulation.

R-value (m <sup>2</sup> C/W)	1.7	1.8	2.0	2.2	2.4	2.6	3.0
Nominal Thickness (mm)	90	93	102	110	119	128	145

**Table 1 Wool Bloc Insulation, Material Properties**

Non-standard sizes are available to order, as is Wool Bloc of different R-values not covered by this Appraisal.

### Supply

After manufacture, Wool Bloc Insulation is packed into white polythene packs for storage and distribution. Installation instructions, batch number, R-value, size of contents and the area that can be covered are printed on the outside of the pack. Included within each pack are printed installation instructions that are also marked with the batch number.

The batch number contains a code that indicates the date of manufacture. For example, a batch number of 200,99 means the bale was made on the 200th day of 1999.

### Handling and Storage

Wool Bloc Insulation must be protected from moisture before, during and after construction since its insulation performance is markedly reduced when it is wet.

Wool Bloc Insulation must be installed no later than six months after manufacture to ensure that the insulation is restored to its full nominal thickness after removal from the compression packs.

### Design Information

#### General

Wool Bloc Insulation is manufactured for use as insulation material in dry construction cavities.

To ensure optimum insulation value in cavity construction, Wool Bloc Insulation must be friction fitted into the cavities, with no gaps. Purchasers are encouraged to order the correct lengths to suit the application to minimise butt joints within the cavities.

Where Wool Bloc Insulation is used in a roof or floor application without lining, the blocs must be supported from underneath using, for example, foil, straps or mesh.

Where Wool Bloc Insulation is used in conjunction with a vapour barrier, the vapour barrier must be fitted on the warm side of the insulation.

For skillion roof construction there must be an air gap of at least 25mm between the Wool Bloc Insulation and the building paper or roofing underlay. Situations of high humidity such as swimming pools, spa pools, saunas and some industrial processes are outside the scope of this Appraisal and the specific advice of New Wool Products Ltd must be sought.

#### B2 Durability

Wool Bloc Insulation when used in accordance with the provisions of this certificate will meet the performance requirements of NZBC Clause B2.3.1 (a) for 50 years providing it is kept dry.

Wool Bloc Insulation must not be physically damaged. In normal circumstances where the insulation is installed in a closed cavity such as an exterior wall with cladding on the exterior and lined in the interior physical damage is unlikely. In an open cavity such as in ceilings or under suspended floors any damaged insulation must be repaired.

Wool Bloc Insulation is treated with boron compounds to resist the attack from insects and rodents.

### E3 Internal Moisture

Buildings incorporating Wool Bloc Insulation in accordance with this certificate will comply with the performance requirements for internal moisture of NZBC E3.3.1 when used in buildings with adequate ventilation complying with NZBC E3/AS1 paragraph 1.2.

Wool Bloc Insulation will achieve the minimum construction R-value of 1.5 m<sup>2</sup>°C/W for framed walls and roofs or ceilings required by E3/AS1 1.1.1 (a) and (d).

For other forms of construction, NZS 4214 may be used to calculate the construction R-values for the insulation in the building.

### F2 Hazardous Building Materials

In the opinion of Opus, Wool Bloc Insulation does not present a health hazard to any person during installation or the serviceable life of the building in which it is installed. Wool Bloc Insulation will meet the performance requirements of NZBC F2.3.1 without specific precautions.

### H1 Energy Efficiency

Buildings correctly designed and constructed incorporating Wool Bloc Insulation will meet the performance requirements for energy efficiency specified by NZBC H1.3.2 for housing and H1.3.1 for other buildings.

Wool Bloc Insulation can be used to meet the thermal insulation requirements of NZS 4218. Construction conforming to NZS 4218 sections 3.1 or 3.2 satisfies NZBC H1.3.1 (a) for all buildings having a total floor area of no greater than 300 m<sup>2</sup>, and also satisfies NZBC H1.3.2 for housing of any size.

R-value calculations for specific designs, using the R-values in Table 1, should be made in accordance with NZS 4214 which is cited in Approved Document H1/VM1 as a method of determining the thermal resistance of building elements.

For example, a timber framed wall having the following construction:

- top plate (ex 100 x 50)
- building paper
- Wool Bloc Insulation (R1.7)
- studs (ex 100 x 50) at 600 mm centres
- one row of dwangs (1200 centres)
- internal lining (9.5 mm gypsum)
- external cladding (cement fibre board)
- bottom plate (ex 100 x 50)

will give a total thermal resistance of 1.62 °Cm<sup>2</sup>/W.

This exceeds the minimum 1.5 °Cm<sup>2</sup>/W requirement of NZBC E3/AS1 1.1.1 (a) and (d), and required for walls in climate zones 1&2 using the schedule method of NZS 4218.

### Spread of Fire

When R1.7 Wool Bloc Insulation was tested to AS 1530.3-1989 the following indices were obtained:

Ignitability	0
Spread of Flame	0
Heat evolved	0
Smoke developed	7

### Airborne and Impact Sound

Tests have shown that R2.2 Wool Bloc Insulation have similar performance to that of 75 mm Sound Barrier fibreglass batts for the frequency range 500Hz-8kHz (typical human voice frequency range) when used in double wall or ceiling cavity systems. Details of such walls are given in Figures 2 to 5 of NZBC G6/AS1.

### Installation

Wool Bloc Insulation must be installed in accordance with this Appraisal and the Wool Bloc Insulation Installation Instructions dated June 1999/21.

The compression packed bales can be easily moved into less accessible areas before opening. Wool Bloc Insulation will recover to its design thickness within four days after removal from the packs.

Wool Bloc Insulation has user-friendly handling properties and special protective equipment is not required.

The moisture content of the framing timber at the time of enclosing Wool Bloc Insulation must be less than 24%. Construction practice in accordance with NZBC E2/AS1 paragraph 6.0.2 meets this requirement. Wool Bloc Insulation must not become wet, either during installation or in service. If it does become wet it must be removed and thoroughly dried before being reinstalled.

Wool Bloc Insulation must be fitted into construction cavities with no edge gaps. It should be cut slightly oversize using a sharp knife or shears to ensure a friction fit between joists, studs and noggins. Wool Bloc Insulation must not be installed squeezed or folded, both of which will reduce its insulating competence.

Fill gaps such as around windows and doors with offcuts of Wool Bloc Insulation. Insulation may be installed directly up to brick or concrete chimneys, but a 150mm clearance must be left from steel flues, hot ducting vents and recessed lights. Insulate around ceiling vents, not over them, to allow unhindered ventilation.

Fit Wool Bloc Insulation beneath electrical wiring and plumbing where possible.

Wool Bloc Insulation is suitable for use in skillion roofs.

### Basis of Appraisal

Tests were carried out by Otago University to determine the R-values for Wool Bloc Insulation. On the basis of those test results, Opus formed an opinion regarding compliance with NZBC Clauses E2, E3 and H1.

Tests were carried out by BRANZ to assess corrosiveness, and on the basis of those test results,

Opus formed an opinion regarding compliance with NZBC Clause B2.

### Other Investigations

The quality control procedures for the manufacture of Wool Bloc Insulation, including raw material specification, factory production and ongoing quality assurance were examined by Opus.

The non-hazardous nature of Wool Bloc Insulation was assessed by the Wool Research Organisation of New Zealand (WRONZ).

Opus formed an opinion regarding the durability of Wool Bloc Insulation for compliance with NZBC Clause B2.

Opus has examined the results of testing done by the Cawthron Institute and is satisfied that Wool Bloc Insulation is suitable for use in skillion roofs.

The following New Wool Ltd literature and documentation has been examined by Opus:

The quality control manual for the manufacture of Wool Bloc Insulation.

Installation Instructions dated June 1999/21

Opus International Consultants is satisfied that the testing and documentation show Wool Bloc Insulation is fit for the purpose for which it has been appraised.

### Sources of Information

NZS 2295 : 1988. Specification for Building Papers (breather type).

NZS 3604 : 1990. Code of Practice for Light Timber Frame Buildings Not Requiring Specific Design.

NZS 4214 : 1977. Methods of Determining Total Thermal Resistances of Parts of Buildings.

NZS 4218 : 1996. Energy Efficiency – Housing and Small Building Envelope.

NZS 4222 : 1992. Specification for materials for the thermal insulation of buildings: Appendix A

AS 1503 Part 3-1989 Simultaneous determination of ignitability, flame propagation, heat release and smoke release.

"Comparison of the Sound Absorbing Properties of four fibre products"; a report on tests done by A B Effendi, Upper Hutt dated 29 June 1993.

New Zealand Building Code Handbook and Approved Documents, Building Industry Authority, 1992.

The Building Regulations 1992.

### Conditions of Appraisal

The Appraisal will remain valid subject to the following:

1. The product continues to comply with the manufacturing specification and quality

measures of New Wool Products Ltd. These specifications and quality assurance measures are as viewed and approved by Opus International Consultants.

2. The product complies with the conditions of the Appraisal and with the installation instructions for Wool Bloc Insulation.
3. New Wool Products Ltd continues to have the product reviewed by Opus International Consultants every two years from the date of issue.
4. The overall quality and expected performance of the product is maintained. New Wool Products Ltd shall notify Opus International Consultants of any changes in specification or quality assurance measures prior to them coming into effect.
5. The opinions expressed in this Appraisal relating to compliance with the New Zealand Building Code are in respect of the New Zealand Building Code in force at the date of issue of this Appraisal.

Reviewed By:
P N Thorby Appraisal Manager
Date

***Enquiries about the current status or technical aspects of this Appraisal should be made to:***

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