



**BRANZ Appraised**

Appraisal No.294 [2009]

BRANZ Appraisals

Technical Assessments of products  
for building and construction

**BRANZ  
APPRAISAL  
No. 294 (2009)**

This Appraisal replaces BRANZ  
Appraisal No. 294 (2006) issued  
22 November 2006.

**GIB® EZYBRACE™  
SYSTEMS**

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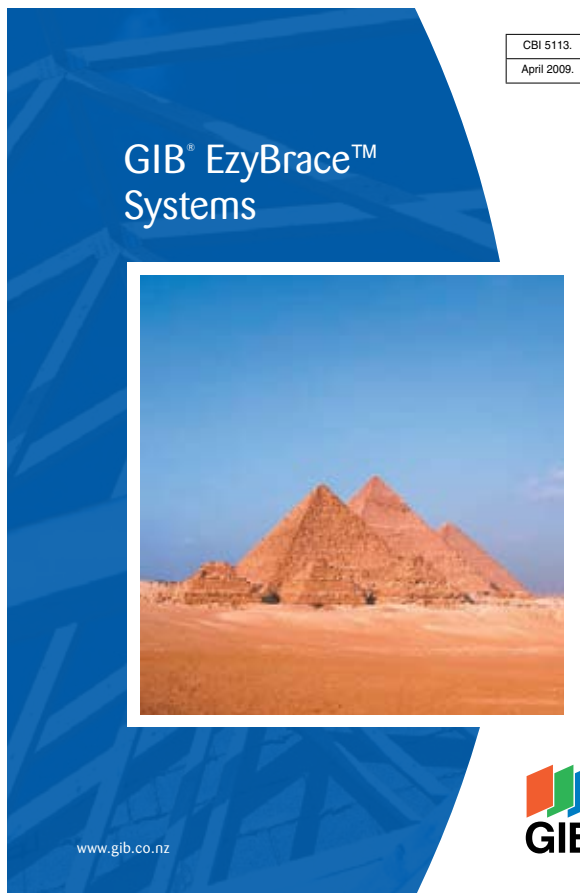
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## Product

1.1 GIB® EzyBrace™ Systems are a range of wall and ceiling bracing systems based on the use of GIB Braceline®, GIB® Standard plasterboard and other GIB® plasterboards. GIB® EzyBrace™ Systems are used to resist earthquake and wind loads on timber frame buildings designed and constructed in accordance with NZS 3604. The GIB® EzyBrace™ FP software provides an electronic means of calculating bracing demand and resistance.



CBI 5113.  
April 2009.



## Scope

2.1 GIB® EzyBrace™ Systems and the GIB® EzyBrace™ FP software have been appraised for the design and use of interior wall and ceiling bracing systems in buildings within the scope limitations of NZS 3604.

## Building Regulations

### New Zealand Building Code (NZBC)

3.1 In the opinion of BRANZ, the GIB® EzyBrace™ Systems, if designed, used, installed and maintained in accordance with the statements and conditions of this Certificate, will meet the following provisions of the NZBC:

**Clause B1 STRUCTURE:** Performance B1.3.1, B1.3.2 and B1.3.4. GIB® EzyBrace™ Systems meet the requirements for loads arising from self-weight, earthquake, wind and impact [i.e. B1.3.3 (a), (f), (h) and (j)]. See Paragraphs 8.1 - 8.11.

**Clause B2 DURABILITY:** Performance B2.3.1 (a) not less than 50 years. GIB® EzyBrace™ Systems meet this requirement. See Paragraphs 9.1 - 9.4.

**Clause C3 SPREAD OF FIRE:** Performance C3.3.1, C3.3.2 and C3.3.5. GIB Braceline® meets these requirements by providing fire and smoke protection. See Paragraph 11.1.

**Clause F2 HAZARDOUS BUILDING MATERIALS:** Performance F2.3.1. GIB® EzyBrace™ Systems meet this requirement and will not present a health hazard to people.

3.2 This is an Appraisal of an **Alternative Solution** in terms of New Zealand Building Code compliance.

3.3 GIB® EzyBrace™ Systems are for use to satisfy the bracing demand requirements of Section 5 of NZS 3604 which is a NZBC Compliance Document.

## Technical Specification

4.1 The GIB® plasterboards and accessories used with the GIB® EzyBrace™ Systems and supplied or specified by Winstone Wallboards Ltd are as follows:

### GIB® Plasterboards

#### • GIB Braceline®

GIB Braceline® is a high-density fibreglass reinforced paper-bound gypsum-plaster core sheet lining material. GIB® Braceline® is available in 10 mm and 13 mm thicknesses. The sheets have a taper on the two long sheet edges. GIB Braceline® has a sheet width of 1200 mm and is available in lengths of 2400 mm, 2700 mm, 3000 mm, 3600 mm and 4800 mm. The nominal weights are 9 kg/m<sup>2</sup> and 12.5 kg/m<sup>2</sup> for 10 m and 13 m thick sheets respectively. GIB Braceline® face paper is a light blue in colour.

#### • GIB® Standard plasterboard

GIB® Standard plasterboard is a paper-bound gypsum-plaster core sheet lining material. GIB® Standard plasterboard is available in 10 mm and 13 mm thicknesses and a sheet width of 1200 mm and 1350 mm (GIB® Wideline). The sheets have a taper on the two long sheet edges. The 10 mm thick sheets are also available with a square edge. Sheets are available in various lengths from 2400 mm to 6000 mm. The nominal weights are 7 kg/m<sup>2</sup> and 8.7 kg/m<sup>2</sup> for 10 mm and 13 mm thick sheets respectively. GIB® Standard plasterboard face paper is a light buff colour.

4.2 In specific situations as specified in the Technical Literature substitution is permitted with GIB Fyrelite®, GIB Noiseline®, GIB Toughline®, GIB Aqualine®, GIB Ultralite® and GIB Ultralite® PLUS.

### Fastenings

- GIB® Grabber® Drywall screws for fixing to timber: 6g x 32 mm.
- GIB® Grabber® Braceline Screw: 7g x 32 mm.
- GIB® Nail: 30 x 2.8 mm.
- GIB Braceline® Nail 35 mm long.
- GIB® Grabber® screws for fixing light gauge steel battens: 8g x 32 mm.

### Ceiling Diaphragms

4.3 Ceiling diaphragms are constructed using timber, or GIB® Rondo™, or similar metal ceiling batten systems. The perimeter of the ceiling diaphragm is fixed to GIB® Rondo™ perimeter channel, or alternatively, to an additional ex150 x 40 mm timber plate fixed to the top plate.

### Adhesive and Sealants

- GIBFix® Wood Bond (Acrylic)
- GIBFix® All-Bond (Solvent)

### GIB® Accessories and GIB® Jointing Compounds

- As specified in the GIB® Site Guide Technical Literature.

### Plywood

- Plywood must be a minimum of 7 mm thick complying with AS/NZS 2269 D-D Grade Structural.
- Plywood fixings are 30 x 2.8 mm hot-dipped galvanised or stainless steel flat-head nails.

### Fasteners, braces and connections

- GIB® HandiBrac™, galvanised steel 90 x 62 x 54 x 1.55 mm thick angle bracket.
- GIB® HandiBrac™ Washer, 50 x 60 x 5 mm thick electroplated.
- GIB® HandiBrac™ Fixings, 8 Type 17 screws 5 x 35 mm.
- Coach screws 12 mm x 150 mm and 50 x 50 x 3 mm washer hot-dipped galvanised for fixing to timber floors.

- Cast-in bolts M12 x 150 mm minimum and 50 x 50 x 3 mm washers for fixing to concrete floors. Proprietary fixings with a minimum characteristic strength of 15kN may be used.
- Shot fired fasteners minimum 75 mm x 3.8 mm with 16 mm discs for fixing GS1a and GS2 internal line bracing elements to concrete slabs.
- Galvanised or Stainless steel strap 25 x 0.9 mm top and bottom plate connections.
- Strap fixings 30 x 2.5 mm hot-dipped galvanised or stainless steel flat-head nails.

*Note: For corrosion protection requirements refer to NZS 3604 Section 4.*

## Handling and Storage

5.1 The best results are achieved when GIB® plasterboards are treated as a finishing material and protected from damage. Sheets must be stacked flat and kept dry at all times. For limits on stack heights see the GIB® Site Guide. Sheets must be carried on edge and not dragged.

5.2 All accessories must be kept dry.

## Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for the GIB® EzyBrace™ System. 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 The GIB® EzyBrace™ Systems Technical Literature contains design procedures and a manual calculation method for bracing demand calculated in accordance with NZS 3604 Section 5.5. Refer to NZS 3604 Bracing Demand Tables 5.5 - 5.10 for 2 kPa floor loads and Tables 14.1 - 14.3 for 3 kPa floor loads. The tabulated BU/m ratings given in Tables 1 and 2 of this Appraisal are for manual calculations and are conservative and have been rounded. The Technical Literature provides methods to distribute the bracing units in walls to resist forces in order to meet the requirements of NZS 3604 and a method for modifying the wall bracing demand for alternative wall heights. The use of ceiling diaphragms is also defined in the Technical Literature.

### GIB® EzyBrace™ FP Software

7.2 GIB® EzyBrace™ FP Software has been assessed as part of this Appraisal.

7.3 The bracing demand calculations contained in GIB® EzyBrace™ FP Software are based on first principles engineering and calculate wind and earthquake demand based on the building parameters entered. Resulting bracing demand calculations are project specific and can differ from values derived using NZS 3604 wind and earthquake demand tables. The BU/m ratings for various GIB® EzyBrace™ Systems embedded in the software increase with wall length and are higher than those given in Tables 1 and 2 of this Appraisal.

**Table 1: 10 mm GIB® plasterboard BU ratings**

GIB® EzyBrace™ Systems 2009					
Type	L (m) minimum	Lining	Other Requirements	BU/M	
				W	EQ
GIB® Standard					
GS1(10)	0.4	10 mm GIB® Standard Plasterboard one face	n/a	60	55
	1.2			70	55
GS2(10)	0.6	10 mm GIB® Standard Plasterboard both faces		75	70
	1.8			90	80
GIB Braceline®					
BL1(10)	0.4	GIB Braceline® one face	Hold-Downs	120	100
	1.2			135*	100
BLP	0.4	GIB Braceline® one face plywood other		135*	135*
	0.9			150*	150*
BLG	0.6	GIB Braceline® one face GIB® Standard other		145*	135*
	1.2			150*	135*

**Table 2: 13 mm GIB® plasterboard BU ratings**

GIB® EzyBrace™ Systems 2009					
Type	L (m) minimum	Lining	Other Requirements	BU/M	
				W	EQ
GIB® Standard					
GS1(13)	0.4	13 mm GIB® Standard Plasterboard one face	n/a	60	60
	1.2			70	60
GS2(13)	0.6	13 mm GIB® Standard Plasterboard both faces		75	70
	1.8			90	85
GIB Braceline®					
BL1(13)	0.4	13 mm GIB Braceline® one face	Hold-Downs	140*	130*
	1.2	Fixed with GIB® Grabber® Braceline screw only		150*	130*

Notes:  
 The BU/m ratings are conservative. Using the GIB® EzyBrace™ FP software will deliver higher ratings.  
 \* **Timber Floors** - Winstone Wallboards Ltd recommend a limit of 120 BU/m for NZS 3604 timber floors unless specific engineering to ensure that uplift forces generated by elements rated higher than 120 BU/m can be resisted by floor framing.  
 Where linings are specified on both faces, each face must be fastened as a bracing element.

7.4 GIB® EzyBrace™ Systems are for use in dry, internal situations only.

7.5 GIB® Plasterboards must not be exposed to temperatures of 52°C or greater for prolonged periods. Refer to appliance and fitting manufacturers for installation details.

**Framing**

7.6 Timber framing grade, spacing and construction must comply with NZS 3604. Timber treatment must comply with NZS 3602.

7.7 GIB® EzyBrace™ Systems Technical Literature recommends the use of kiln-dried machine stress-grade framing timber. The minimum actual framing dimensions are 90 x 35 mm for external walls and 75 x 35 mm for internal walls.

7.8 Joints in the top plates of bracing panels must be tied together with 3kN and 6 kN top plate connectors using 2.5 x 0.9 mm galvanised mild steel strap, 3 nails each side of joint for 3kN and 6 nails each side of joint for 6kN.

7.9 On occasions, properties additional to bracing may be required of the plasterboard lining. Table 3 gives permitted GIB® plasterboard substitutions.

**Structure**

**Bracing**

8.1 The bracing units achieved (wind and earthquake) published for manual calculations in GIB® EzyBrace™ Systems are given in Table 1 and Table 2.

8.2 The bracing unit ratings embedded in the GIB® EzyBrace™ FP software are less conservative and vary with wall length.

8.3 The GIB® EzyBrace™ Systems Technical Literature provides comprehensive construction and panel hold-down details. These include bottom plate fixings using bolts (concrete) or coach screws (timber) and the GIB® HandiBrac™ or nailed stud-to-plate straps.

8.4 The bracing units are derived from BRANZ P21 test method based on a wall height of 2.4 m. For greater wall heights the bracing rating is calculated by multiplying the appropriate value shown in Table 1 and Table 2 by a factor  $f=2.4$  and divided by the wall height in metres. Walls lower than 2.4 m shall be rated as if they were 2.4 m high.

**Table 3: Permitted Substitutions**

PERMITTED GIB® PLASTERBOARD SUBSTITUTIONS IN GIB® EZYBRACE™ SYSTEMS													
GIB® EzyBrace™ Systems have been tested and appraised using only the products specified above. Occasionally additional properties may be required from bracing elements which need to be provided by a different GIB® plasterboard product. The following chart provides acceptable substitution options													
Specified Board	Permitted alternative GIB® plasterboards												
	GIB® Standard		GIB® Ultralite®		GIB® Braceline® GIB® Noiseline®		GIB® Aqualine®		GIB® Toughline®	GIB® Fyrelite®			
	10	13	10	13	10	13	10	13	13	10	13	16	19
<b>10 mm GIB® Standard</b>	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<b>13 mm GIB® Standard</b>	x	✓	x	✓	x	✓	x	✓	✓	x	✓	✓	✓
<b>10 mm GIB® Braceline®</b>	x	x	x	x	✓	✓	✓ Note 1		✓	x	✓ Note 2		
<b>13 mm GIB® Braceline®</b>	x	x	x	x	x	✓	x	Note 1	✓	x			
<b>13 mm GIB® Ultralite®</b>	<i>As GIB® Ultralite® is the only product with Pearlcoat paper it cannot be substituted</i>												
<b>NOTE 1</b>	Use GIB® Braceline® nails or screws at 100 mm centres to the perimeter of the bracing element starting at 50 and 100 mm from the element corners. The element must be 900 mm or longer.												
<b>NOTE 2</b>	The fastener type and length must be as specified for the relevant FRR system. Fastening centres are at 100 mm around the perimeter of the bracing element starting at 50 and 100 mm from the element corners. The element must be 900 mm or longer.												

### Ceiling Diaphragms

8.4 GIB® ceiling diaphragms are used to space bracing lines further apart than 6 m. The basic shape of a ceiling diaphragm must be rectangular and the length must not exceed twice the width.

8.5 10 mm or 13 mm GIB® Standard Plasterboard ceiling diaphragms are limited to not being steeper than 25° to the horizontal and not exceeding 7.5 metres in length.

8.6 GIB® Ultralite® ceiling diaphragms are limited to not being steeper than 25° to the horizontal and not exceeding 10 m in length.

8.7 GIB® Braceline® ceiling diaphragms are limited to not being steeper than 25° to the horizontal and not exceeding 15 m in length or not being steeper than 45° to the horizontal and not exceeding 7.5 m in length.

### Openings in Bracing Elements

8.8 Openings are allowed within the middle third of bracing elements (length and height walls, length and width ceilings). The opening dimension in either direction must not exceed one third of the element height (width). Small openings of 90 x 90 mm or less may be placed anywhere except within 90 mm of the edge of the bracing element.

### Water-splash Areas

8.9 GIB® EzyBrace™ Systems must not be located in shower cubicles or behind baths and the like. GIB® EzyBrace™ Systems may be used in water-splash areas provided they are protected as required by NZBC Clause E3.

### Impact Resistance

8.10 GIB® plasterboards provide adequate resistance to soft body impact, based upon experience of use in domestic and light commercial applications.

### Durability

9.1 GIB® EzyBrace™ Systems, including linings and their fixings have a serviceable life of at least 50 years. The ability of the systems to remain durable is dependent on them remaining dry in service, and being maintained in accordance with this Certificate.

### Maintenance

9.2 The building must be maintained weatherproof and GIB® Plasterboard must be protected from external and internal moisture in accordance with NZBC Clauses E2 and E3.

9.3 Holes resulting from damage to the lining, up to 100 x 100 mm square, will have no significant effect on the performance of the bracing panel. Such holes may be repaired by patching, stopping and finishing as appropriate. Independent expert advice must be sought to assess the effect and repair of larger areas of damage.

9.4 Bracing elements require no ongoing maintenance, apart from decoration and the repair of any damage.

### Outbreak of Fire

10.1 Separation or protection must be provided to GIB® Plasterboard from heat sources such as stoves, heaters, flues and chimneys.

10.2 NZBC Acceptable Solution C/AS1, Part 9 and Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

### Spread of Fire

11.1 10 mm and 13 mm GIB® Braceline® may substitute for 10 mm and 13 mm GIB® Fyrelite® respectively in all fire resistant wall construction. Refer to GIB® Fire Rated Systems Technical Literature.

## Internal Moisture

12.1 GIB® Plasterboard must be used in dry internal situations, and must not be used where likely to be exposed to liquid water, or where extended exposure to humidity above 90% RH is expected, e.g., such as may be expected in sauna rooms, commercial kitchens and the like.

## Installation Information

### Installation Skill Level Requirement

13.1 Installation of GIB® EzyBrace™ Systems can be carried out by any competent building contractor.

### General

14.1 GIB® EzyBrace™ Systems must be installed in accordance with the Technical Literature. For inspection, reference must be made to the Technical Literature.

### Cutting

14.2 GIB® plasterboard is easily cut by scoring the face paper with a sharp short-bladed trimming knife, and then snapping the plasterboard away from the cut face and cutting the back paper or by sawing. Use of a metal straightedge facilitates clean straight cuts. Cut edges can be tidied up by using a knife. Paper dags should be removed.

### Health and Safety

14.3 Dust resulting from the sanding of stopping and finishing compounds may be a respiratory irritant, and the use of a suitable facemask is recommended.

### Framing

14.4 To achieve an acceptable decorative finish, GIB® Site Guide specifies that walls must not be lined unless the moisture content of timber framing is less than 18%.

### Sheet Fixing

14.5 GIB® EzyBrace™ System plasterboards are fixed at 150 mm centres (Note variation for GIB Aqualine®) around the perimeter framing of the wall bracing element. Fixing to other framing is either mechanical or by using GIBFix® Adhesives. Corner fixings must be 50 mm away from the sheet corner. All GIB® EzyBrace™ System elements and ceiling diaphragms require a special fastening pattern with fasteners spaced at 50 mm, 100 mm and 150 mm from the corner and there-after at 150 mm.

14.6 The GIB® EzyBrace™ Systems requirements for horizontal or vertical sheet installation must be met. Full sheets must be used wherever possible. Fixings must be no closer than 12 mm from the paper-bound sheet edge, and no closer than 18 mm from a cut edge, and driven at right angles to the sheet until the head is seated in a slight dimple just below the surface of the paper liner. Fixings must not be over-driven.

14.7 Where GIB Aqualine® substitutes for GIB Braceline®, bracing elements must be longer than 900 mm and the bracing element perimeter fasteners must be spaced at 100 mm centres following using the corner pattern described in 14.5.

14.8 13 mm GIB® Braceline® must only be fixed with GIB® Grabber® Braceline Screws.

14.9 Plywood is nail fixed at 150 mm centres around the perimeter of each sheet and at 300 mm centres to intermediate framing.

14.10 Where a bracing element is also used as a fire-rated element, the method of fixing (including the length of the fixing specified) for the fire-rated element must be used, but the perimeter fixings of the bracing element must be at 150 mm centres. In two-layer systems the inner layer must be used for bracing.

## Jointing and Finishing

14.11 All bracing element joints must be reinforced with paper tape and finished in accordance with GIB® Site Guide.

## Basis of Appraisal

The following is a summary of the technical investigations carried out:

### Tests

15.1 Bracing tests were carried out by Winstone Wallboards Ltd and BRANZ in accordance with BRANZ Technical Paper P21 to determine the performance of GIB® EzyBrace™ Systems when the building is subjected to lateral wind or earthquake loading. Nail and screw slip tests were carried out by BRANZ and Winstone Wallboards Ltd. The Winstone Wallboard's test facilities, procedures and results have been reviewed by BRANZ and found to be satisfactory.

### Other Investigations

16.1 The GIB® EzyBrace™ System FP Software has been assessed by BRANZ and found to be satisfactory.

16.2 The GIB® EzyBrace™ Systems and GIB® Site Guide Technical Literature have been examined by BRANZ and found to be satisfactory.

16.3 Site visits were carried out by BRANZ to assess the practicability of the installation of the systems, and to view completed installations.

16.4 An assessment was made of the durability of the systems by BRANZ technical experts and found to be satisfactory.

16.5 The properties of Winstone Wallboards Ltd GIB® plasterboards have been assessed for the following properties, MOR, MOE, paper tensile strength, paper shear strength, nail pull resistance, Hunter hardness, inspection for fungal spores, hard and soft body impact tests.

### Quality

17.1 Winstone Wallboards Ltd's manufacturing process and details of the quality and composition of the materials, have been examined by BRANZ and found to be satisfactory.

17.2 The quality management systems of Winstone Wallboards Ltd have been assessed and registered by TELARC as meeting the requirements of ISO 9001, Registration No. 581.

17.3 Winstone Wallboards Ltd is responsible for the quality of the product supplied.

17.4 The quality of the application and finish on site is the responsibility of the installation and stopping contractors.

17.5 Designers are responsible for the design of buildings.

17.6 Building owners are responsible for the maintenance in accordance with the instructions of Winstone Wallboards Ltd.

## Sources of Information

- AS/NZS 2269: 1994 Structural plywood.
- AS/NZS 2588: 1998 Gypsum Plasterboard.
- BRANZ Technical Paper P21:1979 (revised 1982, 1987, 1988) A wall bracing test and evaluation procedure.
- BRANZ Technical Recommendation No. 10 - December 1991, Supplement to P21: An evaluation method of P21 test results for use with NZS 3604: 1990.
- NZS 3602: 2003 Timber and wood-based products for use in building.
- NZS 3604: 1999 Timber framed buildings.
- New Zealand Building Code Handbook Department of Building and Housing, Third Edition May 2007.
- The Building Regulations 1992, up to, and including August 2008 Amendment.



**BRANZ**

In the opinion of BRANZ, **GIB® EzyBrace™ Systems** are fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided they are used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **Winstone Wallboards 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. **Winstone Wallboards 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 **Winstone Wallboards 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 **Winstone Wallboards Ltd** or any third party.

For BRANZ

P Burghout  
Chief Executive

Date of issue: 3 April 2009