



BRANZ Appraised

Appraisal No.294 [2006]

BRANZ Appraisals

**Technical Assessments of products
for building and construction**

**BRANZ
APPRAISAL
CERTIFICATE
No. 294 (2006)**

This Certificate replaces Appraisal
Certificate No. 294B (1999) issued 27
October 1999.

**GIB® BRACING
SYSTEMS**

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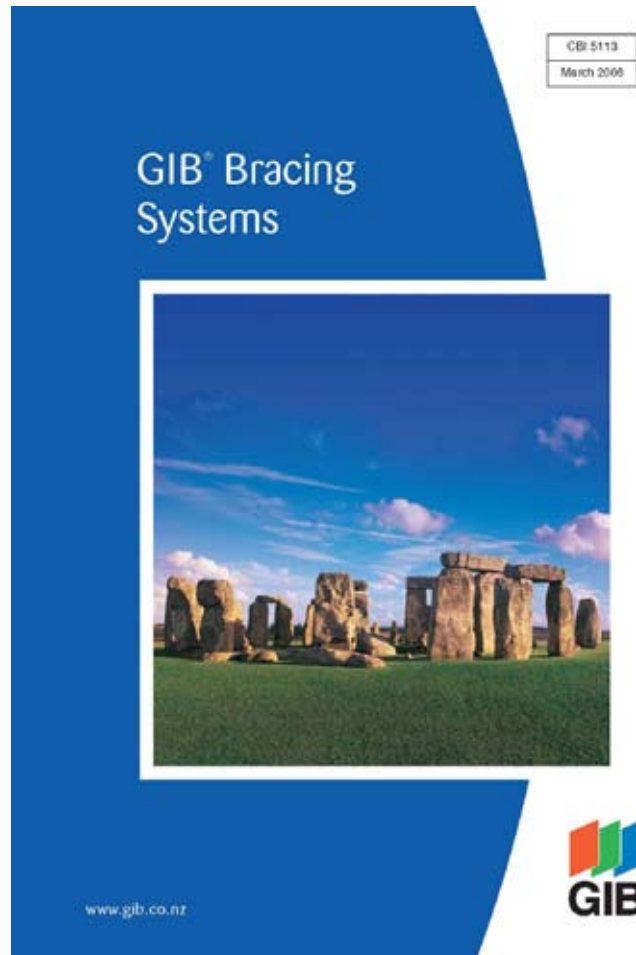
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Product

1.1 GIB® Bracing 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® Bracing Systems are used to resist earthquake and wind loads on timber frame buildings designed and constructed in accordance with NZS 3604.



Scope

2.1 GIB® Bracing Systems have been appraised for use as 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® Bracing 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® Bracing 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® Bracing 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® Bracing Systems meet this requirement and will not present a health hazard to people.

3.2 This Certificate appraises an **Alternative Solution** in terms of New Zealand Building Code compliance.

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

Technical Specification

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

GIB® Plasterboards

• GIB Braceline®

GIB Braceline® is a high-density 10 mm thick fibreglass reinforced paper-bound gypsum-plaster core sheet lining material. 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 weight is 9 kg/m². 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/m² and 8.7 kg/m² 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® Hight Thread Drywall screws for fixing to timber:
6g x 32 mm.
- GIB® Grabber® Braceline Screw:
7g x 32 mm.
- GIB® Nail annular threaded shank:
30 x 2.8 mm.
- GIB Braceline® Nail 35 mm long.
- GIB® Grabber® Self Tapping Drywall screws for fixing light gauge steel battens:
6g x 25, 32 mm.

Ceiling Diaphragms

4.3 Ceiling diaphragms are constructed using timber, or GIB® Rondo™, or USG Donn® ScrewFix™ 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 fixing are 30 x 2.8 mm hot-dipped galvanised flat-head nails.

Fasteners, braces and connections

- Angle braces, galvanised steel.
- Angle brace fixing 30 x 2.8 mm hot-dipped galvanised flat-head nails.
- Coach screws 12 mm x 150 mm and 50 x 50 x 3 mm washer hot-dipped galvanised for fixing to timber floors.
- 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 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® Bracing System. The Technical Literature must be read in conjunction with this Certificate. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Certificate must be followed.

Design Information

General

7.1 The GIB® Bracing Systems Technical Literature contains design procedures to calculate the bracing demand required to resist wind and earthquake forces that will act on a building according to NZS 3604. The design procedures take into account the building type and size, building construction, earthquake and wind zones, topography and environmental conditions of the building site. The manual provides methods to distribute the bracing units in walls to resist these 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.

7.2 Bracing demand calculations made using the GIB® Bracing Systems Technical Literature may occasionally produce different values than if using NZS 3604. Either

bracing demand calculation method may be used with GIB® Bracing Systems.

7.3 GIB® Bracing Systems are for use in dry, internal situations only.

7.4 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

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

7.6 GIB® Bracing 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.

7.7 Angle braces provide some bracing resistance for holding the frames square during construction and transportation. Angle braces, where required in the bracing panel, must be fixed with three 30 x 2.8 mm GIB® Nails at the bottom and top plates, and two 30 x 2.8 mm GIB® Nails at intermediate studs.

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.

Structure

Bracing

8.1 The bracing units achieved (wind and earthquake) when using GIB® Bracing Systems are given in Table 1 and Table 2.

8.2 The GIB® Bracing Systems Technical Literature provides comprehensive construction and panel hold-down details.

8.3 The bracing units are derived from BRANZ P21 test method based on a wall height of 2.4 m. For any other wall height the bracing rating can be calculated by multiplying the appropriate value shown in Table 1 by 2.4 and dividing by the wall height in metres, except that panels less than 1.8 m high shall be rated as if they were 1.8 m high.

Ceiling Diaphragms

8.4 GIB® ceiling diaphragms are used to space bracing lines further apart than 5 m (or 6 m where double top plate). Ceiling diaphragms 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 Ultraline® 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.

Table 1: Bracing Unit Ratings for 10 mm GIB® Standard plasterboard and any other 10 mm and 13 mm GIB® plasterboard.

Type	Length (m)	Lining Requirement	Other Requirements	BU Per Metre	
	Minimum			Diagonal Brace	Wind
GS1a	1.8	10mm GIB® Standard plasterboard one face fixed horizontal or vertical	yes	65	55
	2.4			75	65
GS2	1.2	10 mm GIB® Standard plasterboard both sides fixed horizontal or vertical ¹	no	70	60
	1.8			80	70
	2.4			90	80

Table 2: Bracing Unit Ratings for 10 mm GIB Braceline® and 10 mm and 13 mm GIB Noiseline® (fixed with GIB Braceline® Screws or GIB Braceline® Nails)

Type	Length (m)	Lining Requirement	Other Requirements		BU Per Metre	
	Minimum		Diagonal Brace	Hold-downs	Wind	Earthquake
BL1	0.4	GIB Braceline® one face fixed horizontal or vertical ²	no	yes	120	115
	0.6		no	yes	125	115
BL1a	1.8	GIB Braceline® one face fixed horizontal or vertical ²	yes	yes	130	115
BLP	0.6	GIB Braceline® one face fixed horizontal or vertical, 7mm D-D plywood on the other ^{1,2}	no	yes	145	135
	0.9				145	145
BLG	0.6	GIB Braceline® one face, 10mm GIB® Standard on the other face, linings fixed horizontal or vertical ^{1,2}	no	yes	145	130
	1.2				150	130

Notes: 1) Where linings are specified on both faces, each face must be fastened as a bracing element.

2) GIB Aqualine® can be used in place of GIB Braceline® in bracing elements 900 mm or longer, provided the perimeter of the element is fixed with GIB Braceline® Nails or Screws spaced at 100mm centres generally, using the GIB Braceline® corner fixing pattern.

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.

8.9 The GIB® Bracing Systems Technical Literature provides comprehensive installation details.

Water-splash Areas

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

Impact Resistance

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

Durability

9.1 GIB® Bracing 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® Bracing Systems 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® Bracing Systems 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 GIB Braceline® may substitute for 10 mm GIB Fyreline® in all fire resistant wall construction. Refer to GIB® Fire Rated Systems Technical Literature.

Internal Moisture

12.1 GIB® Bracing Systems 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® Bracing Systems can be carried out by any competent building contractor.

General

14.1 GIB® Bracing 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® Bracing Systems plasterboards are fixed at 150 mm centres around the perimeter framing of the wall bracing element. Fixing to other framing is either mechanical or by using GIBFix® Adhesives. All edge fixings must be in accordance with the edge fixing pattern. Corner fixings must be 50 mm away from the sheet corner. GIB Braceline® bracing elements require a special fastening pattern with three fasteners at 50 mm centres from each corner. GIB® Standard bracing elements and ceiling diaphragms require the first corner fastening at 50 mm, the second at 100 mm and there after at 150 mm.

14.6 The GIB® Bracing 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. Mechanical fixings must be spaced between the daubs of adhesive.

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 GIB Braceline® corner pattern.

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

14.9 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

14.10 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

16.1 Bracing tests were carried out by BRANZ in accordance with BRANZ Technical Paper P21 to determine the performance of GIB® Bracing Systems when the building is subjected to lateral wind or earthquake loading. Nail and screw slip tests were carried out by BRANZ.

Other Investigations

17.1 The GIB® Bracing Systems and GIB® Site Guide Technical Literature have been examined by BRANZ and found to be satisfactory.

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

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

17.4 The properties of Winstone Wallboards Limited 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

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

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

18.3 Winstone Wallboards Limited is responsible for the quality of the product supplied.

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

18.5 Designers are responsible for the design of buildings.

18.6 Building owners are responsible for the maintenance in accordance with the instructions of Winstone Wallboards Limited.

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 and framed buildings.
- New Zealand Building Code Handbook and Approved Documents, Building Industry Authority, 1992.
- The Building Regulations 1992, up to, and including October 2004 Amendment.



In the opinion of BRANZ, GIB® Bracing System is fit for purpose and will comply with the Building Code to the extent specified in this Certificate provided it is used, designed, installed and maintained as set out in this Certificate.

The Appraisal Certificate is issued only to the Certificate Holder, Winstone Wallboards Limited, and is valid until further notice, subject to the Conditions of Certification.

Conditions of Certification

1. This Certificate:
 - 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. The Certificate Holder:
 - 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. The product and the manufacture are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ.
4. BRANZ makes no representation 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 the Certificate Holder.
5. Any reference in this Certificate to any other publication shall be read as a reference to the version of the publication specified in this Certificate.

For BRANZ

P Robertson
Chief Executive

Date of issue: 22 November 2006