



BRANZ Appraised
Appraisal No. 1079 [2020]

GAMMA WALL BRACING SYSTEMS

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BRANZ Appraisals

Technical Assessments of products for building and construction.



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Product

- 1.1 Gamma Wall Bracing Systems are a range of wall bracing systems based on the use of Gamma Bracing Frames. Gamma Wall Bracing Systems are used to resist earthquake and wind loads on timber frame buildings designed and constructed in accordance with NZS 3604: 2011 or to a specific engineering design [SED]. The Gamma Bracing Calculator Software provides an electronic means of calculating bracing demand and resistance.

Scope

- 2.1 Gamma Wall Bracing Systems have been appraised for design and use as interior and exterior wall bracing systems in buildings within the scope limitations of NZS 3604: 2011 or to a specific engineering design [SED].

Building Regulations

New Zealand Building Code

- 3.1 In the opinion of BRANZ, Gamma Wall Bracing Systems, if designed, used and installed in accordance with the statements and conditions of this Appraisal, will meet the following provisions of the NZBC:

Clause B1 STRUCTURE: Performance B1.3.1, B1.3.2 and B1.3.4 Gamma Wall Bracing Systems meet the requirements for loads arising from earthquake and wind [ie B1.3.3 (f), and (h)]. See Paragraphs 8.1 to 8.3.

Clause B2 DURABILITY: Performance B2.3.1 [a] not less than 50 years. Gamma Wall Bracing Systems meet this requirement. See Paragraph 9.1.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1 Gamma Wall Bracing Systems meet this requirement and will not present a health hazard to people.

- 3.2 The bracing demand calculation and bracing distribution rules contained in the Gamma Wall Bracing Systems Software are in accordance with Section 5 of NZS 3604. Bracing resistance is provided by bracing element ratings determined in accordance with NZS 3604, Paragraph 8.3.1.2.
- 3.3 Bracing Resistance is provided by bracing element ratings determined in accordance with NZS 3604, Paragraph 8.3.1.2.



Technical Specification

4.1 Gamma Bracing Frames are fabricated from 0.75 mm thick G550 Galvsteel® which is punched and folded into the frame components. The side and top channels are riveted together to form the outer frame. GBF220 frames comprise a flat steel sheet riveted to the frame. GBF400 and GBF600 frames have diagonal braces riveted within the outer frame. Hold down brackets are temporarily attached to the frame for transportation. All frames have service holes to allow electrical and plumbing services to be installed in the wall.

The frames are manufactured in 6 sizes as follows:

- GBF220 frames - 218 mm wide x 2010 and 2310 mm high.
- GBF400 frames - 353 mm wide x 2010 and 2310 mm high.
- GBF600 frames - 553 mm wide x 2010 and 2310 mm high.

4.2 System components and accessories supplied by Gamma Bracing Technologies Limited are as follows:

- 12 g x 40 mm Tek screws to secure Gamma Bracing frames to timber studs and plates.
- 12 g x 70 mm Tek Screws to secure GBF535 frames to the top plate.
- GBF Hold Down Brackets - 155 x 100 x 5 mm galvanised steel
- Slotted washer - 50 x 50 x 8 mm galvanised steel

4.3 Accessories used with Gamma Wall Bracing Systems that are supplied by the building contractor are as follows:

- M12 x 150 mm or M10 x 140 mm screw bolts for fixing to concrete floors.
- M12 x 200 mm galvanised coach screws for fixing to timber floors
- 7 mm thick DD grade structural grade plywood [for GBPF]
- 50 x 2.8 mm galvanised flat head nails [for GBPF]
- 300 x 25 mm galvanised straps [for GBPF]

Handling and Storage

5.1 Gamma Bracing Frames and accessories should be stored in a clean, dry area until they are used. Should the metal components get wet they should be separated and dried to prevent premature corrosion.

Technical Literature

6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for Gamma Wall Bracing Systems. The Technical Literature should be read in conjunction with this Appraisal. All aspects of design, use and installation contained in the technical literature and with in the scope of this appraisal must be followed.

Design Information

General

- 7.1 Gamma Wall Bracing Systems are for use to provide structural bracing for both residential and light commercial buildings for both new and existing buildings which may not require additional, speciality bracing linings.
- 7.2 Gamma Bracing Frames are supplied in three different widths, each in two different heights. GBF220S, GBF400S and GBF600S are designed for short walls 2.1m high. GBF220, GBF400 and GBF600 frames can be used for walls between 2.4 and 3.0 m high. For walls above 2.4 m high, additional timber blocking is required above the GBF. Some bracing systems require additional studs to achieve the required bracing ratings. Refer to the Technical Literature for further details.
- 7.3 Gamma Bracing System is for use in a closed environment and requires the supporting timber framing moisture levels to comply with NZS 3604 and NZS 3602.
- 7.4 Gamma Wall Bracing Systems once installed can eliminate the majority of temporary bracing.
- 7.5 Gamma Wall Bracing Systems can be installed in wet areas and unlined areas.

- 7.6 Gamma Wall Bracing Systems can be used with either timber framed floors or concrete slab-on-ground floors.
- 7.7 Gamma Wall Bracing Systems can be used in combinations with other bracing systems such as plywood or plasterboard.

Gamma Portal Frames

- 7.8 Pairs of GBF220 frames can be used in conjunction with a 300 x 90 mm LVL lintel to form a portal frame for large openings such as garage doors. Refer to the Technical Literature for further details.

Framing

- 7.9 Timber framing grade, spacing and construction must comply with NZS 3604 or be to a SED. Timber treatment must comply with NZBC Acceptable Solution B2/AS1.
- 7.10 Gamma Bracing Technologies Ltd recommends the use of kiln-dried stress-graded framing timber. The minimum actual framing dimensions are 90 x 45 mm.

Structure

Bracing

- 8.1 The Technical Literature provides comprehensive construction and hold-down details. These include options for timber and concrete floors.
- 8.2 The Gamma Bracing Software contains design procedures and an electronic calculation method for bracing demand calculated in accordance with NZS 3604: 2011, Section 5. Floor loadings can be selected in accordance with either NZS 3604, Bracing Demand Tables 5.5 - 5.10 for 2 kPa floor loads or less, or Tables 14.1 - 14.3 for 3 kPa floor loads.
- 8.3 NZS3604 Section 5 contains design procedures and a manual calculation method for calculating bracing demand. Refer to NZS 3604, Bracing Demand Tables 5.5 - 5.10 for 2kPa floor loads and Tables 14.1 - 14.3 for 3kPa floor loads. The bracing ratings given in Table 1 of this Appraisal are for manual calculations.

Table 1: Gamma Bracing Systems Bracing Ratings

| Gamma Bracing System Reference | Performance Bracing Units (BU's) | | Wall Heights | |
|--------------------------------|----------------------------------|-------|-----------------|-----------------|
| | Wind | Earth | Min Wall Height | Max Wall Height |
| GBF220S/2100 | 37 | 44 | 2100 | 2400 |
| GBF220/2400 | 37 | 44 | 2400 | 2700 |
| GBF400S/2100 | 45 | 55 | 2100 | 2400 |
| GBF400/2400 | 45 | 55 | 2400 | 2700 |
| GBF400/2700 | 40 | 47 | 2700 | 3000 |
| GBF400/3000 | 35 | 44 | 3000 | 3300 |
| GBF535S/2100 | 69 | 75 | 2100 | 2400 |
| GBF535/2400 | 69 | 75 | 2400 | 2700 |
| GBF535/2700 | 61 | 67 | 2700 | 3000 |
| GBF535/3000 | 55 | 60 | 3000 | 3300 |
| GBF600S/2100 | 84 | 90 | 2100 | 2400 |
| GBF600/2400 | 84 | 90 | 2400 | 2700 |
| GBF600/2700 | 70 | 70 | 2700 | 3000 |
| GBF600/3000 | 55 | 60 | 3000 | 3600 |
| GBPF/2400 | 124 | 137 | 2400 | 2400 |
| GBPF/2700 | 110 | 122 | 2700 | 2700 |

Note: Timber Floors - A limit of 120 BU/m applies to NZS 3604 timber floors and 150BU/m for concrete floors.



Durability

- 9.1 Gamma Wall Bracing Systems are expected to have a serviceable life of at least 50 years. The ability for the systems to remain durable is dependant of them remaining dry in service.

Maintenance

- 10.1 Gamma Wall Bracing Systems should be kept dry during service. The building envelope should be maintained to prevent the components getting wet. Any damage to the envelope must be repaired immediately.
- 10.2 System components that are damaged must be replaced as soon as possible.

Prevention of Fire Occurring

- 11.1 Separation or protection must be provided to Gamma Wall Bracing Systems from heat sources such as fireplaces, heating appliances and chimneys. Part 7 of NZBC Acceptable Solution C/AS1, C/AS2 and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

Installation Information

Installation Skill Level Requirement

- 12.1 All design and building work must be carried out in accordance with the Gamma Wall Bracing Systems Technical Literature and this Appraisal by competent and experienced tradespersons conversant with bracing systems. Where the work involves Restricted Building Work (RBW) this must be completed by, or under the supervision of, a Licensed Building Practitioner (LBP) with the relevant License class.
- 12.2 Once the positions of the Gamma Bracing Frames (GBF's) have been determined from the bracing design remove any dwangs where the GBFs are to be installed. Ensure the inside dimension of the framing provides a suitable fit for the GBFs. A tolerance of +2.0 mm and -0 mm between the GBF and the timber framing is acceptable. The GBFs need to fit snugly into the framing.
- 12.3 For wall heights of 2.7m and 3.0m install the required timber framing members as detailed in the Technical Literature.
- 12.4 If thermal insulation is to be installed then cut the thermal insulation to fit snugly within the timber framing and Gamma Frame members.
- 12.5 If interior sheet linings are to be installed fix in accordance with the manufacturer's instructions or in accordance with AS/NZS 2589.

Concrete Floors

- 12.6 Where the GBFs are located in external walls position the GBFs flush with the inside face of the timber framing to ensure the hold down fastener is away from the edge of the concrete slab (minimum edge distance = 60 mm). For internal walls the GBFs can be positioned centrally within the framing.

Timber Floors

- 12.7 Where the GBFs are located in external walls and internal walls the GBFs must be positioned within the framing ensuring the position of the hold down bolt is secured in to solid timber framing.
- 12.8 Once the GBFs are positioned mark the positions for the hold down fasteners through the slot in the hold down bracket and on to the bottom plate. Remove the GBF or where possible swing the GBF to one side to allow access for drilling the holes for the hold down fasteners. To swing the GBF to one side it is useful to install a single Tek screw fastener into each stud (do not fully tighten these until the GBF is fully installed). Drill the holes for the hold down fasteners.

Frame Fixing

- 12.9 Fix the perimeter of the GBF to the surrounding framing with nine 12 g x 40 mm Tek Screws. Screw each hold down bracket to the adjacent stud with eight 12 g x 40 mm Tek screws. Place slotted washer on hold down bracket and fix the GBF down with selected hold-down.

Health and Safety

13.1 Gamma Wall Bracing Systems should be handled in accordance with the manufacturer's instructions. Accessories and other components of Gamma Wall Bracing Systems must also follow the relevant manufacturer's instructions for safe handling.

Basis of Appraisal

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

Tests

14.1 Bracing tests were carried out by SCION and BRANZ in accordance with BRANZ Technical Paper P21 to determine the performance of Gamma Wall Bracing Systems when the building is subject to lateral wind or earthquake loading.

Other Investigations

- 14.2 The Gamma Wall Bracing Systems Technical Literature has been examined by BRANZ and found to be satisfactory.
- 14.3 Site inspections were carried out by BRANZ to examine the practicability of the installation of the systems, and to view completed installations.
- 14.4 An assessment was made of all structural and durability testing by BRANZ technical experts and found to be satisfactory.

Quality

- 14.5 The manufacture of Gamma Wall Bracing Systems has been examined by BRANZ, including methods adopted for quality control. Details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory.
- 14.6 Gamma Bracing Technologies Limited is responsible for the quality of the product being supplied.
- 14.7 The quality of installation on site is the responsibility of the building contractor.
- 14.8 Designers are responsible for the design of the building.
- 14.9 Building owners are responsible for the maintenance of the product in accordance with the instructions of Gamma Bracing Technologies Ltd.

Sources of Information

- AS/NZS 2589: 2017 Gypsum Linings - Application and Finishing
- BRANZ Technical Paper P21: 2010 A wall bracing test and evaluation procedure.
- NZS 3602: 2003 Timber and wood-based products for use in building.
- NZS 3604: 2011 Timber-framed buildings.
- Ministry of Business Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992



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GAMMA WALL BRACING
SYSTEMS



In the opinion of BRANZ, **Gamma Wall Bracing Systems** are 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 **Gamma Bracing Technologies 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. **Gamma Bracing Technologies 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;
 - d) 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.
3. 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 **Gamma Bracing Technologies Limited**.
4. 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.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to **Gamma Bracing Technologies Limited** or any third party.

For BRANZ

Chelydra Percy

Chief Executive

Date of Issue:

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