



**BRANZ Appraised**  
Appraisal No. 779 [2018]

**GOLDENEDGE® MDF  
PANELBRACE™ WALL  
BRACING SYSTEMS**



# Panelbrace™

**Appraisal No. 779 [2018]**

This Appraisal replaces Appraisal  
No. 779 [2013].

## BRANZ Appraisals

Technical Assessments of  
products for building and  
construction.



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## Product

- 1.1 GoldenEdge® MDF Panelbrace™ Wall Bracing Systems are a range of wall bracing systems based on 9 mm and 12 mm GoldenEdge® Regular MDF. GoldenEdge® MDF Panelbrace™ Wall 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 GoldenEdge® MDF Panelbrace™ Wall Bracing Systems have been appraised for the design and use of interior wall bracing systems in dry and protected environments in buildings within the scope limitations of NZS 3604.

## Building Regulations

### New Zealand Building Code (NZBC)

- 3.1 In the opinion of BRANZ, GoldenEdge® MDF Panelbrace™ Wall Bracing Systems, if designed, used, installed and maintained 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. GoldenEdge® MDF Panelbrace™ Wall Bracing Systems meet the requirements for loads arising from earthquake, wind and impact [i.e. B1.3.3 (f), (h) and (j)]. See Paragraphs 8.1 - 8.7.

**Clause B2 DURABILITY:** Performance B2.3.1 (a) not less than 50 years. GoldenEdge® MDF Panelbrace™ Wall Bracing Systems meet this requirement. See Paragraphs 9.1 - 9.4.

**Clause F2 HAZARDOUS BUILDING MATERIALS:** Performance F2.3.1. GoldenEdge® MDF Panelbrace™ Wall Bracing Systems meet this requirement and will not present a health hazard to people. See Paragraphs 13.1 - 13.2.

- 3.2 Bracing resistance is provided by bracing element ratings determined in accordance with NZS 3604, Paragraph 8.3.1.2.



## Technical Specification

4.1 GoldenEdge® Regular MDF and accessories used with the GoldenEdge® MDF Panelbrace™ Wall Bracing Systems and supplied or specified by Nelson Pine Industries Ltd are as follows:

### GoldenEdge® Regular MDF Sheets

- GoldenEdge® Regular MDF is medium-density fibreboard, 9 mm and 12 mm thick, with a sheet width of 1200 mm and a length of 2400 mm. The sheets have square edges to all four sides. The nominal density is 725 kg/m<sup>3</sup>.

### Sheet Fasteners

- 40 x 2.8 mm hot-dipped galvanised fibre cement nails.
- 8 g x 40 mm, gold-passivated countersunk, coarse thread woodscrews.

### Fasteners and Connections

- **GIB® HandiBrac®** - a one-piece, 2 mm thick, galvanised-steel angle bracket approximately 95 mm high, 65 mm long and 54 mm wide. The bracket is supplied with 5 Type 17 screws 14 g x 35 mm.
- **BOWMAC® screw bolt** - M10 x 140 mm screw anchor, with a blue painted hex-head.
- **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 15 kN may be used.
- **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 GoldenEdge® Regular MDF sheets 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 Technical Literature. 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 GoldenEdge® MDF Panelbrace™ Wall Bracing Systems. 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 NZS 3604 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 2 kPa floor loads and Tables 14.1 - 14.3 for 3 kPa floor loads. The bracing ratings given in Table 1 of this Appraisal are for manual calculations. The Technical Literature provides a method for modifying the wall bracing demand for alternative wall heights.

**Table 1: GoldenEdge® MDF Panelbrace™ Wall Bracing Systems Bracing Ratings**

Type	Minimum length [m]	Lining	Other Requirements	BU/m	
				W	EQ
NP4	0.4	9 or 12 mm GoldenEdge® Regular MDF one side	Hold-downs	95	105
NP6	0.6	9 or 12 mm GoldenEdge® Regular MDF one side	n/a	80	70
NP12	1.2	9 or 12 mm GoldenEdge® Regular MDF one side	Hold-downs	150*	135*

Notes: \* Timber Floors - A limit of 120 BU/m applies to NZS 3604 timber floors.

- 7.2 GoldenEdge® MDF Panelbrace™ Wall Bracing Systems are for use in dry, internal, protected locations of thermally insulated buildings. GoldenEdge® MDF Panelbrace™ Wall Bracing Systems are for use in heated, intermittently heated and predominantly unheated buildings in accordance with NZS 3602 Section 110, Table 1E and Section 205. The internal environment must be such that the moisture content of the supporting timber framing does not exceed 18%. GoldenEdge® MDF Panelbrace™ Wall Bracing Systems must be located within the building thermal envelope. GoldenEdge® MDF Panelbrace™ Wall Bracing Systems must either be exposed to view or be in locations easily accessible for inspection. The wall linings must be painted with either three coats of polyurethane or a paint system comprising a primer/sealer and two top coats. All visible edges are to be painted.
- 7.3 GoldenEdge® MDF Panelbrace™ Wall Bracing System sheets must not be located in any high moisture environment or in areas subject to water splash. They must not be used in areas such as bathrooms, toilets, laundries or kitchens. GoldenEdge® MDF sheets must not be used in saunas or steam rooms.
- 7.4 GoldenEdge® MDF Panelbrace™ Wall Bracing Systems must not be exposed to temperatures of 50°C or greater for prolonged periods. Refer to appliance and fitting manufacturers for installation details.
- 7.5 GoldenEdge® MDF sheets may also be used for general wall lining.

### Framing

- 7.6 Timber framing grade, spacing and construction must comply with NZS 3604. Timber treatment must comply with NZBC Acceptable Solution B2/AS1.
- 7.7 GoldenEdge® MDF Panelbrace™ Wall Bracing Systems Technical Literature recommends the use of kiln-dried stress-graded framing timber. The minimum actual framing dimensions are 90 x 45 mm for external walls and 75 x 45 mm for internal walls.
- 7.8 Joints in the top plates of bracing panels must be tied together with 3 kN and 6 kN top plate connectors using 25 x 0.9 mm galvanised mild steel strap, 3 nails each side of joint for 3 kN and 6 nails each side of joint for 6 kN.



- 7.9 When BOWMAC Screw Bolts are used as fixings for external walls with concrete masonry header block foundations, the minimum grout/concrete strength must be as specified in NZS 3604. BOWMAC Screw Bolts may be used in Corrosion Zones B and C as defined in NZS 3604. BOWMAC Screw Bolts may only be used in NZS 3604 Corrosion Zone D where the minimum concrete cover to the bolt is 60 mm. This cannot be achieved with standard 90 mm wide timber framing. An alternative option in this scenario is to use 140 mm wide framing.

## Structure

### Bracing

- 8.1 The bracing units achieved [wind and earthquake] published for manual calculations in GoldenEdge® MDF Panelbrace™ Wall Bracing Systems are given in Table 1.
- 8.2 The Technical Literature provides comprehensive construction and 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.
- 8.3 The bracing units are derived from the 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 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.

### Openings in Bracing Elements

- 8.4 Openings are allowed within the middle third of bracing elements [length and height walls]. The opening dimension in either direction must not exceed one third of the sheet 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.

### Moisture Exposure

- 8.5 GoldenEdge® MDF Panelbrace™ Wall Bracing Systems must not be located in areas subject to water splash, damp conditions, or high humidity. See also Paragraph 7.2.

### Impact Resistance

- 8.6 GoldenEdge® Regular MDF provides adequate resistance to soft body impact, based upon experience of use in domestic and light commercial applications.

## Durability

- 9.1 GoldenEdge® MDF Panelbrace™ Wall 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 Appraisal. See Paragraph 7.2.

### Maintenance

- 9.2 The building must be maintained weatherproof and GoldenEdge® Regular MDF must be protected from external and internal moisture in accordance with NZBC Clauses E2 and E3. Regular inspections must be made to ensure that GoldenEdge® MDF Panelbrace™ Wall Bracing Systems are not being damaged by humidity or moisture. This is particularly important in buildings that are only intermittently heated or predominantly unheated. Where any evidence of edge swelling caused by moisture to bracing panels is evident, the panels must be removed and replaced with new material. Any damaged bracing panels must similarly be replaced.
- 9.3 Holes resulting from damage to the lining, up to 90 x 90 mm square except where within 90 mm of the edge of the bracing element, 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.



## Prevention of Fire Occurring

- 10.1 Separation or protection must be provided to GoldenEdge® Regular MDF from heat sources such as fireplaces, heating appliances, flues and chimneys. Part 7 of NZBC Acceptable Solutions C/AS1-C/AS6 and NZBC Verification Method C/VM1 provide methods for separation and protection of combustible materials from heat sources.

## Fire Affecting Areas Beyond the Fire Source

### Internal Surface Finishes

- 11.1 The Material Group Number for the complete lining system including applied finishes, must be obtained from the supplier of the finish system. These have not been assessed by BRANZ and are outside the scope of this Appraisal.

### Internal Moisture

- 12.1 GoldenEdge® MDF Panelbrace™ Wall Bracing Systems are for use in dry, internal, protected locations of thermally insulated buildings. See Paragraph 7.2.

### Hazardous Building Materials

- 13.1 When installed and painted, the level of formaldehyde emission from GoldenEdge® MDF will be tolerable for most occupants in buildings with an adequate level of ventilation provided in accordance with NZBC Performance Provision G4.3.1. Vapour emissions will be encapsulated to some degree by sealing the surface with either 3 coats of polyurethane or a paint system. Sealing of the sheets must be carried out before the building is occupied.
- 13.2 A Material Safety Data Sheet is available for download from [www.nelsonpine.co.nz](http://www.nelsonpine.co.nz).

## Installation Information

### Installation Skill Level Requirement

- 14.1 Installation must always be carried out in accordance with the GoldenEdge® MDF Panelbrace™ Wall Bracing Systems Technical Literature and this Appraisal by, or under the supervision of, a Licensed Building Practitioner (LBP) with the relevant Licence Class.

### General

- 15.1 GoldenEdge® MDF Panelbrace™ Wall Bracing Systems must be installed in accordance with the Technical Literature. For inspection, reference must be made to the Technical Literature.
- 15.2 GoldenEdge® MDF Panelbrace™ Wall Bracing Systems must be completely protected from the weather during construction. They must not be installed prior to roof and wall claddings. Temporary bracing should be used until the building is closed and the lining can be fixed.

### Framing

- 15.3 Nelson Pine Industries Limited specifies that walls must not be lined unless the moisture content of timber framing is less than 18%.

### Cutting

- 15.4 GoldenEdge® Regular MDF can be cut with either a fine tooth saw (hand or power). Cut edges can be tidied up by using a plane or sandpaper.

### Sheet Fixing

- 15.5 GoldenEdge® Regular MDF sheets are fixed vertically. Adjoining sheets require an approximate 2 mm gap between them to allow for movement. Full sheets must be used wherever possible.
- 15.6 Fixings must be no closer than 10 mm from the sheet edge and no closer than 18 mm from the sheet end. Fixings are driven at right angles to the sheet until the head is flush with the sheet surface for nail fixings or countersunk approximately 0.5 mm for screw fixings. Fixings must not be over-driven.



- 15.7 GoldenEdge® Regular MDF sheets are fixed at 150 mm centres around the perimeter of the sheets starting at the corner and at 300 mm centres to intermediate studs. Fixing to dwangs is not required.

#### **Finishing**

- 15.8 GoldenEdge® Regular MDF sheets are finished with three coats of polyurethane or a paint system comprising a primer/sealer and two top coats.

#### **Health and Safety**

- 16.1 Dust resulting from the cutting or sanding of GoldenEdge® Regular MDF may be a respiratory irritant, and the use of a suitable respiratory protection is recommended. A Material Safety Data Sheet is available for download from [www.nelsonpine.co.nz](http://www.nelsonpine.co.nz).

### **Basis of Appraisal**

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

#### **Tests**

- 17.1 Bracing tests were carried out by BRANZ in accordance with BRANZ Technical Paper P21 to determine the performance of GoldenEdge® MDF Panelbrace™ Wall 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**

- 18.1 The GoldenEdge® MDF Panelbrace™ Wall Bracing Systems Technical Literature has been examined by BRANZ and found to be satisfactory.
- 18.2 Site inspections were carried out by BRANZ to examine the practicability of the installation of the systems, and to view completed installations.
- 18.3 An assessment was made of the durability of the systems by BRANZ technical experts and found to be satisfactory.
- 18.4 GoldenEdge® Regular MDF have been assessed for the following properties: Modulus of Rupture [MOR], Modulus of Elasticity [MOE], Internal Bond, resistance to axial withdrawal, of both new and aged samples.

#### **Quality**

- 19.1 The manufacture of GoldenEdge® MDF Panelbrace™ 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.
- 19.2 The quality management systems of Nelson Pine Industries Limited have been assessed and registered as meeting the requirements of ISO 9001:2008.
- 19.3 Nelson Pine Industries Limited is responsible for the quality of the product supplied.
- 19.4 The quality of the application and finish on site is the responsibility of the building contractor.
- 19.5 Designers are responsible for the design of the building.
- 19.6 Building owners are responsible for the maintenance of the product in accordance with the instructions of Nelson Pine Industries Limited.

#### **Sources of Information**

- 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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20 December 2018

GOLDENEDGE® MDF  
PANELBRACE™ WALL BRACING  
SYSTEMS



In the opinion of BRANZ, **GoldenEdge® MDF Panelbrace™ Wall Bracing 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 **Nelson Pine Industries 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. **Nelson Pine Industries 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 **Nelson Pine Industries 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 **Nelson Pine Industries Limited** or any third party.

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**For BRANZ**

**Chelydra Percy**

Chief Executive

Date of Issue:

20 December 2018