



BRANZ Appraised
Appraisal No. 1065 [2021]

IPL BRACING PLY™

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BRANZ Appraisals

Technical Assessments of products for building and construction.



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Product

1.1 IPL Bracing Ply™ is a range of plywood wall and ceiling bracing systems to resist wind and earthquake loads on timber-framed buildings. The product can also be used as a rigid wall underlay on timber-framed buildings.

Scope

- 2.1 IPL Bracing Ply™ has been appraised for use as wall and ceiling bracing for timber-framed buildings within the scope of NZS 3604.
- 2.2 IPL Bracing Ply™ has also been appraised for use as a rigid wall underlay on timber-framed buildings within the following scope:
- the scope limitations of NZBC Acceptable Solution E2/AS1, Paragraph 1.1; and,
 - when covered with a flexible wall underlay in accordance with NZBC Acceptable Solution E2/AS1 Paragraph 9.1.7.2; and
 - used with absorbent and non-absorbent wall claddings installed over an 18 mm minimum drained cavity; or,
 - used with masonry veneer in accordance with NZBC Acceptable Solution, E2/AS1; and,
 - situated in NZS 3604 Wind Zones up to, and including, Extra High.

Building Regulations

New Zealand Building Code (NZBC)

- 3.1 In the opinion of BRANZ, IPL Bracing Ply™, if used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet, or contribute to meeting the following provisions of the NZBC:
- Clause B1 STRUCTURE:** Performance B1.3.1, B1.3.2 and B1.3.4. IPL Bracing Ply™ meets the requirements for loads arising from earthquake and wind [i.e. B1.3.3 (f) and (h)]. See Paragraphs 9.1-9.9.
- Clause B2 DURABILITY:** Performance B2.3.1 (a) not less than 50 years, B2.3.1 (b) 15 years and B2.3.2. IPL Bracing Ply™ meets these requirements. See Paragraphs 10.1-10.4.
- Clause E2 EXTERNAL MOISTURE:** Performance E2.3.2. When used as part of the wall cladding system, IPL Bracing Ply™ will contribute to meeting this requirement. See Paragraphs 13.1-13.3.
- Clause F2 HAZARDOUS BUILDING MATERIALS:** Performance F2.3.1. IPL Bracing Ply™ meets this requirement.
- 3.2 IPL Bracing Ply™ bracing systems can be used to satisfy the bracing demand requirements of Section 5 of NZS 3604, which is an Acceptable Solution for compliance with NZBC Clause B1 Structure.

Technical Specification

- 4.1 The products supplied by International Panel and Lumber (West Coast) Ltd are:
- **IPL Bracing Ply™** - 7 mm thick, 2,400 mm long x 1,200 mm wide structural plywood sheets manufactured from pinus radiata in accordance with AS/NZS 2269. Sheets are available in either H3.2 CCA treated for exterior use or untreated for interior use. Sheets are marked on the back with: sheet face, DD [grade], IPL [company name], A bond [bond type], F8 [stress grade], AS/NZS 2269 [Structural Plywood Standard], 914 [EWPA mill number], 7-24-3 [construction code] and treatment type [H3.2 or UT for untreated].
- 4.2 The components and accessories used with IPL Bracing Ply™ which are supplied by the building contractor are:
- **Fasteners** - 50 x 2.8 mm flathead nails, either hot-dip galvanised or ringshank stainless steel. *[Note: Hot-dip galvanising must comply with AS/NZS 4680 and stainless steel must be Grade 304 or 316.]*
 - **Bracing panel end stud connection** - GIB® Handibrac 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.
 - **Timber floor end stud hold down** - hot-dip galvanised 12 mm x 150 mm coach screws.
 - **Concrete floor end stud hold down** - hot-dip galvanised cast-in bolts M12 x 150 mm minimum or proprietary fixings with a minimum characteristic strength of 15 kN.
 - **Flexible wall underlay** - complying with NZBC Acceptable Solution E2/AS1, Table 23.
 - **Flexible wall underlay fixings** - staples, clouts, screws or proprietary underlay fixings to attach the wall underlay to the plywood.

Handling and Storage

- 5.1 Handling and storage of all materials supplied by International Panel and Lumber (West Coast) Ltd or the building contractor, whether on-site or off-site, is under the control of the building contractor. IPL Bracing Ply™ sheets must be stacked flat, off the ground and supported on a level platform. They must be kept dry at all times either by storing under cover or providing waterproof covers to the stack. Care must be taken to avoid damage to the edges, ends and surfaces.
- 5.2 Other accessories must be stored so they are kept clean, dry and undamaged.

Technical Literature

- 6.1 Refer to the Appraisals listing on the BRANZ website for details of the current IPL Bracing Ply™ Technical Literature which must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within this Appraisal must be followed.

Design Information

General

- 7.1 IPL Bracing Ply™ is intended for use as wall bracing for exterior and interior walls, and for ceiling diaphragms on timber-framed building designed in accordance with NZS 3604. When IPL Bracing Ply™ is used internally, it should be noted that it is not an appearance grade plywood and further decoration or lining may be desirable.
- 7.2 IPL Bracing Ply™ can also be used as a rigid wall underlay fixed over timber-framed walls in order to support wind pressures as required by NZBC Acceptable Solution E2/AS1, Paragraph 9.1.7.2.
- 7.3 IPL Bracing Ply™ must **not** be used as a temporary weather protecting sheathing to allow the insulation and internal lining of the building to proceed before the wall cladding is installed.

Framing

Timber Framing Treatment

- 8.1 Timber wall framing behind the IPL Bracing Ply™ must be treated as required by NZBC Acceptable Solution B2/AS1.

Timber Framing

- 8.2 Timber framing must be minimum 90 x 45 mm structural grade SG8 and must comply with NZS 3604 for buildings or parts of buildings within the scope limitations of NZS 3604. Buildings or parts of buildings outside the scope of NZS 3604 must be to a specific design in accordance with NZS 3603 and AS/NZS 1170 considering local factors. In all cases, studs must be at maximum 600 mm centres. Dwargs must be fitted flush between the studs at maximum 1,200 mm centres. *[Note: The timber framing must also be suitable for the selected wall cladding. Refer to the selected cladding system's Technical Literature for specific framing requirements.]*
- 8.3 Timber wall framing where the IPL Bracing Ply™ sheets are joined must be minimum 45 mm wide .
- 8.4 Timber framing must be kiln-dried and as dry as practically possible at the time of IPL Bracing Ply™ installation.

Wall Bracing Set Out

- 8.5 All IPL Bracing Ply™ sheet edges must be fully supported by framing.
- 8.6 IPL Bracing Ply™ sheets must be installed vertically. At the base of the wall, the plywood sheets must finish flush with the underside of the bottom plate or bearer.

Ceiling Diaphragm Set Out

- 8.7 When IPL Bracing Ply™ is used for ceiling diaphragms, the framing must in accordance with NZS 3604.

Structure

Mass

- 9.1 The mass of IPL Bracing Ply™ sheets is approximately 3.9 kg/m². This mass must be added to the selected wall cladding system mass when determining the overall wall cladding mass in terms of NZS 3604.

Wind Zones

- 9.2 IPL Bracing Ply™ is suitable for use in all Wind Zones of NZS 3604 up to, and including, Extra High.

IPL Bracing Ply™ Sheet and Cladding Fixing

- 9.3 IPL Bracing Ply™ sheets must be fixed at maximum 150 mm centres around the perimeter of each sheet and at maximum 300 mm centres to intermediate studs. When used in Extra High Wind Zone, the fixing centres on the intermediate studs must be closed up to a maximum 150 mm centres. The fixing centres are at the same spacing regardless of whether the IPL Bracing Ply™ sheets are being used for bracing or not.
- 9.4 The length of the selected wall cladding fasteners must be increased by a minimum of 7 mm to maintain the face load strength of the wall cladding system.

Wall Bracing

- 9.5 The bracing units achieved [wind and earthquake] for the IPL Bracing Ply™ are given in Table 1. The Technical Literature gives details of edge and end fixing distances, and construction and panel hold-down details.

- 9.6 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 2.4 and then dividing by the wall height in metres. Walls lower than 2.4 m are to be rated as if they were 2.4 m high.

Table 1: Bracing Ratings for IPL Bracing Ply™

System	Minimum Wall Length [m]	Lining/Sheathing Requirements	Bottom Plate Hold-Downs	Wind [BU/m]	Earthquake [BU/m]
IPL 1	0.4	IPL Bracing Ply™ one side	GIB® Handibrac	85	95
	0.6	IPL Bracing Ply™ one side	GIB® Handibrac	105	105
	1.2	IPL Bracing Ply™ one side	GIB® Handibrac	130*	125*
IPL 2	0.4	IPL Bracing Ply™ both sides	GIB® Handibrac	110	130*
	0.6	IPL Bracing Ply™ both sides	GIB® Handibrac	140*	150*

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

Penetrations for Services

- 9.7 Small openings for services of up to 90 x 90 mm may be placed no closer than 90 mm to the edge of the bracing element and service penetrations up to a maximum of 150 mm diameter may be placed no closer than 150 mm from the sheet edge, without affecting the bracing rating of the panel.

Ceiling Diaphragms

- 9.8 IPL Bracing Ply™ may be used as a ceiling lining material for ceiling diaphragms in accordance with NZS 3604, Paragraph 13.5.2 [b] [i].

Connections

- 9.9 The IPL Bracing Ply™ Technical Literature contains a top plate hold down detail to resist uplift, that is an alternative to the detail given in NZS 3604 for Fixing type B (4.7 kN uplift capacity).

Durability

- 10.1 IPL Bracing Ply™ meets code compliance with NZBC Clause B2.3.1 [a] not less than 50 years when used where the cladding durability requirement or expected serviceable life is not less than 50 years, e.g. behind masonry veneer, or where it is used as a bracing element. IPL Bracing Ply™ also meets code compliance with NZBC Clause B2.3.1 [b] 15 years when the cladding durability requirement is 15 years and IPL Bracing Ply™ is not used for bracing.

Serviceable Life

- 10.2 Provided H3.2 treated IPL Bracing Ply™ is not exposed to the weather for a total of more than 90 days, and provided the exterior cladding is maintained in accordance with the cladding manufacturer's instructions and the cladding remains weather-resistant, the IPL Bracing Ply™ is expected to have a serviceable life of at least 50 years. Untreated IPL Bracing Ply™ must only be used on the building interior and must not be exposed to the weather.
- 10.3 Coastal locations can be very corrosive to fasteners, especially coastal locations within distances of up to 500 m of the sea including harbours, or 100 m from tidal estuaries and otherwise as shown in NZS 3604, Figure 4.2. These coastal locations are defined in NZS 3604 as Zone D and stainless steel fasteners must be used. For installation in NZS 3604 Corrosion Zones C and B, hot-dip galvanised steel fasteners complying with the requirements of NZS 3604 may be used.

10.4 Micro-climatic conditions, including geothermal hot spots, industrial contamination and corrosive atmospheres, and contamination from agricultural chemicals and fertilisers can convert a mildly corrosive atmosphere into an aggressive environment for fasteners. The fixing of IPL Bracing Ply™ in areas subject to micro-climatic conditions requires specific design in accordance with NZS 3604, Paragraph 4.2.4 and is outside the scope of this Appraisal.

Maintenance

11.1 IPL Bracing Ply™ will not normally require maintenance. However, if damage occurs to the cladding or underlay protecting the sheet or to the sheet itself, then repairs or replacement must be carried out to ensure the integrity of the system.

Prevention of Fire Occurring

12.1 Separation or protection must be provided to the IPL Bracing Ply™ and associated combustible materials from heat sources such as fireplaces, heating appliances, flues and chimneys. Part 7 of NZBC Verification Method C/VM1 and Acceptable Solution C/AS1, and Acceptable Solution C/AS2 provide methods for separation and protection of combustible materials from heat sources.

External Moisture

- 13.1 When used on the building exterior, IPL Bracing Ply™ must be used behind wall claddings that meet the performance requirements of NZBC Clause E2.
- 13.2 IPL Bracing Ply™ when installed in accordance with the Technical Literature and this Appraisal, will assist in the total cladding system's compliance with NZBC Clause E2.
- 13.3 IPL Bracing Ply™ is suitable for use under wall claddings as a rigid wall underlay as specified in NZBC Acceptable Solution E2/AS1, Table 23 on timber-framed buildings. Refer to Table 2 for material properties.

Table 2: NZBC E2/AS1, Table 23 Requirements

NZBC E2/AS1 Table 23 Rigid Wall Underlay Properties	Property Performance Requirement	IPL Bracing Ply™ Properties
Vapour Resistance	< 7 MN s/g	0.9 MN s/g
Absorbency	> 100 g/m ²	1,650 g/m ²
Water Resistance	> 20 mm	Pass
pH of Extract	≥ 6.0 and ≤ 9.0	Pass

Installation Information

Installation Skill Level Requirements

14.1 All design and building work must be carried out in accordance with the IPL Bracing Ply™ 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.

System Installation

Hold-downs

- 15.1 The end studs of each bracing element must be connected to the bottom plate with a GIB® Handibrac and the supplied screws. The GIB® Handibrac must be fixed to the floor structure with coach screws for timber-framed floors, or cast-in bolts or proprietary fixings for concrete floors.
- 15.2 Intermediate hold-down fixings [bottom plate to floor structure] must be installed as specified in NZS 3604.

IPL Bracing Ply™ Installation

- 15.3 IPL Bracing Ply™ plywood sheets may be cut using a circular saw or hand saw. Holes and cut-outs may be formed by using a hole saw.
- 15.4 Sheets must be dry prior to installation. Cut edges that are left exposed must be sealed in accordance with the Technical Literature.
- 15.5 Prior to fixing IPL Bracing Ply™ sheets, a check must be made to ensure all sheet edges will be supported by framing. At the base of the wall the sheets must finish flush with the underside of the bottom plate or bearer.
- 15.6 IPL Bracing Ply™ sheets must be fixed to the framing with 50 x 2.8 mm hot-dip galvanised flathead nails or 50 x 2.8 mm ringshank stainless steel nails. Nails may either be hand-driven or power-driven. Refer to Paragraph 9.3 for fixing centres and Paragraph 10.3 for fastener material selection.
- 15.7 At vertical joints, IPL Bracing Ply™ sheets must be installed with a minimum 2 mm gap between the sheet edges. Sheets at horizontal joints between floor levels must be installed with a minimum of 15 mm gap between the edges and must be supported over horizontal framing.

Flexible Wall Underlay

- 15.8 A flexible wall underlay must be installed over the IPL Bracing Ply™ sheets in accordance with NZBC Acceptable Solution E2/AS1 and the underlay supplier's instructions. The wall underlay should be run over openings and these left covered until the window and door joinery is ready to be installed.

Flexible Sill and Jamb Tape Installation

- 15.9 The joinery openings must be flashed with flashing tape in accordance with NZBC Acceptable Solution E2/AS1 and the tape supplier's instructions.

Inspections

- 15.10 The Technical Literature must be referred to during the inspection of the IPL Bracing Ply™ installations.

Health and Safety

- 16.1 IPL Bracing Ply™ sheets must be handled in accordance with the Safety Data Sheet for H3.2 CCA treated IPL Bracing Ply™.
- 16.2 When power tools are used for cutting or forming holes, health and safety measures as set out in the Safety Data Sheet must be undertaken because of the amount of dust generated.

Basis of Appraisal

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

Tests

- 17.1 Racking tests were carried out by BRANZ to determine earthquake and wind bracing ratings in accordance with BRANZ Technical Paper P21.
- 17.2 Testing has been carried out by BRANZ to determine the face load pressure resistance of IPL Bracing Ply™ sheets.
- 17.3 Testing to determine the resistance of IPL Bracing Ply™ to water vapour transmission in accordance with AS/NZS 4200.1, resistance to water penetration in accordance with AS/NZS 4201.4 and absorbency in accordance with AS/NZS 4201.6 has been completed by BRANZ.

Other Investigations

- 18.1 Structural and durability opinions have been given by BRANZ technical experts.
- 18.2 Site inspections were carried out by BRANZ to assess the practicability of installation.
- 18.3 The IPL Bracing Ply™ Technical Literature has been examined by BRANZ and found to be satisfactory.



Quality

- 19.1 The manufacture of the IPL Bracing Ply™ has been examined by BRANZ, including methods adopted for quality control. Details regarding the composition of the materials used were obtained by BRANZ and found to be satisfactory.
- 19.2 International Panel and Lumber (West Coast) Ltd are responsible for the quality of IPL Bracing Ply™. The quality control system for the manufacture of the plywood used for the IPL Bracing Ply™ has been assessed and registered as meeting the requirements of AS/NZS 2269 by the Engineered Wood Products Association of Australasia [EWPA].
- 19.3 The timber treatment processes of International Panel and Lumber (West Coast) Ltd have been certified by the New Zealand Timber Preservation Council [NZTPC], WOODMark® Plant Number 127.
- 19.4 Quality of installation on-site of components and accessories supplied by International Panel and Lumber (West Coast) Ltd and the building contractor is the responsibility of the installer.
- 19.5 Designers are responsible for the building design, and building contractors are responsible for the quality of installation in accordance with the instructions of International Panel and Lumber (West Coast) Ltd.

Sources of Information

- AS/NZS 1170:2002 Structural design action - General principles.
- AS/NZS 2269:2012 Plywood - Structural.
- AS/NZS 4200.1:2017 Pliable building membranes and underlays - Materials.
- AS/NZS 4201.4:1994 Pliable building membranes and underlays - Methods of test - Resistance to water penetration.
- AS/NZS 4201.6:1994 Pliable building membranes and underlays - Methods of test - Surface water absorbency.
- 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 3603:1993 Timber structures standard.
- 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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IPL BRACING PLY™



In the opinion of BRANZ, **IPL Bracing Ply™** is 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 **International Panel and Lumber [West Coast] 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. **International Panel and Lumber [West Coast] 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;
 - 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 **International Panel and Lumber [West Coast] Ltd**.
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 **International Panel and Lumber [West Coast] Ltd** or any third party.

For BRANZ

Chelydra Percy

Chief Executive

Date of Issue:

06 October 2021