



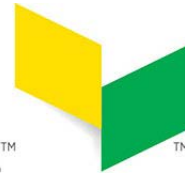
BRANZ Appraised
Appraisal No. 898 [2015]

**USG BORAL
PARTIWALL®
INTERTENANCY WALL
SYSTEMS**

Appraisal No. 898 [2015]

Amended 31 August 2017

USG BORAL
INNOVATION INSPIRED BY YOU.™



BRANZ Appraisals

Technical Assessments of products for building and construction.



USG Boral Building Products NZ

PO Box 11-155
Ellerslie
Auckland 1542
Tel: 0800 874 267
Fax: 0800 332 123
Web: www.usgboral.com
Email: info.nz@usgboral.com



BRANZ

BRANZ
1222 Moonshine Rd,
RD1, Porirua 5381
Private Bag 50 908
Porirua 5240,
New Zealand
Tel: 04 237 1170
branz.co.nz



Product

- 1.1 USG Boral Partiwall® Intertenancy Wall Systems are a range of fire-rated and sound-insulating intertenancy walls for timber-framed household units, utilising USG Boral Shaftliner™, USG Boral Firestop® and other USG Boral plasterboards, Partiwall® clips and Partiwall® steel framing.

Scope

- 2.1 USG Boral Partiwall® Intertenancy Wall Systems have been appraised for use as fire-rated and sound-insulation rated walls between household units within the following scope:
- constructed with timber-framing within the scope of NZS 3604, or to a specific engineering design [refer Paragraph 8.1]; and
 - with a maximum building height of 10.0 m when designed in accordance with NZS 3604; or
 - with a maximum Partiwall® height of 12.0 m when subject to a specific engineering design.

Building Regulations

New Zealand Building Code (NZBC)

- 3.1 In the opinion of BRANZ, USG Boral Partiwall® Intertenancy Wall 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. USG Boral Partiwall® Intertenancy Wall Systems meet the requirements for loads arising from self-weight, imposed gravity loads arising from use, and impact [i.e. B1.3.3 (a), (b) and (j)]. See Paragraphs 8.1 - 8.4.

Clause B2 DURABILITY: Performance B2.3.1 (a) not less than 50 years, B2.3.1 (b) 15 years and B2.3.1 (c) 5 years. USG Boral Partiwall® Intertenancy Wall Systems meet these requirements. See Paragraphs 9.1 - 9.4.

Clause C3 FIRE AFFECTING AREAS BEYOND THE FIRE SOURCE: Performance C3.4 (a) and C3.6. USG Boral Partiwall® Intertenancy Wall Systems meet the requirements by providing passive fire and smoke protection. See Paragraphs 12.1 - 12.2.

Clause F2 HAZARDOUS BUILDING MATERIALS: Performance F2.3.1. USG Boral Partiwall® Intertenancy Wall Systems meet this requirement and will not present a health hazard to people.

Clause G6 AIRBORNE AND IMPACT SOUND: Performance G6.3.1. USG Boral Partiwall® Intertenancy Wall Systems meet this requirement. See Paragraph 15.1.

Technical Specification

General

- 4.1 USG Boral Partiwall® Intertency Wall Systems are primarily based on Shaftliner™ and Firestop® plasterboard for Fire Resistance Ratings. Other USG Boral Plasterboards along with acoustic insulation, are used to provide the internal linings to the household units for acoustic performance.
- 4.2 The USG Boral plasterboards and accessories used with the USG Boral Partiwall® Intertency Wall Systems and supplied or specified by USG Boral Building Products NZ are as follows:

USG Boral Plasterboards

- **Shaftliner™ Plasterboard** is a paper-bound gypsum-plaster core sheet lining material. Shaftliner™ is available in a thickness of 25 mm and a sheet width of 600 mm. The sheets have a formed square edge on the two long sheet edges. Sheets are available in lengths of 3.0 m and 3.6 m. The nominal sheet weight is 20.5 kg/m². Shaftliner™ plasterboard is ivory coloured on the front and rear faces.
- **Firestop® Plasterboard** is a paper-bound gypsum-plaster core sheet lining material. Glass fibre and other additives are added to the core during manufacture. The sheets have a recess on the two long sheet edges. Firestop® has a thickness of 16 mm with a sheet width of 1200 mm. The standard length of the sheet is 2.4 m. The nominal sheet weight is 10.5 kg/m². Firestop® face paper is pink in colour.

Plasterboard Internal Linings

- The following USG Boral plasterboards may be used to provide the internal linings: 10mm USG Boral Sheetrock® Ceiling and Wall, 10 and 13 mm USG Boral MultiStop™4, 10 and 13 mm USG Boral Soundstop®, and 13 and 16 mm USG Fiberock® Aqua-Tough™.

Partiwall® Steel Framing and Fixings

- **Partiwall® H stud** - 25 mm wide galvanized steel H-stud, available in lengths of 3.0 m and 3.6 m.
- **Partiwall® I stud** - 50 mm wide galvanized steel I-stud, available in lengths of 3.0 m and 3.6 m.
- **25 mm Partiwall® track** - 25 mm wide galvanized steel furring channel track, available in lengths of 3.0 m and 3.6 m.
- **51 mm Partiwall® track** - 51 mm wide galvanized steel furring channel track, available in a length of 3.0 m.
- **Partiwall® clip** - 70 mm x 40 mm x 50 mm wide x 1.6 mm thick, aluminium unequal angle, with pre-drilled fixing holes.

Fixings

- **Laminating Screws** - 10 g x 40 mm Type 'L' Laminating Screws.

Accessories

- **USG Boral Firepack™** - mineral wool packer, 5 m x 200 mm x 5 mm thick.

Jointing Compounds

- As specified in the Technical Literature.

- 4.3 System components and accessories for USG Boral Partiwall® Intertency Wall Systems, which are supplied by the building contractor are:

Fixings

- **Steel frame fixing screws** - 10 g x 16mm and 10 g x 30mm Type 'D' drill point wafer head screws.
- **Plasterboard fixing screws** - 6 g x 25 mm and 6 g x 30 mm Type 'W' timber screws.
- **Nail** - 30 mm x 2.5 mm galvanised clouts.
- **Adhesive** - for adhering plasterboard linings to timber framing must comply with AS 2753.
- **Bottom track fixings to concrete** - shot fired masonry nails, minimum 22 mm x 2.5 mm.

Accessories

- **Damp Proof Course** - DPC complying with AS/NZS 2904: 1995.
- **Acoustic Insulation**
 - R2.0 glass-wool wall insulation,
 - Glass-wool acoustic insulation 110 mm thick and with a minimum density of 11 kg/m³, or
 - 90 mm thick glass-wool insulation with minimum density of 24 kg/m³.
- **Fire and acoustic sealant** - Proprietary penetration seals and sealants have not been assessed and are outside the scope of this Appraisal.

Handling and Storage

- 5.1 The best results are achieved when USG Boral 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 contact USG Boral Building Products NZ. Sheets must be carried on edge and not dragged.

Technical Literature

- 6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for USG Boral Partiwall® Intertency Wall 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 USG Boral Partiwall® Intertency Wall Systems are based around a central Shaftliner™ and Firestop® fire barrier with insulated timber framed walls either side which are lined with USG Boral Plasterboards.
- 7.2 USG Boral Partiwall® Intertency Wall Systems provide fire resistance ratings (FRRs) of 60/60/60 and 90/90/90. A number of acoustic rated systems are available using combinations of USG Boral Plasterboards as the internal linings and acoustic insulants. Refer to the Technical Literature for options.
- 7.3 In order to ensure that the Shaftliner™ fire barrier is not damaged by the collapse of the structure on the fire side, Partiwall® aluminium clips are utilised to attach the Shaftliner™ fire barrier to the timber frame on both sides. As the clips on the fire side melt, the Shaftliner™ fire barrier is disconnected from the collapsing structure and is supported by the clips and the structure on the protected side for the specified fire rating period.
- 7.4 USG Boral Plasterboards must not be exposed to temperatures of 52°C or greater for prolonged periods. Refer to appliance and fitting manufacturers for installation details.

Maximum Exposure Period

- 7.5 Exposure of the Shaftliner™ fire barrier to the weather should be kept to a minimum. It must not be exposed for more than one month. The use of tarpaulins, plastic sheeting and other weather protection is recommended in inclement weather conditions to shed water away from the fire barrier. Any tears in the paper surface must be taped with flexible flashing tape to protect the core from moisture damage.

Control Joints

- 7.6 Where control joints are required, the joints must be specifically designed to maintain the integrity of the fire and acoustic rated system.

Structure

Framing

- 8.1 Timber framing must be designed and constructed in accordance with NZS 3604, or to a specific engineering design using NZS 3603 and AS/NZS 1170, with studs at maximum 600 mm centres. The structural design for each specific structure is the responsibility of the building designer.

Bracing

- 8.2 The household units will require bracing systems to resist wind and seismic loads, e.g. by provision of USG Boral Plasterboard Bracing Systems or other verified bracing systems. These bracing systems have not been assessed and are outside the scope of this Appraisal.

Impact Resistance

- 8.3 USG Boral Plasterboards provide adequate resistance to soft body impact, based upon experience of use in domestic and light commercial applications.

Post Fire Strength

- 8.4 The exposed Shaftliner™ will resist a 0.5 kPa wind load in any direction after a fire event as required by NZBC Verification Method B1/VM1 Clause 2.2.4 (iii).

Durability

- 9.1 USG Boral Partiwall® Intertenancy Wall 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.
- 9.2 The building must be maintained weatherproof and USG Boral Partiwall® Intertenancy Wall Systems must be protected from external and internal moisture in accordance with NZBC Clauses E2 and E3 to maintain their FRR for at least 50 years.
- 9.3 The integrity of fire rated sealants and packing must be maintained.
- 9.4 Timber framing treatment must comply with NZBC Acceptable Solution B2/AS1.

Maintenance

- 10.1 Internal linings require no ongoing maintenance, apart from decoration and the repair of any damage.
- 10.2 Any cracks or damage which may occur as a result of events such as exposure to excessive moisture or flooding, local outbreak of fire, wind or earthquake, timber shrinkage, or excessive impact, must be repaired immediately. This may require removal of the linings to inspect the integrity of the Shaftliner™ and Firestop® fire barrier. Repair will include the replacement of any damaged sheets, materials or components.

Prevention of Fire Occuring

- 11.1 Separation or protection must be provided to USG Boral Partiwall® Intertenancy Wall Systems from heat sources such as fire places, 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

- 12.1 Table 1 shows the Material Group Numbers for USG Boral Plasterboards without applied paint or wallpaper finishes. When an applied finish is used over USG Boral Plasterboards, the Material Group Number must be obtained from the manufacturer of the finish product or system, for the complete lining system. USG Boral Plasterboards can be used as internal surface linings where permitted by NZBC Performance Clause C3.4 (a).
- 12.2 In all Risk Groups, where foamed plastics building materials or combustible insulating materials form part of a wall system, the complete system including the internal lining and finishes must achieve a Group Number of not more than three.

12.3 In buildings with a SH Risk Group classification, there are no internal surface finish requirements for USG Boral Plasterboards (with or without an applied finish), unless foamed plastics building materials or combustible insulating materials form part of the wall system.

Fire Resistance Ratings (FRRs)

12.4 USG Boral Partiwall® Intertency Wall Systems can be used to provide FRRs as determined by NZBC Acceptable Solutions C/AS1 - C/AS7 and NZBC Verification Method C/VM2. Refer to the Technical Literature for details of available FRRs.

Table 1. Surface Finish Properties

Product	Material Group Number
USG Boral Firestop®	1-S
USG Boral Sheetrock® Ceiling and Wall	1-S
USG Boral MultiStop™4	1-S
USG Boral Soundstop®	1-S
USG Fiberock® Aqua-Tough™	1-S

Structural Stability During Fire

13.1 In order to satisfy the requirements of NZBC C6 Structural Stability, designers must ensure that fire rated elements are supported by building elements having at least the same FRR as the fire rated element they are supporting.

Internal Moisture

14.1 USG Boral Plasterboards are intended for use in dry internal situations and must not be used where they are likely to be exposed to liquid water or be installed where extended exposures to humidity above 90% RH can reasonably be expected.

Airborne and Impact Sound

15.1 The inter-tenancy provisions of NZBC G6 for wall elements can be achieved when a USG Boral Partiwall® Intertency Wall System with a minimum STC rating of 55 is installed in accordance with the Technical Literature. Refer to the Technical Literature for available options.

Installation Information

Installation Skill Level Requirement

16.1 Installation of USG Boral Partiwall® Intertency Wall Systems must be completed by, or under the supervision of a Licensed Building Practitioner with the relevant Licence Class, in accordance with the Technical Literature and this Appraisal.

General

17.1 USG Boral Partiwall® Intertency Wall Systems must be installed in accordance with the Technical Literature.

17.2 Temporary support of the timber wall framing must be provided during installation as the Shaftliner™ panels may attract high wind forces.

17.3 Exposure of the Shaftliner™ panels to the weather should be kept to a minimum. Where they are likely to be exposed to inclement weather, waterproof covers such as tarpaulins must be used to keep them dry.

Wall Framing

- 18.1 Construction details for the framing, in particular type, dimensions and spacings, must be strictly in accordance with the specifications outlined in the Technical Literature and the specific design documentation for the building project.
- 18.2 All framing must be plumb, level and in true alignment.
- 18.3 USG Boral Building Products NZ specifies timber framing with a moisture content less than 18% at the time interior linings are installed. The use of kiln-dried timber is recommended.

Fire Barrier Installation

- 19.1 After the timber framing on one side has been erected, the Shaftliner™ panels and Partiwall® steel frame are installed 20 to 40 mm away from the timber frame.
- 19.2 The Partiwall® track for the Shaftliner™ panels must be fixed to a concrete floor foundation using power actuated fasteners at both ends and at 600 mm maximum spacing. Partiwall® track ends at joints must be spaced 6 mm apart to allow for drainage of construction water. A continuous bead of fire/acoustic sealant is applied at the track/floor junction on one side.
- 19.3 Shaftliner™ panels and Partiwall® studs are installed progressively. To enable later fixing of Partiwall® Clips, cut the Shaftliner™ panel to width so that its edge is offset at least 50 mm horizontally from a timber stud. The first horizontal joint may be situated above first floor level. Partiwall® Clips are fastened to each Partiwall® stud at maximum 2.7 m centres vertically on the completed side of the timber framing before the other timber framing side is installed.
- 19.4 Partiwall® clips must be fixed to Partiwall® studs with two 10 g x 16 mm drill point wafer head screws, and to wall plates or noggings with two 30 mm x 2.5 mm galvanised clouts or 6 g x 25 mm timber screws.
- 19.5 The vertical edge of the Shaftliner™ panels which abuts an external wall (with the required 20-40 mm gap) must be supported with Partiwall® track which is screw fixed to the base and top Partiwall® track.
- 19.6 At mid-floors a layer of 16 mm Firestop® is laminated to one side ensuring minimum 150 mm overlap above floor and below ceiling level, with 10 g x 40 mm type laminating screws at maximum 400 mm vertical and horizontal centres. Where Partiwall® clips are fixed over 16 mm Firestop®, they must be fixed to the Partiwall® studs with two 10 g x 30 mm drill point wafer head screws.
- 19.7 As the second wall of timber framing is constructed the Partiwall® clips must be fastened to the timber frame and to every Partiwall® stud directly opposite the previously installed Partiwall® clips which have been fixed to the first timber wall frame.
- 19.8 Upper storey Shaftliner™ panels are installed by first fixing a section of Partiwall® track, back-to-back with the top track of the lower storey fire barrier. Partiwall® tracks must be fastened together using 10 g x 16 mm drill point wafer head screws at both ends and at maximum 600 mm centres.
- 19.9 Upper storey Partiwall® studs must align with the lower storey Partiwall® studs.
- 19.10 Shaftliner™ panels are continued into the roof space, with Partiwall® studs fixed to roof framing and the panels shaped to fit the roof profile. Allowance must be made for framing member shrinkage and roof deflection. The Shaftliner™ panels are capped with Partiwall® track which must be fastened to the perimeter track with 10 g x 16 mm drill point screws.
- 19.11 To maintain the fire and sound rating in the roof space a single layer of 16 mm Firestop® Plasterboard must be shaped to the roof profile and fixed to one side of the Shaftliner™ panels at 400 mm centres horizontally and vertically. Partiwall® Clips must be fixed to Partiwall® studs through the Firestop® Plasterboard with two 10 g x 30 mm drill point wafer head screws.
- 19.12 Particular attention must be paid to ensure all voids at wall perimeters are sealed with Firepack insulation.

Internal Linings

- 20.1 Prior to installation of the internal linings, insulation is fitted to the timber framed cavity as required to achieve the desired acoustic rating.
- 20.2 USG Boral Plasterboard linings are fitted to the framing either side of the fire barrier in conventional fashion. A continuous bead of fire/acoustic sealant is applied around the plasterboard lining, on both sides of the wall. All joints in single or outer layers of multiple layer linings must be paper-tape reinforced. A minimum of two layers of bedding compound are required to achieve the stated fire resistance rating [FRR]. Inner sheet joints of multiple layer linings do not require stopping.

Health and Safety

- 21.1 Dust resulting from the sanding of boards, jointing or finishing compounds may be a respiratory irritant, therefore the use of a suitable face mask is recommended. Where sealants, insulation and other materials are used, the instructions of the manufacturer must be followed.

Basis Of Appraisal

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

Tests

- 22.1 Testing to determine the FRR of USG Boral Partiwall® Intertency Wall Systems and penetrations has been completed by CSIRO and Exova Warrington in accordance with AS 1530.4.
- 22.2 Airborne sound tests have been completed by CSIRO and RMIT.
- 22.3 USG FibreRock® Aqua-Tough™ and the plasterboard liners have been subject to an accelerated aging regime by BRANZ to assess their long term properties.
- 22.4 The properties of USG Shaftliner™ and Firestop® have been assessed by BRANZ before and after natural weather exposure and found to be satisfactory.
- 22.5 Cone calorimeter tests to ISO 5660 have been carried out by BRANZ.

Investigations

- 23.1 Opinions on the fire resistance of variations to systems tested in accordance with AS 1530.4 were given by BRANZ experts.
- 23.2 An opinion on the likely sound insulation performance of USG Boral Partiwall® Intertency Wall Systems has been given by Renzo Tonin & Associates.
- 23.3 The USG Boral Partiwall® Technical Literature has been examined by BRANZ and found to be satisfactory.
- 23.4 Site visits were carried out by BRANZ to assess the practicability of the installation of the systems, and to view completed installations.
- 23.5 An assessment was made of the durability of the systems by BRANZ technical experts and found to be satisfactory.
- 23.6 USG Boral plasterboards have been assessed for the following properties: MOR, MOE, nail pull resistance, edge hardness, hard and soft body impact resistance and humidified deflection.

Quality

- 24.1 The manufacturing process of the Australian manufacturer USG Boral Building Products Pty Ltd and details of the quality and composition of the materials, have been examined by BRANZ and found to be satisfactory.
- 24.2 The quality management systems of USG Boral Building Products Pty Ltd have been assessed and registered by SAI Global as meeting the requirements of ISO 9001, Registration No. QEC0400.
- 24.3 The manufacture of USG FibreRock® Aqua-Tough™ has not been examined by BRANZ, but details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory. BRANZ has taken note of product certification covering quality aspects associated with the product. BRANZ also undertakes an ongoing review of product quality on an inwards goods basis.



- 24.4 USG Boral Building Products NZ is responsible for the quality of the product supplied.
- 24.5 The quality of the application and finish on site is the responsibility of the installation, stopping and finishing contractors.
- 24.6 Designers are responsible for the design of buildings.
- 24.7 Building owners are responsible for the maintenance in accordance with the instructions of USG Boral Building Products NZ.

Sources of Information

- AS 1530: 2005 Part 4 Fire resistance tests on elements of construction.
- AS/NZS 1170: 2002 Structural design actions.
- AS/NZS 2588: 1998 Gypsum plasterboard.
- ISO 5660 Reaction-to-fire tests - heat release, smoke production and mass loss rate - Part 1: Heat release rate [cone calorimeter method] and Part 2: Smoke production rate [dynamic measurement].
- 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.
- New Zealand Building Code Clauses C1 - C6 Protection from Fire, Department of Building and Housing, 10 April 2012.
- The Building Regulations 1992.

Amendments

Amendment No. 1, dated 31 August 2017.

This Appraisal has been amended to add USG Boral Multistop™4 and to omit 10 mm Fiberock® Aqua-Tough™ and 10 and 13 mm USG Boral Wet Area Board as internal wall linings.




In the opinion of BRANZ, **USG Boral Partiwall® Intertenancy Wall 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 **USG Boral Building Products NZ**, 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. **USG Boral Building Products NZ:**
 - 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 **USG Boral Building Products NZ**.
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 **USG Boral Building Products NZ** or any third party.

For BRANZ



Chelydra Percy

Chief Executive

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