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SYSTEMS+

H

MULTI-RESIDENTIAL

INNOVATIVE SYSTEMS SOLUTIONS

INTRODUCTION

USG Boral offers a range of BCA compliant fire and acoustic rated building systems for the Multi-Residential sector. These include:

- **Partiwall**® separating walls for Class 1 attached dwellings
- **IntRwall**® separating walls for Class 2 and 3 buildings with concrete slabs
- **Multiframe**™ timber framed construction system for low rise buildings Class 2 and 3.

A brief overview of the above systems and BCA requirements for Multi-Residential buildings is provided below. For more information on various systems refer to the relevant USG Boral publications and **usgboral.com**

BCA REQUIREMENTS

NOTE

Extracts of BCA requirements provided below are intended for guidance only and should not be used as a substitute for professional advice. Refer to BCA for the full set of performance requirements for Multi-Residential buildings.

FIRE RESISTANCE

FIRE RESISTANCE LEVELS

In accordance with BCA, certain elements in multi-residential buildings must achieve stipulated Fire Resistance Levels (FRL).

Class 1 Buildings

Separating walls between Class 1 buildings (ie attached villa units and townhouses) must have an FRL of not less than 60/60/60.

Class 2 and 3 Buildings

Building elements in Class 2 and 3 buildings (ie apartments, boarding houses, hotels) must have minimum FRLs depending the type of fire resisting construction ranging from Type A (the most fire resistant) to Type C (the least fire resistant):

TABLE H1: **TYPES OF FIRE RESISTING CONSTRUCTION FOR CLASS 2 AND 3 BUILDINGS**

RISE IN STOREYS	TYPE OF CONSTRUCTION
4 or more	A
3	A
2	B
1	C

Refer to BCA for:
- Calculations of rise in storeys.
- Treatment of buildings with multiple classifications.
- Concession for Class 2 and 3 Buildings.

Minimum FRL's for Class 2 and 3 buildings are outlined in tables H3 and H4

Class 9c Buildings

Refer to the BCA for fire resistance requirements for Class 9c buildings.

FIRE HAZARD PROPERTIES OF LINING MATERIALS

Under the BCA, wall and ceiling lining materials are assigned a group number from Group 1 (best performing) to Group 4 (worst performing) based on their Fire Hazard Properties.

The following table outlines permitted group numbers of wall and ceiling lining materials in Class 2 buildings:

TABLE H2: **PERMITTED GROUPS FOR WALL AND CEILING MATERIALS**

CLASS OF BUILDING	FIRE-ISOLATED EXITS & FIRE CONTROL ROOMS	PUBLIC CORRIDORS		SOLE OCCUPANCY UNITS		OTHER AREAS
	WALL/ CEILING	WALL	CEILING	WALL	CEILING	WALL/ CEILING
Unsprinklered	1	1, 2	1, 2	1, 2, 3	1, 2, 3	1, 2, 3
Sprinklered	1	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3	1, 2, 3

SMOKE-PROOF WALLS

Public corridors in Class 2 or 3 buildings must be divided at intervals of not more than 40m with smoke-proof walls complying with Specification C2.5 of BCA.

STRUCTURAL TESTS FOR LIGHTWEIGHT CONSTRUCTION

Fire-resisting walls of lightweight construction must satisfy the structural test criteria outlined in Specification C1.8 of BCA.

NON-COMBUSTIBLE MATERIALS

Under Clause C1.12 of BCA, plasterboard is deemed to be a non-combustible material. Where Class 2 building is constructed using timber framing, insulation in the cavity of a fire-resisting wall must be non-combustible.

» INTRODUCTION

TABLE H3: **MINIMUM FRLs OF BUILDING ELEMENTS IN A CLASS 2 AND 3 BUILDING WITHOUT SPRINKLERS**

BUILDING ELEMENT	TYPE OF FIRE RESISTING CONSTRUCTION				
	TYPE A		TYPE B		TYPE C
	LOAD BEARING	NON-LOAD BEARING	LOAD BEARING	NON-LOAD BEARING	LOAD BEARING
External wall (including any column and other building element incorporated therein) or other external building element, where the distance from any fire-source feature to which it is exposed is:					
Less than 1.5m	90/90/90	–/90/90	90/90/90	–/90/90	90/90/90
1.5m to less than 3m	90/60/60	–/60/60	90/60/30	–/60/30	–/–/–
3m to less than 9m	90/60/30	–/–/–	90/30/30	–/–/–	–/–/–
9m to less than 18m	90/60/30	–/–/–	90/30/–	–/–/–	–/–/–
18m or more	90/60/30	–/–/–	–/–/–	–/–/–	–/–/–
External Column (not incorporated in an external wall) Distance from a fire-source feature:					
Less than 1.5m	90/–/–	–/–/–	90/–/–	–/–/–	90/–/–
1.5m to less than 3m	90/–/–	–/–/–	90/–/–	–/–/–	–/–/–
3m or more	–/–/–	–/–/–	–/–/–	–/–/–	–/–/–
Internal Walls					
Fire-resisting lift shafts	90/90/90	–/90/90	90/90/90	–/–/–	–/–/–
Fire-resisting stair shafts	90/90/90	–/90/90	90/90/90	–/90/90	60/60/60
Bounding public corridors, public lobbies and the like	90/90/90	–/60/60	60/60/60	–/60/60	60/60/60
Between or bounding sole-occupancy units	90/90/90	–/60/60	60/60/60	–/60/60	60/60/60
Ventilating, pipe, garbage and like shafts not used for the discharge of hot products of combustion	90/90/90	–/90/90	–/–/–	–/–/–	–/–/–
Other Loadbearing Internal Walls	90/–/–	NA	60/–/–	NA	–/–/–
Loadbearing Internal Columns	90/–/–	NA	60/–/–	NA	–/–/–
Internal Beams	90/–/–	NA	Ref BCA	NA	Ref BCA
Floors	90/90/90	NA	Ref BCA	NA	NA

- Where fire rated internal wall extends to the underside of a ceiling immediately below the roof, such ceiling must have Resistance to Incipient Spread of Fire (RISF) of not less than 60 minutes.
- Where the lowest storey is used solely for car parking or some other ancillary purpose, such storey must be separated from the storey above by construction having an FRL of not less than 90/90/90.
- Refer to BCA for concessions for Class 2 and 3 buildings without sprinklers.

» INTRODUCTION

TABLE H4: **MINIMUM FRLs OF BUILDING ELEMENTS IN A CLASS 2 AND 3 BUILDING WITH SPRINKLERS**

BUILDING ELEMENT	TYPE OF FIRE RESISTING CONSTRUCTION				
	TYPE A		TYPE B		TYPE C
	LOAD BEARING	NON-LOAD BEARING	LOAD BEARING	NON-LOAD BEARING	LOAD BEARING
External wall (including any column and other building element incorporated therein) or other external building element Distance from a fire-source feature:					
Less than 1.5m	90/90/90	–/90/90	90/90/90	–/90/90	90/90/90
1.5m to less than 3m	90/60/60	–/60/60	90/60/30	–/60/30	–/–/–
3m to less than 9m	90/60/30	–/–/–	90/30/30	–/–/–	–/–/–
9m to less than 18m	90/60/30	–/–/–	90/30/–	–/–/–	–/–/–
18m or more	90/60/30	–/–/–	–/–/–	–/–/–	–/–/–
External Column (not incorporated in an external wall) Distance from a fire-source feature:					
Less than 1.5m	90/–/–	–/–/–	90/–/–	–/–/–	90/–/–
1.5m to less than 3m	90/–/–	–/–/–	90/–/–	–/–/–	–/–/–
3m or more	–/–/–	–/–/–	–/–/–	–/–/–	–/–/–
Internal Walls					
Fire-resisting lift shafts	60/60/60	–/–/–	60/60/60	–/–/–	–/–/–
Fire-resisting stair shafts	60/60/60	–/–/–	60/60/60	–/–/–	60/60/60
Bounding public corridors, public lobbies and the like	60/60/60	–/–/–	60/60/60	–/–/–	60/60/60
Between or bounding sole-occupancy units	60/60/60	–/–/–	60/60/60	–/–/–	60/60/60
Ventilating, pipe, garbage and like shafts not used for the discharge of hot products of combustion	60/60/60	–/–/–	–/–/–	–/–/–	–/–/–
Other Loadbearing Internal Walls	60/–/–	NA	60/–/–	NA	–/–/–
Loadbearing Internal Columns	90/–/–	NA	60/–/–	NA	–/–/–
Internal Beams	90/–/–	NA	Ref BCA	NA	Ref BCA
Floors	60/60/60	NA	Ref BCA	NA	Ref BCA

- Where fire rated internal wall extends to the underside of a ceiling immediately below the roof, such ceiling must have Resistance to Incipient Spread of Fire (RISF) of not less than 60 minutes.
- Where the lowest storey is used solely for car parking or some other ancillary purpose, such storey must be separated from the storey above by construction having an FRL of not less than 90/90/90.
- Refer to BCA for concessions for Class 2 and 3 buildings with sprinklers.

» INTRODUCTION

ACOUSTICS

In accordance with BCA, separating walls and floors in multi-residential buildings must provide minimum levels of acoustic isolation as summarised below:

TABLE H5: **CLASS 9C BUILDINGS**

BUILDING ELEMENT	IMPACT SOUND INSULATION (Separate Leaves)	R_w
Floor	NA	45
Wall separating sole occupancy units or sole occupancy unit from a bathroom, sanitary compartment (not being associated with ensuite), plant room or utilities room	No	45
Wall separating sole occupancy unit from kitchen or laundry	Yes	45

TABLE H6: **CLASS 1 BUILDINGS**

WALL TYPE	DISCONTINUOUS CONSTRUCTION	R_w+C_{tr}
Separating wall between bathroom, sanitary compartment, laundry or kitchen and habitable room (other than kitchen) in adjoining Class 1 building	Yes	50
In all other cases to those listed above	No	50
Duct, soil, waste or water supply pipe or storm water pipe that passes through a separating wall between class 1 buildings if the adjacent room is a habitable room (other than a kitchen)	No	40
As above, if the adjacent room is a kitchen or any other room	No	25

TABLE H7: **SUMMARY OF BCA ACOUSTIC REQUIREMENTS FOR FLOORS, WALLS AND SERVICES IN CLASS 2 AND 3 BUILDINGS**

APPLICATION	BCA DEEMED-TO-SATISFY PROVISION (Laboratory performance)				BCA VERIFICATION METHOD (in-situ performance)		
	R_w (not less than)	R_w+C_{tr} (not less than)	IMPACT SOUND INSULATION (discontinuous construction, walls only)	$L_{n,w}+C_I$ (not more than – floor only)	$D_{nt,w}$ (not less than)	$D_{nt,w}+C_{tr}$ (not less than)	$L_{n,w}+C_I$ (not more than – floor only)
Floors separating sole-occupancy units	–	50	–	62	–	45	62
Floors separating a sole-occupancy unit from a plant room, lift shaft, stairway, public corridor, public lobby or the like, or parts of a different classification	–	50	–	62	–	45	62
Walls separating sole-occupancy units ie habitable rooms adjoining, or, non-habitable rooms adjoining	–	50	No	–	–	45	–
Walls separating a sole-occupancy unit from a stairway, public corridor, public lobby or the like	50	–	No	–	45	–	–
Walls separating a sole-occupancy unit from a plant room or lift shaft	50	–	Yes	–	45	–	–
Walls separating a bathroom, sanitary compartment, laundry or kitchen in one sole-occupancy from a habitable room (other than a kitchen) in an adjoining unit	–	50	Yes	–	–	45	–
Duct, soil, waste or water supply pipe, including a duct or pipe that is located in a wall or floor cavity, that serves or passes through more than one sole-occupancy unit if the adjacent room is a habitable room (other than a kitchen)	–	40	–	–	–	–	–
Duct, soil, waste or water supply pipe, including a duct or pipe that is located in a wall or floor cavity, that serves or passes through more than one sole-occupancy unit if the adjacent room is a kitchen or non-habitable room	–	25	–	–	–	–	–

NOTES:
Refer to General Information - Acoustics for:
- Explanation of various sound insulation terms.
- Definition of discontinuous construction.
- Sound insulation ratings of services.

» INTRODUCTION

THERMAL INSULATION

Under the Deemed-to-Satisfy provisions of the Energy Efficiency requirements of the BCA, walls, roofs and ceilings forming part of a building envelope of a Class 1 or 2 building must achieve the minimum total R-values for various Climate Zones as outlined in Tables H8 and H9:

TABLE H8: **MINIMUM *R* VALUES FOR CLASS 1 BUILDINGS**

CLIMATE ZONE	EXAMPLE CITY	ROOFS AND CEILINGS			EXTERNAL WALLS
		RED, GREEN, DARK GREY	LIGHT GREY, YELLOW	LIGHT CREAM, OFF WHITE	
1	Darwin	5.1	4.6	4.1	2.8
2	Brisbane	5.1	4.6	4.1	2.8
3	Alice Springs	5.1	4.6	4.1	2.8
4	Broken Hill, Mildura	5.1	4.6	4.1	2.8
5	Sydney East, Adelaide, Perth	5.1	4.6	4.1	2.8
6	Melbourne, Sydney West, Ballarat	5.1	4.6	4.1	2.8
7	Canberra, Hobart	5.1	4.6	4.1	2.8
8	Mount Buller	6.3	6.3	6.3	3.8

TABLE H9: **MINIMUM *R* VALUES FOR CLASS 2 BUILDINGS**

CLIMATE ZONE	EXAMPLE CITY	ROOFS AND CEILINGS			INTERNAL FLOORS	EXTERNAL WALLS
		RED, GREEN, DARK GREY	LIGHT GREY, YELLOW	LIGHT CREAM, OFF WHITE		
1	Darwin	4.2	3.7	3.2	2.0	3.3
2	Brisbane	4.2	3.7	3.2	2.0	3.3
3	Alice Springs	4.2	3.7	3.2	2.0	3.3
4	Broken Hill, Mildura	4.2	3.7	3.2	2.0	2.8
5	Sydney East, Adelaide, Perth	4.2	3.7	3.2	2.0	2.8
6	Melbourne, Sydney West, Ballarat	3.2	3.2	3.2	2.0	2.8
7	Canberra, Hobart	3.7	3.7	3.7	2.0	2.8
8	Mount Buller	4.8	4.8	4.8	3.5	3.8

Notes to Tables H8 and H9
Refer to the BCA for:
- Full set of Deemed-to-Satisfy Energy Efficiency provisions
- Outline of Climate Zones
- Definition of a building envelope for the purposes of thermal design
- Thermal construction compliance and installation requirements
- Adjustments of minimum R-values for roofs and ceilings to account for loss of ceiling insulation due to exhaust fans, flues, recessed downlights, etc
- Reduction of minimum R-value requirements for external walls to account for their thermal mass, orientation, shading and composition.

WET AREAS

Wet areas as defined in BCA is an area within a building supplied with water from a water supply system and includes bathrooms, showers, laundries and sanitary compartments.

According to BCA, building elements in wet areas must be waterproof or water resistant depending on the location within a wet area and must comply with AS 3740 *Waterproofing of Domestic Wet Areas.*

» INTRODUCTION

USG BORAL MULTI-RESIDENTIAL SYSTEMS

PARTIWALL®

DESCRIPTION

USG Boral Partiwall is a family of separating wall systems for Class 1 buildings.

Purpose-designed to suit Australian construction techniques, Partiwall is a twin stud wall system incorporating a 25mm Shaftliner plasterboard fire barrier within the wall cavity. Cavity insulation is placed on one or both sides of the wall as required to achieve stated acoustic ratings.

Shaftliner panels are held in position by lightweight H-studs that are fixed to timber framing on both sides with aluminium clips. In the case of fire, aluminium clips on the fire side will melt, while the Shaftliner fire barrier is supported by, and provides protection to the structure on the opposite side.

Figure H1: **Partiwall System PWT60.1**

FEATURES AND BENEFITS

- No wet trades required.
- No additional trades required at framing stage.
- Permits easy incorporation of services and service penetrations in internal linings without the need for fire treatment.
- Wall linings are installed at the plastering stage as per normal installation specifications.

NOTE

Partiwall system is designed to provide fire protection to the adjacent dwelling and not to dwellings above or below. As such, Partiwall system is not suitable for use in timber framed Class 2 or 3 buildings.

DESIGN OPTIONS

Partiwall systems are available in three basic fire rated configurations:

TABLE H10: **PARTIWALL SYSTEM TYPES**

SYSTEM TYPE	FIRE BARRIER	FRL
PWT60.1	1x25mm SHAFTLINER	60/60/60
PWT90.1	1x25mm SHAFTLINER + 1x16mm FIRESTOP	90/90/90
PWT90.2	2x25mm SHAFTLINER	90/90/90

All fire rated configurations are available with a wide range of outer linings, including hybrid linings with different impact and/or water resistance properties on each side of the wall.

All Partiwall systems listed in this manual achieve acoustic ratings equal to or exceeding R_w+C_{tr}= 50 and provide acoustic impact isolation as defined in the BCA (Discontinuous Construction).

While only timber framed Partiwall systems have been listed in this manual, Partiwall is also available in steel framed configurations. Contact USG Boral for more information.

MATERIALS

FIRE BARRIER

- 25mm Shaftliner
- 25mm H-studs or 50mm I-studs
- Rondo 25mm or 50mm steel track
- Partiwall aluminium clips
- USG Boral Firepack® mineral wool packer.

LININGS

- 10mm/13mm Soundstop plasterboard
- 10mm/13mm Impactstop plasterboard
- 10mm/13mm Wet Area plasterboard
- 10mm Fiberock
- 6mm Villaboard® fibre cement.

» INTRODUCTION

INSULATION

- R2.0 Pink Wall Batts® 90mm glasswool by Fletcher Insulation
- 110mm USG Boral Partiwall Acoustic Batt
- 90mm Pink® Acousti-Therm® HD glasswool 24kg/m^3 by Fletcher Insulation.

SEALANT

H.B. Fuller Firesound sealant.

FASTENERS

Refer Partiwall brochure for fastener types used in construction of Partiwall system.

DESIGN CONSIDERATIONS

MAXIMUM HEIGHTS AND LOADS

- Overall height of Shaftliner fire barrier must not exceed 12.0m.
- Spacing between aluminium clips supporting H-studs or I-studs must not exceed 3.0m vertically and 600mm horizontally.
- Timber framing is to be designed for normal service conditions and must comply with AS 1684 *Timber Framed Construction.*
- Partiwall is suitable for wind classification N1 and N2 as determined by AS 4055 *Wind Loads for Housing*. Where Partiwall is proposed for higher wind classification areas contact USG Boral for advice.

FIRE RATING

- Linings in the occupancy areas do not need be fire rated and are constructed using the normal installation and finishing methods outlined in USG Boral Plasterboard Installation Manual.
- Normal service penetrations are allowed through outer linings and are not required to be fire rated.
- Service penetrations through Shaftliner fire barrier are allowed only in the roof space (refer Partiwall brochure for details of approved penetrations). There should be no other penetrations through the fire barrier.
- Use only the specified Partiwall aluminium clips to attach the H-studs or I-studs to framing members. Other than the clips, there should be no attachments to the fire barrier.

ACOUSTICS

- All Partiwall systems outlined in this manual are covered by acoustical opinion RT&A TE-405-05F19 from Acoustical Consultants Renzo Tonin & Assoc.
- Partiwall® satisfies BCA acoustic requirements for separating walls of $R_w+C_{tr}=50$ and acoustic impact isolation, and $R_w+C_{tr}=25$ and $R_w+C_{tr}=40$ acoustic separation of adjoining soil and waste pipes within the wall cavity. To maintain acoustic performance, service pipes must not be in contact with the Shaftliner fire barrier.
- Small penetrations in outer linings (ie switches, power points, light fittings and pipes) do not need to be acoustically sealed, however Shaftliner fire barrier base and internal lining junctions with floors must be sealed with H.B. Fuller Firesound sealant.
- Stair stringers and treads should be kept clear of the separating wall in order to reduce the likelihood of stair impact sound travelling through the wall.

WET AREAS

Wet areas (as defined in the BCA) must be waterproofed as per the wet area details contained in USG Boral Installation Manual.

Partiwall Systems extending into wet areas must incorporate water resistant linings.

INSTALLATION

Partiwall system must be installed strictly in accordance with USG Boral installation specifications in order to achieve design fire and acoustic ratings. Refer to Partiwall brochure for installation specifications.

» INTRODUCTION

INTRWALL®

DESCRIPTION

IntRwall system is a non-load bearing separating wall system utilising 25mm Shaftliner plasterboard fire barrier with various configurations of outer linings on both sides. Cavity insulation is placed on one or both sides of the wall as required to achieve stated acoustic ratings.

Shaftliner panels are held in position by light gauge steel I-studs or H-studs.

Figure H2: **IntRwall System IW60.1**

FEATURES AND BENEFITS

- A simple, panelised lightweight system that can be installed by a plastering contractor.
- All components are manually handled and do not require heavy lifting equipment.
- Easy inspection of acoustic and fire sealing.
- Services can be easily incorporated in the wall cavities.
- If required, the stud centres can be reduced so that the system can be used in areas subject to higher than normal pressures.

DESIGN OPTIONS

IntRwall systems are available in seven basic configurations with Fire Resistance Levels up to –/120/120 and acoustic ratings up to $R_w+C_{tr}=59$ with acoustic impact isolation.

Various IntRwall configurations represent different options in regard to the type and fixing of outer linings to suit fire rating and services cavity requirements.

Each configuration also provides a number of options in regard to impact and moisture resistance of outer linings on each side of the wall.

MATERIALS

The following materials are used in USG Boral IntRwall systems:

PLASTERBOARD

- 25mm Shaftliner plasterboard
- 13mm Firestop plasterboard
- 13mm Multistop plasterboard
- 13mm SHEETROCK Brand Standard plasterboard
- 13mm Regular plasterboard
- 13mm Wet Area plasterboard
- 13mm Soundstop plasterboard
- 10mm Fiberock
- 6mm Villaboard® fibre cement.

RONDO STEEL COMPONENTS

- 50mm I-stud
- 25mm H-stud
- 64mm C-stud
- 51mm Deflection Head track
- 35x35x0.75mm angle
- 28mm Furring Channel
- 237 Fixing Clip.

INSULATION

- 30mm, 75mm and 90mm Pink Partition 11kg/m^3 glasswool by Fletcher Insulation
- 75mm and 90mm Polyester insulation 14kg/m^3 density.

SEALANTS AND PACKERS

- H.B. Fuller Firesound sealant
- IBS intumescent rod by Promat.

FASTENERS

Refer to IntRwall brochure for fasteners used in installation of the system.

» INTRODUCTION

DESIGN CONSIDERATIONS

FIRE RATING

- IntRwall system IW90.1A has been fire tested at CSIRO laboratories at North Ryde in Sydney and system IW60.1B has been tested at Warrington Fire Research facility in Melbourne. Refer to IntRwall tables for fire test reports and assessments numbers for various IntRwall systems.
- Penetrations in single layer Shaftliner systems are not permitted.
- Services penetrations in double-layer Shaftliner fire barrier and/or fire resistant outer linings must be treated to maintain fire rating. Refer IntRwall brochure for details.
- Services penetrations in non-fire resistant outer linings are not required to be fire rated.
- Where IBS rod is specified in the top track, it must be installed in order to achieve the stated Fire Resistance Levels.

STRUCTURAL

The IntRwall system has been tested in USG Boral NATA accredited laboratory in Port Melbourne and satisfies the requirements of the BCA Specification C1.8 to a maximum height of 3.0m. For greater wall heights refer to USG Boral.

System IW90.1 meets BCA serviceability requirements for walls of shafts and fire isolated exits (max deflection L/240 @ 350Pa lateral pressure). All IntRwall systems meet BCA requirements for walls generally (max deflection L/240 @ 250Pa lateral pressure).

For maximum heights of independent studs in IntRwall systems refer to Steel Stud Walls Lined One Side.

NOTE

In high-rise apartment construction, confirmation of internal design pressures should be obtained from the project Structural Engineer, especially where there are large openings such as sliding glass doors onto balconies. Consult USG Boral for stud sizes, heights and spacing for design pressures other than those specified above.

ACOUSTICS

IntRwall system has been the subject of a series of acoustic tests at the CSIRO Acoustic Laboratory at Highett, Victoria.

All IntRwall systems outlined in this manual are covered by Acoustical Opinion RT&A TE405-05F20 from Acoustic Consultants Renzo Tonin & Assoc.

IntRwall systems with free standing framing on either side satisfy BCA Discontinuous Construction requirement where separating wall must provide impact sound isolation.

If services (duct, soil, waste or water supply pipe) are to be located within an IntRwall system and the adjacent dwelling is a habitable room (other than a kitchen), minimum construction on the adjacent dwelling's side in order to achieve BCA acoustic isolation requirement of $R_w+C_{tr}=40$ must be as follows:

- 13mm Regular plasterboard (or heavier)
- 64mm free-standing studs
- 20mm gap between Shaftliner barrier and free standing studs
- 75mm Glasswool insulation 11kg/m^3 or 75mm Polyester insulation 14kg/m^3

All IntRwall systems achieve minimum $R_w+C_{tr}=25$ required for separation of services where the adjacent room is a kitchen or non-habitable room.

WET AREAS

Wet areas (as defined in the BCA) must be waterproofed as per the wet area details contained in USG Boral Installation Manual.

IntRwall Systems extending into wet areas must incorporate water resistant linings.

LIMITATIONS

- IntRwall is not suitable for use in lift shafts or in other applications where it would be subjected to cyclical loading.
- Independent studs must be checked for pressure and other imposed loads (including shelf loads) as determined by the Project Structural Engineer.
- Penetrations in Shaftliner panels are not permitted unless it is a tested system. Contact USG Boral for further information.

INSTALLATION

IntRwall system must be installed strictly in accordance with USG Boral installation specification in order to achieve design fire and acoustic ratings. Refer to IntRwall brochure for installation specification and details.

» INTRODUCTION

MULTIFRAME™

DESCRIPTION

Multiframe is a family of timber framed wall and ceiling systems satisfying BCA Fire Resistance and Acoustic requirements for low rise multi-residential buildings Class 2 and 3 (refer to BCA for height restrictions for timber framed Multi-Residential buildings).

DESIGN OPTIONS

Multiframe includes a range of wall and ceiling systems as outlined below. Refer the relevant sections of this manual for configurations and acoustic ratings of various systems.

TABLE H11: **SEPARATING WALLS**

SYSTEM TYPE	NON-LOAD BEARING FRL	LOAD BEARING FRL
TT60.6	–/60/60	60/60/60
TT90.1	–/90/90	90/90/90
TT120.1	–/120/120	120/120/120

TABLE H12: **CORRIDOR WALLS**

SYSTEM TYPE	NON-LOAD BEARING FRL	LOAD BEARING FRL
TT60.6	–/60/60	60/60/60
TT90.1	–/90/90	90/90/90
TF90.1	–/90/90	90/90/90
TF120.1	–/120/120	120/120/120

TABLE H13: **LOAD BEARING INTERNAL WALLS**

SYSTEM TYPE	NON-LOAD BEARING FRL	LOAD BEARING FRL
TB90.1	–/90/90	90/90/90
TB120.1	–/120/120	120/120/120

TABLE H14: **EXTERNAL WALLS - LIGHTWEIGHT**

SYSTEM TYPE	NON-LOAD BEARING FRL	LOAD BEARING FRL
OWT.1	Non-fire rated	Non fire rated
OWT30.1	NA	30/30/30
OWT60.2	NA	60/60/60
OWT90.1	NA	90/90/90 from outside only
OWT.90.3	NA	90/90/90

TABLE H15: **EXTERNAL WALLS - BRICK VENEER**

SYSTEM TYPE	FRL FORM INSIDE	FRL FROM OUTSIDE
BVT.1	–/–/–	Brick veneer FRL as req'd
BV30.1	30/30/30	Brick veneer FRL 30/30/30
BV60.1	60/60/60	Brick veneer FRL 60/60/60
BV90.1	90/90/90	Brick veneer FRL 90/90/90

TABLE H16: **FLOOR/CEILINGS**

SYSTEM TYPE	FRL FROM BELOW	RISF
CT60.1	60/60/60	30min
CT60.2	60/60/60	60min
CT90.1	90/90/90	60min

FEATURES AND BENEFITS

- Cost effective (independent costings are available from Aquenta Consulting)
- Lightweight
- Comprehensive solution (full range of systems to meet BCA requirements)
- Ease of incorporating thermal and acoustic insulation.

MATERIALS

Refer to the relevant sections of this manual for materials used in Multiframe wall and ceiling systems.

DESIGN CONSIDERATIONS

FIRE RATING

Insulation Materials

Fletcher Insulation glasswool satisfies the requirement for non-combustible insulation in fire rated walls in timber framed Class 2 and 3 buildings. Refer to manufacturer's information for combustibility of polyester insulation.

Fire Rated Walls under Ceilings

Where in accordance with BCA a fire rated wall can terminate at the underside of the ceiling with Resistance to Incipient Spread of Fire (RISF) of not less than 60min, USG Boral ceiling systems with 1x13mm Firestop plasterboard + 1x16mm Firestop plasterboard satisfy this requirement.

Penetrations

Penetrations in a fire rated system must be treated strictly in accordance with relevant test reports and approved installation details in order to maintain the system's Fire Resistance Level.

Where components by others are specified in USG Boral fire rated penetration details (ie. dampers, GPO's, fire collars, etc), such components must be installed in accordance with the manufacturer's specifications. It is the responsibility of the component manufacturer to ensure that the fire rating performance of the system is not affected.

Tables H11-H16 updated Dec 2015

» INTRODUCTION

ACOUSTICS

Structural Flanking

One of the main flanking routes occurs around the wall and floor structure as shown in Figure H3. These routes particularly apply to walls and floors between sole occupancy units but may also apply to external and internal walls within the sole-occupancy unit.

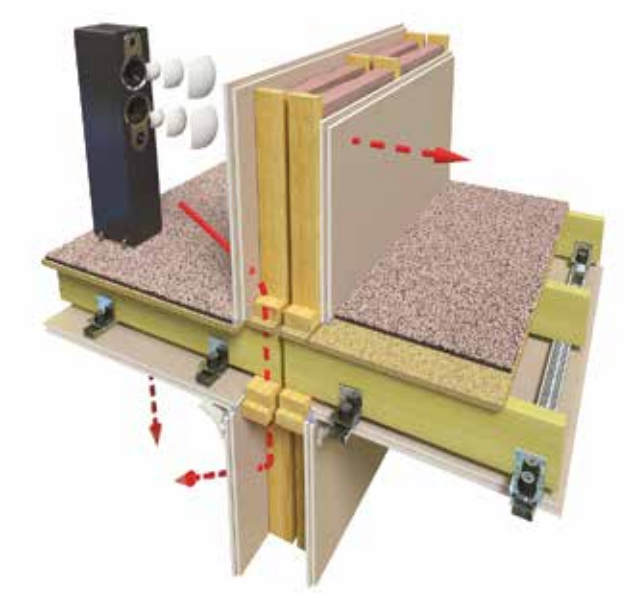


Figure H3: **Flanking and Airborne Noise Pathways Through Floor/Wall Junction**

A recommended solution to minimise structural flanking at wall floor intersections is to fix plasterboard linings to timber studs via furring channels with resilient mounts.

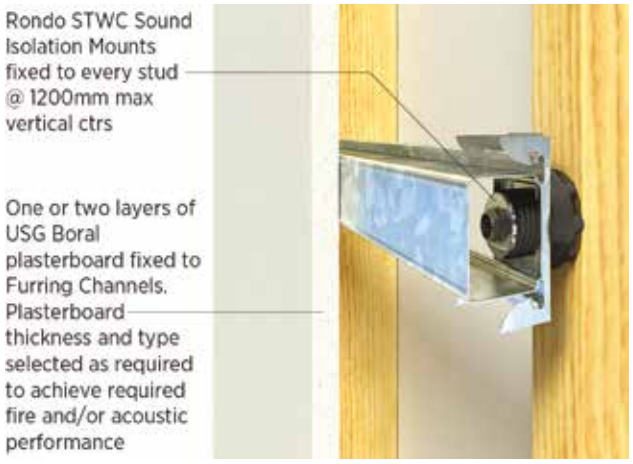


Figure H4: **Furred Lining With Sound Isolation Mounts**

NOTE

Sound Isolation Mounts may be required to both sides of wall system. Refer to USG Boral TecASSIST® for advice on appropriate detailing for flanking sound control.

Floors

The floor systems in this manual are provided with three types of floor coverings; bare timber floor with or without acoustic underlay, carpet and underlay, and ceramic floor tiles with or without acoustic underlay. These floor coverings, in combination with the specified acoustic underlays/mounts and fire rated ceilings underneath, contribute to the overall acoustic performance of the system in order to achieve the minimum acoustic provisions of the BCA.

Consideration should be given to the possibility of occupants changing floor coverings from one type to another that may affect the acoustic performance of the total system. For instance, replacing carpet with timber or another type of floor covering (eg tiles, linoleum), may result in a reduction in acoustic performance that no longer meets the minimum acoustic provisions of the BCA.

If required, contact USG Boral for advice on a suitable floor system where the contribution of floor coverings is not an integral part of meeting the acoustic provisions of the BCA.

Appliances

Noise producing appliances such as dishwashers, clothes dryers, washing machines and pumps should not be affixed to separating walls or should be isolated from the structure with resilient mountings and flexible service leads and connections.

Recessed Light Fittings, Electrical Outlets and Service Pipe Penetrations

Penetrations in fire rated separating walls and ceilings such as recessed light fittings, electrical outlets and supply and return air grilles must themselves be fire rated. The associated detailing of these penetrations for fire rating purposes will also provide an adequate acoustic seal ensuring that the acoustic integrity of the system is maintained.

» INTRODUCTION

Sound Isolation Within Roof Space

In accordance with the BCA, where a wall required to have sound insulation has a roof above, the wall must continue to:

a. the underside of the roof or
b. a ceiling that provides the sound insulation required for the wall.

Where option (b) is adopted, the ceiling must be designed to ensure that the acoustic rating of over partition flanking path matches the performance of the wall.

Figure H5: **Sound Isolation in Roof Space**

The following ceiling treatment is required to achieve over partition acoustic rating of $R_w+C_{tr}=50$ where separating wall terminates at the ceiling:

- The minimum ceiling lining is 1x13mm Firestop + 1x16mm Firestop (FRL 60/60/60, RISF 60min).
- Insulation must be laid over the entire ceiling either side of the wall and must be either minimum 90mm thick glasswool 14 kg/m^3 or minimum 130mm thick glasswool, 11kg/m^3 (R2.5 ceiling batt).
- The plasterboard ceiling must not be continuous over the separating wall.
- In the case where ceiling members/roof trusses run perpendicular over the party wall, the ceiling on both sides must be fixed via steel furring channel on Rondo STWC Sound Isolation Mounts or Embelton Ceiling Isolation Hangers to minimise the effects of flanking sound.
- Ceiling penetrations such as A/C ducts and recessed light fittings are required to be fire rated. The associated detailing will provide adequate acoustic seal ensuring that the acoustic integrity of the system is maintained.

Additional treatments will be required for separating walls with specified acoustic performance above $R_w+C_{tr}=50$. Contact USG Boral for further advice.

STRUCTURAL

Design Loads

Multiframe™ fire rated and acoustic systems are heavier than regular internal partitions and ceilings due to the use of specialised plasterboard linings and other components (ie insulation and furring channels). This increase in weight, together with the weight of the timber framing, must be taken into account when determining dead loads on Multiframe™ systems and supporting structure.

Refer General Information – Materials for weights of various USG Boral plasterboard products.

WET AREAS

Wet Areas (as defined in the BCA) must be waterproofed as per the Wet Area details contained in USG Boral Installation Manual and in the Junctions and Penetrations section of this publication.

Multiframe wall systems extending into Wet Areas must incorporate water resistant linings.

INSTALLATION

Refer to the relevant sections of this manual for installation instructions for various Multiframe systems.

» INTRODUCTION

SERVICES SEPARATION

As demonstrated in Table H17, fire rated linings of USG Boral Multiframe systems incorporating lagged or unlagged pipes meet or exceed the minimum BCA requirement of R_w+C_{tr}=25 and R_w+C_{tr}=40 respectively:

TABLE H17: **R_w+C_{tr} ACOUSTIC RATINGS OF USG BORAL MULTIFRAME™ PLASTERBOARD LININGS**

PLASTERBOARD LINING CONFIGURATION	UNLAGGED PIPES	LAGGED/CLAD PIPES
1x16mm Firestop	30	40
1x16mm Firestop + 1x10mm Regular	32	42
2x13mm Firestop	33	42
1x13mm Firestop + 1x16mm Firestop®	34	42
2x16mm Firestop	34	43

- For lagged and clad pipes, any insulation that is listed as part of the system assembly is acceptable.
- Acoustic ratings based on pipe lagged and clad with Soundlag 4525C from Pyrotek Noise Control or similar.

Designers should be aware of the reduction in acoustic performance of wall and ceiling linings due to penetrations such as downlights, exhaust grills, etc.

The following USG Boral lining configurations satisfy acoustic requirement of R_w+C_{tr}=25:

- Two or more layers of USG Boral linings with or without insulation and having any number of penetrations listed in Table H18, excluding 2x10mm SHEETROCK Brand Wall Board and 2x10mm SHEETROCK Brand Ceiling Board as indicated in Table H18.
- Single layer USG Boral lining configurations as indicated in Table H18.

TABLE H18: **USG BORAL ACOUSTIC LININGS ACHIEVING R_w+C_{tr}=25**

WALL OR CEILING LINING	INSULATION	MAXIMUM NUMBER OF PENETRATIONS		
		2 DOWNLIGHTS	4 DOWNLIGHTS	SMALL TOILET EXHAUST GRILLE AND UP TO 4 DOWNLIGHTS
1x13mm SHEETROCK Brand Standard Board	Nil	●		
	50G11, 50P14	●	●	
1x10mm UNISPAN	Nil	●		
	50G11, 50P14	●	●	
1x13mm REGULAR	Nil	●		
	50G11, 50P14	●	●	
1x10mm SOUNDSTOP	Nil	●	●	
	50G11, 50P14	●	●	●
1x10mm FIBEROCK	Nil	●	●	
	50G11, 50P14	●	●	●
1x13mm WET AREA	Nil	●	●	
	50G11, 50P14	●	●	●
1x13m SOUNDSTOP	Nil	●	●	
	50G11, 50P14	●	●	●
1x13mm FIRESTOP	Nil	●	●	
	50G11, 50P14	●	●	●
1x16mm FIRESTOP	Nil	●	●	
	50G11, 50P14	●	●	●
2x10mm SHEETROCK Brand Wall Board	Nil	●	●	
	50G11, 50P14	●	●	●
2x10mm SHEETROCK Brand Ceiling Board	Nil	●	●	
	50G11, 50P14	●	●	●

NOTES:
- Downlights must be no closer than 900mm.
- Downlights are of any non-gimbal type with glass cover, suitable for a circular cut-out of up to 80mm diameter.
- Toilet exhaust grille with a cut-out of up to 150mm diameter or 150mm x 150mm.
- 50G11 – 50mm glasswool 11kg/m^3, 50P14 – 50mm polyester 14kg/m^3

R_w 40-44 45-49 50-54
R_w+C_{tr}

PWT60.1

FIRE RESISTANCE LEVEL
LB **60/60/60**
FROM BOTH SIDES

FRL Basis: FCO-2256

SYSTEM DESCRIPTION

Side 1:
- Non fire resistant lining (refer to table)
- Timber framing
- 20mm min gap between timber frame and fire barrier
- Insulation (refer to table)

Fire Barrier:
- 1x25mm SHAFTLINER between 25mm H-studs @ 600mm ctrs

Side 2:
- Non fire resistant lining (refer to table)
- Timber framing
- 20mm min gap between timber frame and fire barrier
- Insulation (refer to table).

ACOUSTIC RATINGS BASIS: RT&A TE405-05F19

SYSTEM	LINING SIDE 1	LINING SIDE 2	NOM WIDTH mm	STUD SIZE (GAP) mm / INSULATION*	70 (20) R_w	70 (20) R_w+C_{tr}	70 (40) or 90 (20) R_w	70 (40) or 90 (20) R_w+C_{tr}
PWT60.1A	1x10mm SOUNDSTOP	1x10mm SOUNDSTOP	265	R2.0 GW Wall Batts (both cavities)	NA	NA	63	50
PWT60.1B	1x13mm SOUNDSTOP	1x13mm SOUNDSTOP	231	R2.0 GW Wall Batts (both cavities)	62	52	NA	NA
			271	R2.0 GW Wall Batts (both cavities)	NA	NA	64	55
				110mm USG Boral PARTIWALL Acoustic Batt (one cavity only)	NA	NA	59	51
PWT60.1C	1x13mm WET AREA	1x13mm WET AREA	271	110mm USG Boral PARTIWALL Acoustic Batt (both cavities)	NA	NA	63	51
PWT60.1D	1x10mm SOUNDSTOP	1x10mm WET AREA	265	110mm USG Boral PARTIWALL Acoustic Batt (both cavities)	NA	NA	63	51
PWT60.1E	1x13mm SOUNDSTOP	1x10mm WET AREA	228	90G24 (both cavities)	60	50	NA	NA
			268	R2.0 GW Wall Batts (both cavities)	NA	NA	62	53
PWT60.1F	1x10mm FIBEROCK	1x10mm FIBEROCK	265	R2.0 GW Wall Batts (both cavities)	NA	NA	63	50
PWT60.1G	1x10mm SOUNDSTOP	1x10mm FIBEROCK	265	R2.0 GW Wall Batts (both cavities)	NA	NA	63	50
PWT60.1H	1x13mm SOUNDSTOP	1x10mm FIBEROCK	228	R2.0 GW Wall Batts (both cavities)	60	50	NA	NA
			268	R2.0 GW Wall Batts (both cavities)	NA	NA	64	55
				110mm USG Boral PARTIWALL Acoustic Batt (one cavity only)	NA	NA	58	50
PWT60.1L	2x10mm REGULAR	2x10mm REGULAR	245	R2.0 GW Wall Batts (both cavities)	63	51	NA	NA
			285	110mm USG Boral PARTIWALL Acoustic Batt (one cavity only)	NA	NA	61	51
PWT60.1M	2x10mm WET AREA	2x10mm WET AREA	245	R2.0 GW Wall Batts (both cavities)	66	54	NA	NA
			285	110mm USG Boral PARTIWALL Acoustic Batt (one cavity only)	NA	NA	63	53
PWT60.1W	2x10mm SHEETROCK BRAND WALL BOARD	2x10mm SHEETROCK BRAND WALL BOARD	245	R2.0 GW Wall Batts (both cavities)	61	50	NA	NA
			285	R2.0 GW Wall Batts (both cavities)	NA	NA	63	53

* **R2.0 GW** Wall Batts - R2.0 Pink Wall Batts® 90mm glasswool by Fletcher Insulation.
90G24 – 90mm Pink® Acousti-Therm® HD 24kg/m³ glasswool by Fletcher Insulation.

For the full range of USG Boral systems refer to **usgboral.com/eselector**

Systems PWT60.1L, PWT60.1M and PWT60.1W added Dec 2015

PARTIWALL

R_w 40-44 45-49 50-54
R_w+C_{tr}

PWT90.1

FIRE RESISTANCE LEVEL
LB **90/90/90**
FROM BOTH SIDES

FRL Basis: FCO-2713

SYSTEM DESCRIPTION

Side 1:
- Non fire resistant lining (refer to table)
- Timber framing
- 20mm min gap between timber frame and fire barrier
- Insulation (refer to table)

Fire Barrier:
- 1x25mm SHAFTLINER between 25mm H-studs @ 600mm ctrs + 1x16mm FIRESTOP direct fixed to H-studs

Side 2:
- Non fire resistant lining (refer to table)
- Timber framing
- 20mm min gap between timber frame and fire barrier
- Insulation (refer to table).

ACOUSTIC RATINGS BASIS: RT&A TE405-05F19

SYSTEM	LINING SIDE 1	LINING SIDE 2	NOM WIDTH mm	STUD SIZE (GAP) mm / INSULATION*	70 (20) R_w	70 (20) R_w+C_{tr}	70 (40) or 90 (20) R_w	70 (40) or 90 (20) R_w+C_{tr}
PWT90.1A	1x10mm REGULAR	1x10mm REGULAR	285	R2.0 GW Wall Batts (both cavities)	NA	NA	63	50
PWT90.1B	1x10mm SOUNDSTOP	1x10mm SOUNDSTOP	245	R2.0 GW Wall Batts (both cavities)	64	52	NA	NA
			285	R2.0 GW Wall Batts (both cavities)	NA	NA	67	55
PWT90.1C	1x13mm SOUNDSTOP	1x13mm SOUNDSTOP	290	R2.0 GW Wall Batts (one cavity only)	NA	NA	62	50
PWT90.1D	1x10mm WET AREA	1x10mm WET AREA	285	R2.0 GW Wall Batts (both cavities)	NA	NA	64	51
PWT90.1E	1x10mm REGULAR	1x10mm WET AREA	285	R2.0 GW Wall Batts (both cavities)	NA	NA	63	50
PWT90.1F	1x10mm SOUNDSTOP	1x10mm WET AREA	285	R2.0 GW Wall Batts (both cavities)	NA	NA	64	51
PWT90.1G	1x13mm SOUNDSTOP	1x10mm WET AREA	245	R2.0 GW Wall Batts (both cavities)	63	53	NA	NA
			285	R2.0 GW Wall Batts (one cavity only)	NA	NA	59	50
PWT90.1H	1x10mm FIBEROCK	1x10mm FIBEROCK	245	R2.0 GW Wall Batts (both cavities)	64	52	NA	NA
			285	R2.0 GW Wall Batts (both cavities)	NA	NA	67	55
PWT90.1I	1x10mm REGULAR	1x10mm FIBEROCK	285	R2.0 GW Wall Batts (both cavities)	NA	NA	64	51
PWT90.1J	1x10mm SOUNDSTOP	1x10mm FIBEROCK	245	R2.0 GW Wall Batts (both cavities)	64	52	NA	NA
			285	R2.0 GW Wall Batts (both cavities)	NA	NA	67	55
PWT90.1K	1x13mm SOUNDSTOP	1x10mm FIBEROCK	285	R2.0 GW Wall Batts (one cavity only)	NA	NA	61	52
PWT90.1L	1x6mm VILLABOARD	1x6mm VILLABOARD	275	R2.0 GW Wall Batts (both cavities)	NA	NA	66	53
PWT90.1M	1x10mm REGULAR	1x6mm VILLABOARD	280	R2.0 GW Wall Batts (both cavities)	NA	NA	63	50
PWT90.1N	1x10mm SOUNDSTOP	1x6mm VILLABOARD	280	R2.0 GW Wall Batts (both cavities)	NA	NA	66	53
				110mm USG Boral PARTIWALL Acoustic Batt (one cavity only)	NA	NA	62	50
PWT90.1AA	1x13mm SHEETROCK BRAND STANDARD BOARD	1x13mm SHEETROCK BRAND STANDARD BOARD	290	R2.0 GW Wall Batts (both cavities)	NA	NA	65	52
PWT90.1AB	1x13mm SHEETROCK BRAND STANDARD BOARD	1x13mm WET AREA	290	R2.0 GW Wall Batts (one cavity only)	NA	NA	67	54

* R2.0 GW Wall Batts - R2.0 Pink Wall Batts® 90mm glasswool by Fletcher Insulation

For the full range of USG Boral systems refer to **usgboral.com/eselector**

Systems PWT90.1AA, PWT90.1AB added Dec 2015

R_w 40-44 45-49 50-54
R_w+C_{tr}

PWT90.2

FIRE RESISTANCE LEVEL
LB **90/90/90**
FROM BOTH SIDES

FRL Basis: FCO-1446, FCO-2016, FCO-2256

SYSTEM DESCRIPTION

Side 1:
- Non fire resistant lining (refer to table)
- Timber framing
- 20mm min gap between timber frame and fire barrier
- Insulation (refer to table)

Fire Barrier:
- 2x25mm SHAFTLINER BETWEEN 51mm I-studs @ 600mm ctrs

Side 2:
- Non fire resistant lining (refer to table)
- Timber framing
- 20mm min gap between timber frame and fire barrier
- Insulation (refer to table).

ACOUSTIC RATINGS BASIS: RT&A TE405-05F19

SYSTEM	LINING SIDE 1	LINING SIDE 2	NOM WIDTH mm	STUD SIZE (GAP) mm / INSULATION*	70 (20) R_w	70 (20) R_w+C_{tr}	70 (40) or 90 (20) R_w	70 (40) or 90 (20) R_w+C_{tr}
PWT90.2A	1x10mm REGULAR	1x10mm REGULAR	290	R2.0 GW Wall Batts (both cavities)	NA	NA	64	51
PWT90.2B	1x10mm SOUNDSTOP	1x10mm SOUNDSTOP	250	R2.0 GW Wall Batts (both cavities)	64	52	NA	NA
			290	R2.0 GW Wall Batts (both cavities)	NA	NA	68	56
				110mm USG Boral PARTIWALL Acoustic Batt (one cavity only)	NA	NA	62	51
PWT90.2C	1x13mm SOUNDSTOP	1x13mm SOUNDSTOP	296	R2.0 GW Wall Batts (one cavity only)	NA	NA	62	50
PWT90.2D	1x10mm WET AREA	1x10mm WET AREA	290	R2.0 GW Wall Batts (both cavities)	NA	NA	64	51
PWT90.2E	1x10mm REGULAR	1x10mm WET AREA	290	R2.0 GW Wall Batts (both cavities)	NA	NA	64	51
PWT90.2F	1x10mm SOUNDSTOP	1x10mm WET AREA	290	R2.0 GW Wall Batts (both cavities)	NA	NA	65	52
PWT90.2G	1x13mm SOUNDSTOP	1x10mm WET AREA	253	R2.0 GW Wall Batts (both cavities)	64	54	NA	NA
			293	R2.0 GW Wall Batts (one cavity only)	NA	NA	60	51
PWT90.2H	1x13mm SOUNDSTOP	1x13mm WET AREA	256	R2.0 GW Wall Batts (both cavities)	66	56	NA	NA
			296	R2.0 GW Wall Batts (one cavity only)	NA	NA	62	53
PWT90.2I	1x10mm FIBEROCK	1x10mm FIBEROCK	250	R2.0 GW Wall Batts (both cavities)	64	52	NA	NA
			290	R2.0 GW Wall Batts (both cavities)	NA	NA	68	56
				110mm USG Boral PARTIWALL Acoustic Batt (one cavity only)	NA	NA	62	51
PWT90.2J	1x10mm REGULAR	1x10mm FIBEROCK	290	R2.0 GW Wall Batts (both cavities)	NA	NA	64	51
PWT90.2K	1x10mm SOUNDSTOP	1x10mm FIBEROCK	250	R2.0 GW Wall Batts (both cavities)	64	52	NA	NA
			290	R2.0 GW Wall Batts (both cavities)	NA	NA	68	56
				110mm USG Boral PARTIWALL Acoustic Batt (one cavity only)	NA	NA	62	51
PWT90.2L	1x13mm SOUNDSTOP	1x10mm FIBEROCK	293	R2.0 GW Wall Batts (one cavity only)	NA	NA	62	53
PWT90.2M	1x6mm VILLABOARD	1x6mm VILLABOARD	242	R2.0 GW Wall Batts (both cavities)	64	50	NA	NA
			282	R2.0 GW Wall Batts (both cavities)	NA	NA	68	55
PWT90.2N	1x10mm REGULAR	1x6mm VILLABOARD	286	R2.0 GW Wall Batts (both cavities)	NA	NA	65	52
PWT90.2AB	1x10mm SHEETROCK BRAND WALL BOARD	1x10mm SHEETROCK BRAND WALL BOARD	290	110mm USG Boral PARTIWALL Acoustic Batts (both cavities)	NA	NA	63	50
PWT90.2AC	1x10mm SHEETROCK BRAND WALL BOARD	1x10mm WET AREA	290	110mm USG Boral PARTIWALL Acoustic Batts (both cavities)	NA	NA	64	52

For the full range of USG Boral systems refer to **usgboral.com/eselector**

* R2.0 GW Wall Batts - R2.0 Pink Wall Batts® 90mm glasswool by Fletcher Insulation

Systems PWT90.2AB and PWT90.2AC added Dec 2015

INTRWALL

R_w 40-44 45-49 50-54
R_w+C_{tr}

IW60.1

FIRE RESISTANCE LEVEL
NLB **-/60/60**
FROM BOTH SIDES

FRL Basis: FCO-2660, WFRA 40970, WFRA 41038, FCO-2256

SYSTEM DESCRIPTION

Side 1:
- Non fire resistant lining (refer to table)
- 64mm steel C-studs @ 600mm ctrs
- 20mm or 36mm gap between C-studs and fire barrier
- Insulation (refer to table)

Fire Barrier:
- 2x25mm Shaftliner between 51mm I-studs @ 600mm ctrs

Side 2:
- Non fire resistant lining direct fixed to I-studs.

ACOUSTIC RATINGS BASIS: RT&A TE405-05F20

SYSTEM	LINING SIDE 1	LINING SIDE 2	NOM WALL WIDTH (GAP) mm	INSULATION*	R_w	R_w+C_{tr}
IW60.1A	1x13mm SHEETROCK BRAND STANDARD	1x13mm SHEETROCK BRAND STANDARD	161 (20)	75G11, 75P14 (stud cavity)	55	46
IW60.1B	1x13mm REGULAR	1x13mm REGULAR	177 (36)	90G11, 90P14 (stud cavity)	59	51
IW60.1C	1x13mm SOUNDSTOP	1x13mm SOUNDSTOP	161 (20)	75G11, 75P14 (stud cavity)	60	51
IW60.1D	1x13mm WET AREA	1x13mm WET AREA	177 (36)	90G11, 90P14 (stud cavity)	60	51
IW60.1E	1x13mm WET AREA	1x13mm SHEETROCK BRAND STANDARD	177 (36)	90G11, 90P14 (stud cavity)	59	51
IW60.1F	1x13mm WET AREA	1x13mm REGULAR	177 (36)	90G11, 90P14 (stud cavity)	60	51
IW60.1G	1x13mm WET AREA	1x13mm SOUNDSTOP	177 (36)	90G11, 90P14 (stud cavity)	60	51
IW60.1H	1x13mm FIBEROCK	1x13mm FIBEROCK	171 (36)	90G11, 90P14 (stud cavity)	61	53
IW60.1I	1x13mm FIBEROCK	1x13mm SHEETROCK BRAND STANDARD	177 (36)	90G11, 90P14 (stud cavity)	60	52
IW60.1J	1x13mm FIBEROCK	1x13mm REGULAR	177 (36)	90G11, 90P14 (stud cavity)	61	52
IW60.1K	1x13mm FIBEROCK	1x13mm SOUNDSTOP	177 (36)	90G11, 90P14 (stud cavity)	61	53

* **75/90G11** – 75/90mm Pink® Partition 11kg/m³ glasswool by Fletcher Insulation. **TSB2** by Tontine Insulation (or equivalent)
75/90P14 – 75/90mm Polyester Insulation 14kg/m³

For the full range of USG Boral systems refer to **usgboral.com/eselector.**
Check product availability when specifying Multistop and Impactstop linings.

R_w 40-44 45-49 50-54
R_w+C_{tr}

IW60.2

FIRE RESISTANCE LEVEL
NLB **-/60/60**
FROM BOTH SIDES

FRL Basis: FCO-2660, FSU-0883, FCO-2256, WFRA 40970

SYSTEM DESCRIPTION

Side 1:
- Non fire resistant lining (refer to table)
- 64mm C-studs @ 600mm ctrs
- 20mm gap between C-studs and fire barrier
- Insulation (refer to table)

Fire Barrier:
- 2x25mm Shaftliner between 51mm I-studs @ 600mm ctrs

Side 2:
- Non fire resistant lining
- 28mm furring channels @ 600mm ctrs
- Insulation (refer to table).

ACOUSTIC RATINGS BASIS: RT&A TE405-05F20

SYSTEM	LINING SIDE 1	LINING SIDE 2	NOM WALL WIDTH (GAP) mm	INSULATION*	R_w	R_w+C_{tr}
IW60.2A	1x13mm SHEETROCK BRAND STANDARD	1x13mm SHEETROCK BRAND STANDARD	191 (20)	75G11, 75P14 (stud cavity only)	47	37
IW60.2B	1x13mm REGULAR	1x13mm REGULAR	191 (20)	75G11, 75P14 (stud cavity only)	50	40
IW60.2C	1x13mm SOUNDSTOP	1x13mm SOUNDSTOP	191 (20)	75G11, 75P14 (stud cavity only)	54	43
IW60.2D	1x13mm WET AREA	1x13mm WET AREA	191 (20)	75G11, 75P14 (stud cavity only)	51	41
IW60.2E	1x13mm WET AREA	1x13mm SHEETROCK BRAND STANDARD	191 (20)	75G11, 75P14 (stud cavity only)	50	41
IW60.2F	1x13mm WET AREA	1x13mm REGULAR	191 (20)	75G11, 75P14 (stud cavity only)	51	41
IW60.2G	1x13mm WET AREA	1x13mm SOUNDSTOP	191 (20)	75G11, 75P14 (stud cavity only)	52	40
IW60.2H	1x13mm FIBEROCK	1x13mm FIBEROCK	191 (20)	75G11, 75P14 (stud cavity only)	54	43
IW60.2I	1x13mm FIBEROCK	1x13mm SHEETROCK BRAND STANDARD	191 (20)	75G11, 75P14 (stud cavity only)	53	42
IW60.2J	1x13mm FIBEROCK	1x13mm REGULAR	191 (20)	75G11, 75P14 (stud cavity only)	53	42
IW60.2K	1x13mm FIBEROCK	1x13mm SOUNDSTOP	191 (20)	75G11, 75P14 (stud cavity only)	54	43
IW60.2L	2x13mm SOUNDSTOP	1x13mm SOUNDSTOP	204 (20)	75G11, 75P14 (stud cavity) 30G11 (furring cavity)	63	50

* **30/75G11** – 30/75mm Pink® Partition 11kg/m³ glasswool by Fletcher Insulation.
75P14 – 75mm Polyester Insulation 14kg/m³

For the full range of USG Boral systems refer to **usgboral.com/eselector.**
Check product availability when specifying Multistop and Impactstop linings.

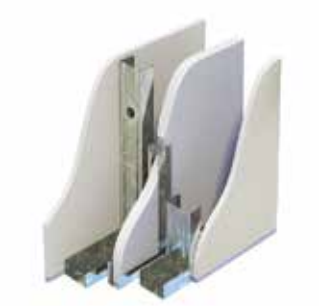
INTRWALL

R_w 40-44 45-49 50-54
R_w+C_{tr}

IW60.3

FIRE RESISTANCE LEVEL
NLB **-/60/60**
FROM BOTH SIDES

FRL Basis: FCO-2256



SYSTEM DESCRIPTION

Side 1:
- Non fire resistant lining (refer to table)
- 64mm C-studs @ 600mm ctrs
- 20mm or 36mm gap between C-studs and fire barrier
- Insulation (refer to table)

Fire Barrier:
- 1x25mm Shaftliner between 25mm H-studs @ 600mm ctrs

Side 2:
- Non fire resistant lining (refer to table)
- 64mm C-studs @ 600mm ctrs
- 20mm or 36mm gap between C-studs and fire barrier
- Insulation (refer to table).

ACOUSTIC RATINGS BASIS: RT&A TE405-05F20

SYSTEM	LINING SIDE 1	LINING SIDE 2	NOM WALL WIDTH (GAP) mm	INSULATION*	R_w	R_w+C_{tr}
IW60.3A	1x13mm SHEETROCK BRAND STANDARD	1x13mm SHEETROCK BRAND STANDARD	220 (20)	75G11, 75P14 (both cavities)	55	40
IW60.3B	1x13mm REGULAR	1x13mm REGULAR	220 (20)	75G11, 75P14 (both cavities)	59	44
IW60.3C	1x13mm SOUNDSTOP	1x13mm SOUNDSTOP	220 (20)	75G11, 75P14 (both cavities)	66	51
IW60.3D	1x13mm WET AREA	1x13mm WET AREA	251 (36)	90G11, 90P14 (both cavities)	67	52
IW60.3E	1x13mm WET AREA	1x13mm SHEETROCK BRAND STANDARD	220 (20)	75G11, 75P14 (both cavities)	59	44
IW60.3F	1x13mm WET AREA	1x13mm REGULAR	251 (36)	90G11, 90P14 (both cavities)	66	51
IW60.3G	1x13mm WET AREA	1x13mm SOUNDSTOP	251 (36)	90G11, 90P14 (both cavities)	68	53
IW60.3H	1x10mm FIBEROCK	1x10mm FIBEROCK	245 (36)	90G11, 90P14 (both cavities)	65	50
IW60.3I	1x10mm FIBEROCK	1x13mm SHEETROCK BRAND STANDARD	217 (20)	75G11, 75P14 (both cavities)	58	43
IW60.3J	1x10mm FIBEROCK	1x13mm REGULAR	248 (36)	90G11, 90P14 (both cavities)	65	50
IW60.3K	1x10mm FIBEROCK	1x13mm SOUNDSTOP	248 (36)	90G11, 90P14 (both cavities)	67	52
IW60.3L	1x6mm VILLABOARD	1x6mm VILLABOARD	237 (36)	90G11, 90P14 (both cavities)	66	51
IW60.3M	1x6mm VILLABOARD	1x13mm SHEETROCK BRAND STANDARD	213 (20)	75G11, 75P14 (both cavities)	58	43
IW60.3N	1x6mm VILLABOARD	1x13mm REGULAR	244 (36)	90G11, 90P14 (both cavities)	65	50
IW60.3O	1x6mm VILLABOARD	1x13mm SOUNDSTOP	244 (36)	90G11, 90P14 (both cavities)	68	52

* **75/90G11** – 75/90mm Pink® Partition 11kg/m³ glasswool by Fletcher Insulation.
75/90P14 – 75/90mm Polyester Insulation 14kg/m³

NOTES:
- Systems IW60.3 are not to be used for corridor walls unless approved by USG Boral.
- Penetrations in Shaftliner panels are not permitted.
- Contact USG Boral for further information.

For the full range of USG Boral systems refer to **usgboral.com/eselector.**
Check product availability when specifying Multistop and Impactstop linings.

R_w 40-44 45-49 50-54
R_w+C_{tr}

IW90.1

FIRE RESISTANCE LEVEL
NLB **-/90/90**
FROM BOTH SIDES

FRL Basis: FCO-2660, FSV 0883, EWFA 2724-00

SYSTEM DESCRIPTION

Side 1:
- Nil linings

Fire Barrier:
- 2x25mm Shaftliner between 51mm I-studs @ 600mm ctrs
- IBS rod in top track

Side 2:
- 1x13mm fire resistant pbd direct fixed to I-studs

ACOUSTIC RATINGS BASIS: RT&A TE405-05F20

SYSTEM	LINING SIDE 1	LINING SIDE 2	NOM WALL WIDTH mm	INSULATION	R_w	R_w+C_{tr}
IW90.1A	Nil	1x13mm FIRESTOP	65	NA	36	33
IW90.1B	Nil	1x13mm MULTISTOP	65	NA	36	33

IW90.2

FIRE RESISTANCE LEVEL
NLB **-/90/90**
FROM BOTH SIDES

FRL Basis: FCO-2660, FSV 0883, EWFA 2724-00

SYSTEM DESCRIPTION

Side 1:
- 1x 13mm fire resistant pbd
- 64mm C-studs @ 600mm ctrs
- 20mm gap between C-studs and fire barrier
- Insulation between studs (refer to table)

Fire Barrier:
- 2x25mm Shaftliner between 51mm I-studs @ 600mm ctrs

Side 2:
- Nil linings.

ACOUSTIC RATINGS BASIS: RT&A TE405-05F20

SYSTEM	LINING SIDE 1	LINING SIDE 2	NOM WALL WIDTH (GAP) mm	INSULATION*	R_w	R_w+C_{tr}
IW90.2A	1x13mm FIRESTOP	Nil	150 (20)	75G11, 75P14 (stud cavity only)	57	48
IW90.2B	1x13mm MULTISTOP	Nil	150 (20)	75G11, 75P14 (stud cavity only)	58	49

* **75G11** – 75mm Pink® Partition 11kg/m³ glasswool by Fletcher Insulation.
75P14 – 75mm Polyester Insulation 14kg/m³

NOTES:
- Penetrations in Systems IW90.2 must be fire rated.
- Contact USG Boral for further information.

For the full range of USG Boral systems refer to **usgboral.com/eselector.**
Check product availability when specifying Multistop and Impactstop linings.

INTRWALL

R_w 40-44 45-49 50-54
R_w+C_{tr}

IW90.3

FIRE RESISTANCE LEVEL
NLB **-/90/90**
FROM BOTH SIDES

FRL Basis: FCO-2660, FCO-2434, EWFA 2724-00

SYSTEM DESCRIPTION

Side 1:
- 1x 13mm fire resistant pbd
- 64mm C-studs @ 600mm ctrs
- 20mm gap between C-studs and fire barrier
- Insulation (refer to table)

Fire Barrier:
- 2x25mm Shaftliner between 51mm I-studs @ 600mm ctrs

Side 2:
- 1x 13mm fire resistant pbd direct fixed to I-studs.

ACOUSTIC RATINGS BASIS: RT&A TE405-05F20

SYSTEM	LINING SIDE 1	LINING SIDE 2	NOM WALL WIDTH (GAP) mm	INSULATION*	R_w	R_w+C_{tr}
IW90.3A	1x13mm FIRESTOP	1x13mm FIRESTOP	160 (20)	75G11, 75P14 (stud cavity)	59	50
IW90.3B	1x13mm MULTISTOP	1x13mm MULTISTOP	160 (20)	75G11, 75P14 (stud cavity)	60	51
IW90.3C	1x13mm FIRESTOP	1x13mm MULTISTOP	160 (20)	75G11, 75P14 (stud cavity)	59	50

* **75G11** – 75mm Pink® Partition 11kg/m³ glasswool by Fletcher Insulation.
75P14 – 75mm Polyester Insulation 14kg/m³

For the full range of USG Boral systems refer to **usgboral.com/eselector.**
Check product availability when specifying Multistop and Impactstop linings.

R_w 40-44 45-49 50-54
R_w+C_{tr}

IW90.4

FIRE RESISTANCE LEVEL
NLB **-/90/90**
FROM BOTH SIDES

FRL Basis: WFRA 40970, FSV 0883

SYSTEM DESCRIPTION

Side 1:
- Non fire resistant lining (refer to table)
- 64mm steel C-studs @ 600mm ctrs
- 20mm or 36mm gap between C-studs and fire barrier
- Insulation (refer to table)

Fire Barrier:
- 2x25mm Shaftliner between 51mm I-studs @ 600mm ctrs

Side 2:
- Non fire resistant lining (refer to table)
- 64mm C-studs @ 600mm ctrs
- 20mm or 36mm gap between C-studs and fire barrier
- Insulation (refer to table).

ACOUSTIC RATINGS BASIS: RT&A TE405-05F20

SYSTEM	LINING SIDE 1	LINING SIDE 2	NOM WALL WIDTH (GAP) mm	INSULATION*	R_w	R_w+C_{tr}
IW90.4A	1x13mm SHEETROCK BRAND STANDARD	1x13mm SHEETROCK BRAND STANDARD	245 (20)	75G11, 75P14 (both cavities)	58	44
IW90.4B	1x13mm REGULAR	1x13mm REGULAR	245 (20)	75G11, 75P14 (both cavities)	64	50
IW90.4C	1x13mm SOUNDSTOP	1x13mm SOUNDSTOP	245 (20)	75G11, 75P14 (both cavities)	69	55
IW90.4D	1x13mm WET AREA	1x13mm WET AREA	245 (20)	75G11, 75P14 (both cavities)	66	51
IW90.4E	1x13mm WET AREA	1x13mm SHEETROCK BRAND STANDARD	277 (36)	90G11, 90P14 (both cavities)	66	52
IW90.4F	1x13mm WET AREA	1x13mm REGULAR	245 (20)	75G11, 75P14 (both cavities)	65	51
IW90.4G	1x13mm WET AREA	1x13mm SOUNDSTOP	245 (20)	75G11, 75P14 (both cavities)	67	53
IW90.4H	1x10mm FIBEROCK	1x10mm FIBEROCK	239 (20)	75G11, 75P14 (both cavities)	65	51
IW90.4I	1x10mm FIBEROCK	1x13mm SHEETROCK BRAND STANDARD	274 (36)	90G11, 90P14 (both cavities)	66	52
IW90.4J	1x10mm FIBEROCK	1x13mm REGULAR	242 (20)	75G11, 75P14 (both cavities)	65	50
IW90.4K	1x10mm FIBEROCK	1x13mm SOUNDSTOP	242 (20)	75G11, 75P14 (both cavities)	67	53
IW90.4L	1x6mm VILLABOARD	1x6mm VILLABOARD	231 (20)	75G11, 75P14 (both cavities)	66	52
IW90.4M	1x6mm VILLABOARD	1x13mm SHEETROCK BRAND STANDARD	270 (36)	90G11, 90P14 (both cavities)	66	52
IW90.4N	1x6mm VILLABOARD	1x13mm REGULAR	238 (20)	75G11, 75P14 (both cavities)	65	51
IW90.4O	1x6mm VILLABOARD	1x13mm SOUNDSTOP	238 (20)	75G11, 75P14 (both cavities)	68	53

* **75/90G11** – 75/90mm Pink® Partition 11kg/m³ glasswool by Fletcher Insulation.
75/90P14 – 75/90mm Polyester Insulation 14kg/m³

For the full range of USG Boral systems refer to **usgboral.com/eselector.**
Check product availability when specifying Multistop and Impactstop linings.

INTRWALL

R_w 40-44 45-49 50-54
R_w+C_{tr}

IW120.1

FIRE RESISTANCE LEVEL
NLB **-/120/120**
FROM BOTH SIDES

FRL Basis: FCO-2434, EWFA 2724-00

SYSTEM DESCRIPTION

Side 1:
- 1x13mm fire resistant pbd
- 64mm C-studs @ 600mm ctrs
- 20mm gap between C-studs and fire barrier
- Insulation (refer to table)

Fire Barrier:
- 2x25mm Shaftliner between 51mm I-studs @ 600mm ctrs

Side 2:
- 1x13mm fire resistant pbd
- 64mm C-studs @ 600mm ctrs
- 20mm gap between C-studs and fire barrier
- Insulation (refer to table).

ACOUSTIC RATINGS BASIS: RT&A TE405-05F20

SYSTEM	LINING SIDE 1	LINING SIDE 2	NOM WALL WIDTH (GAP) mm	INSULATION*	R_w	R_w+C_{tr}
IW120.1A	1x13mm FIRESTOP	1x13mm FIRESTOP	245 (20)	75G11, 75P14 (both cavities)	67	53
IW120.1B	1x13mm MULTISTOP	1x13mm MULTISTOP	245 (20)	75G11, 75P14 (both cavities)	69	55
IW120.1C	1x13mm FIRESTOP	1x13mm MULTISTOP	245 (20)	75G11, 75P14 (both cavities)	68	54

* **75G11** – 75mm Pink® Partition 11kg/m³ glasswool by Fletcher Insulation.
75P14 – 75mm Polyester Insulation 14kg/m³

NOTES:
- Penetrations in Systems IW120.1 must be fire rated.
- Contact USG Boral for further information.

For the full range of USG Boral systems refer to **usgboral.com/eselector.**
Check product availability when specifying Multistop and Impactstop linings.