

The logo for hebel, featuring the word "hebel" in a bold, blue, sans-serif font. To the right of the text is a stylized graphic element consisting of a series of small, light-colored squares arranged in a grid pattern, followed by a larger, light-colored rectangular shape.

The better way to build

Low Rise Multi Residential 75mm PowerPanel^{XL} Intertenancy Walls

DESIGN AND INSTALLATION GUIDE

The logo for CSR, consisting of the letters "CSR" in a bold, black, sans-serif font, enclosed within a white square border.

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This Design and Installation Guide has been prepared as a source of information to provide general guidance to consultants – and in no way replaces the services of the professional consultant and relevant engineers designing the project.

It is the responsibility of the architectural designer and engineering parties to ensure that the details in this Design and Installation Guide are appropriate for the intended application.

The recommendations of this guide are formulated along the lines of good building practice, but are not intended to be an exhaustive statement of all relevant data.

WHY HEBEL® SYSTEMS ARE A BETTER WAY TO DESIGN AND BUILD

Whether you're a developer, architect, designer, builder or wall installer, Hebel wall systems deliver exceptional advantages in terms of performance, quality, speed, efficiency, risk minimisation and sustainability values.

Creating high performance buildings using Hebel PowerPanel^{XL}

At the heart of the Hebel intertenancy wall system for low rise multi-residential buildings is the Hebel PowerPanel^{XL} - a 75mm thick steel reinforced panel made from autoclaved aerated concrete (AAC).

Developed and warranted by CSR, the Hebel PowerPanel^{XL} can reduce heating and cooling loads on buildings and is non-combustible. It can be produced to the size needed, is easily cut, makes construction fast and efficient, creates minimal waste and is a better choice for the environment compared with concrete or brick.

As with all Hebel reinforced panel products, PowerPanel^{XL} conforms to the Australian Standard for Reinforced Autoclaved Concrete (AAC), AS 5146.

Maximising quality with the Hebel 'solid wall' advantage

There's a very good reason why Australia's developers want Hebel internal wall systems. They can increase market potential and return for a minimal initial investment. The PowerPanel^{XL} intertenancy walls create a value-adding sense of safety and security - solid when you knock on them, can't be cut through with a knife and overall provide quality long-term.

Construction speed and efficiency plus cost certainty

The NCC compliant Hebel PowerPanel^{XL} Intertency Wall System goes up quickly and easily which is why developers and construction companies rely on it to keep control of their project schedules and costs.

Builders are already ahead on their project when they specify Hebel systems as delivery of the Hebel panels and installation of the PowerPanel^{XL} wall construction isn't held up by wet or damp conditions.

And where there is limited access, the revolutionary Hebel Hoist vastly improves installation efficiency. Suitable for steel or timber frames up to three storeys high, the Hebel Hoist allows builders to streamline their workflow by erecting all the frames first before installing the Hebel panels.

Constructing with the Hebel PowerPanel^{XL} Intertency Wall System means logistics are simple, work flows easily, project schedules are controlled and cost certainty is maximised.

Minimising risk

Hebel wall systems provide a solid foundation for risk minimisation in design and construction. They are tested, well proven and designed to achieve NCC fire and acoustic compliance easily. Combining the non-combustible property of PowerPanel^{XL} with advanced system designs, CSR Hebel delivers high value cost effective solutions that significantly reduce the number of fire and acoustic risk points in construction.



75mm steel reinforced Hebel PowerPanel^{XL}. For fast construction with minimised waste, 600mm wide panels can be ordered in stock lengths of 2400, 2550, 2700, 2800, 2850, 3000 and 3300mm.



The Hebel Hoist improves the building process for intertenancy / party walls in low rise multi-residential projects.

Gaining high sustainability values

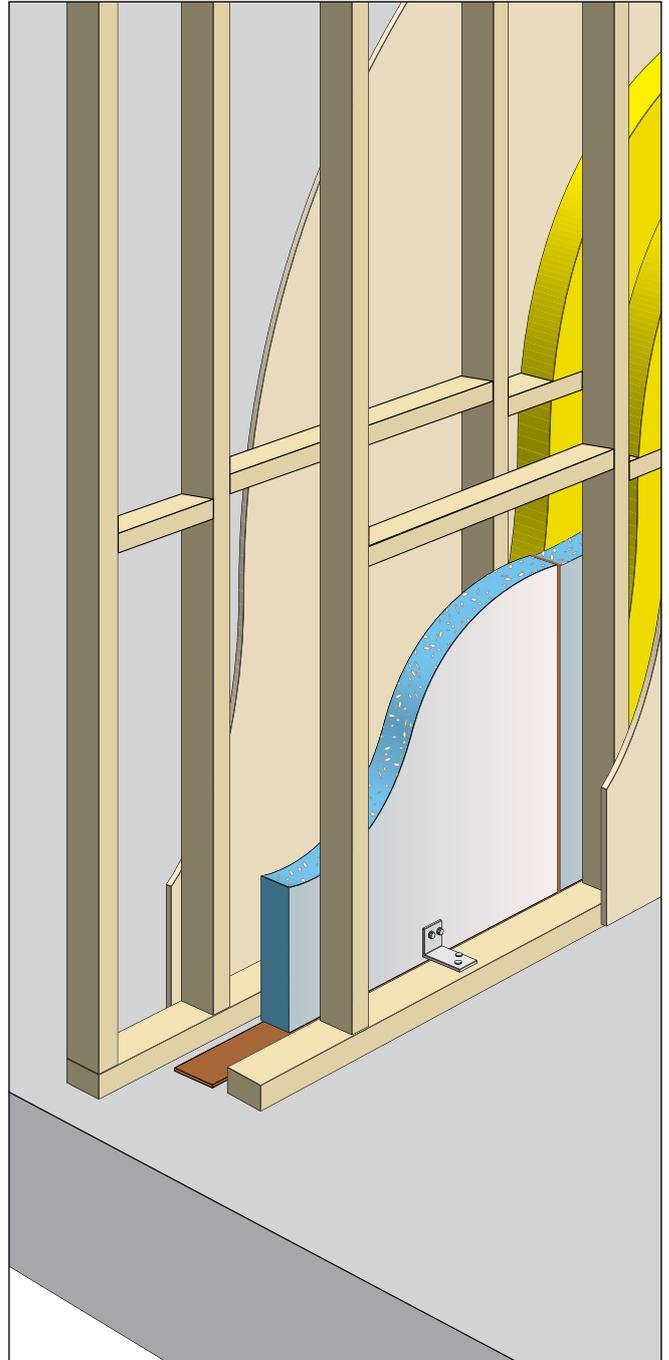
Hebel AAC is a durable inert product, made from raw materials in a process that minimises embodied energy. The low bulk density of Hebel AAC means less than a quarter of the resources in raw materials are used in its production than for concrete and bricks.

Waste in production is reduced through extensive recycling. Production waste, slurry and even the steam generated are all recycled back into the manufacturing process while waste steel and oil are recycled off site. Even the non-toxic citrus based solvents used for cleaning are recycled. Onsite the combination of panel sizes designed to suit standard building modules and the ease of working with standard power tools means there is very little waste. This goes a step further when panels are made-to-order. Altogether, Hebel is one of the most environmentally responsible building materials for wall system construction.

Leveraging the exceptional value-add of Hebel systems

Quite simply the Hebel intertenancy wall system for low rise multi-residential projects delivers a holistic solution that no other systems can match. It benefits all stakeholders in the project lifecycle through its role in value-adding to the project's quality, design and construction efficiency, risk minimisation and cost and time certainty.

Hebel Low Rise Multi Residential PowerPanel^{XL} Intertenancy Wall System



Hebel PowerPanel^{XL} Intertenancy Wall System for load bearing and non-load bearing intertenancy / party walls in low rise multi-residential projects. This wall configuration consists of Hebel (non-load bearing) PowerPanel^{XL} panels installed vertically and secured to the structural load bearing frame. The system utilises an aluminium bracket system which provides the wall with a discontinuous construction for acoustic performance.

Note: For a continuous construction solution please contact Hebel Technical Services for more information.

BENEFITS OF BUILDING WITH HEBEL



STRONG AND SOLID

Hebel panels are high-performance building products made from autoclaved aerated concrete (AAC) containing steel reinforcement for added strength, with an anti-corrosion layer on the steel for maximum durability.



ENERGY EFFICIENT

Hebel panels have superior insulation qualities compared to brick and concrete. Tests have shown a house built with Hebel PowerPanelXL performs better than brick veneer in terms of both heating and cooling. This can save the homeowner in heating and cooling energy costs.



QUALITY AND SPEED

Building with Hebel can mean faster construction times, without sacrificing on quality. One standard Hebel panel is the equivalent of 75 traditional bricks, which means the external walls of a 150m² home can go up in just 3 days when installed by experienced Hebel installers. A high quality building material, Hebel provides a great solution in terms of speed and ease of construction which is why it is increasingly becoming the preferred choice of builders and developers.



ECO-FRIENDLY

Independent testing shows that overall, Hebel has a 30% lower environmental impact than concrete or brick veneer. Hebel panels use 60% less embodied energy and produce 55% less greenhouse emissions compared to concrete or brick veneer, making it a more sustainable, environmentally friendly choice of building material.



FIRE RESISTANT

Hebel is renowned for its fire resistant properties, and is a non-combustible building material. Hebel systems have been tested by the CSIRO and are proven to achieve Fire Resistance Levels (FRLs) of 60 minutes through to 240 minutes – as well as meeting or exceeding the requirements up to Bushfire Attack Level (BAL) FZ. This makes it an ideal choice in bushfire zones.



PROVEN

CSR Hebel is the only manufacturer of AAC in Australia. With over 25 years of experience in developing, testing and producing AAC you can be assured you're getting high quality products and systems and unmatched technical expertise with Hebel.

1.1 POWERPANEL^{XL} INTERTENANCY WALLS

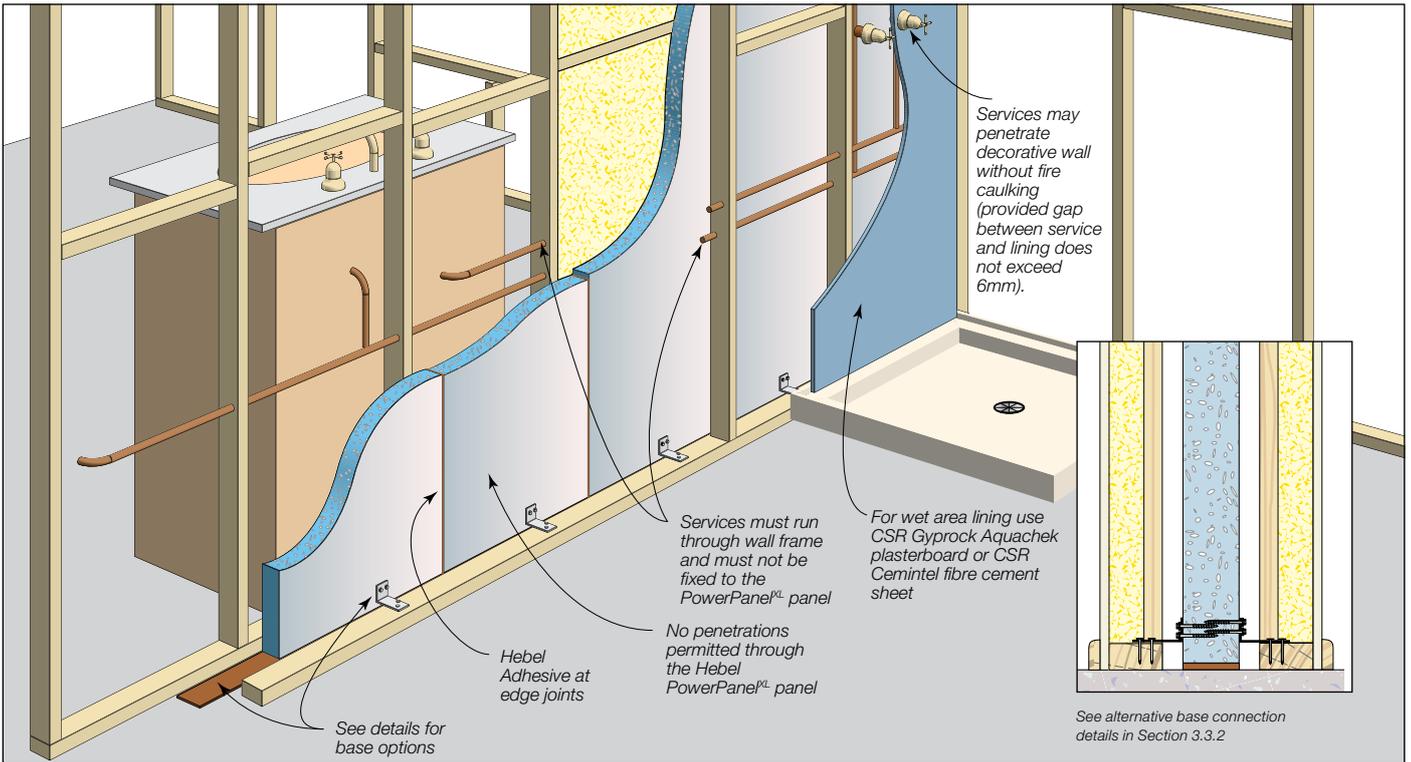


Table 1.1.1 PowerPanel^{XL} Intertency Wall Systems

System		Wall thickness		FRL	R_w/R_w+C_{tr}		Cavity insulation	Wall lining both sides
Stud depth		Stud depth			Stud depth			
70mm	90mm	70mm	90mm		70mm	90mm		
Hebel1287	Hebel1317	275mm	315mm	-/90/90	42/34	44/35	NIL - both sides	1 x 10mm GYPROCK plasterboard
Hebel1288	Hebel1318			90/90/90	61/51	63/54	90mm Bradford Gold Batt R2.0 - both sides	
Hebel1289	Hebel1319			60/50	62/52	Martini Prime ^ MSB3 (70mm) MSB5 (90mm) – both sides OR Martini Prime 50 (70mm) Martini Prime 75 (90mm) – both sides		
Hebel1290	Hebel1320	281mm	321mm	-/90/90	43/34	45/36	NIL - both sides	1 x 13mm GYPROCK plasterboard
Hebel1291	Hebel1321			90/90/90	64/52	67/55	90mm Bradford Gold Batt R2.0 - both sides	
Hebel1292	Hebel1322			63/50	66/53	Martini Prime ^ MSB3 (70mm) MSB5 (90mm) – both sides OR Martini Prime 50 (70mm) Martini Prime 75 (90mm) – both sides		
Hebel1293	Hebel1323	281mm	321mm	-/90/90	44/35	45/36	NIL - both sides	1 x 13mm GYPROCK SOUNDCEK
Hebel1294	Hebel1324			90/90/90	67/55	70/58	90mm Bradford Gold Batt R2.0 - both sides	
Hebel1295	Hebel1325			66/53	69/56	Martini Prime ^ MSB3 (70mm) MSB5 (90mm) – both sides OR Martini Prime 50 (70mm) Martini Prime 75 (90mm) – both sides		
Hebel1296	Hebel1326	275mm	315mm	-/90/90	43/34	45/36	NIL - both sides	1 x 10mm GYPROCK AQUACHEK
Hebel1297	Hebel1327			90/90/90	64/52	67/55	90mm Bradford Gold Batt R2.0 - both sides	
Hebel1298	Hebel1328			63/50	66/53	Martini Prime ^ MSB3 (70mm) MSB5 (90mm) – both sides OR Martini Prime 50 (70mm) Martini Prime 75 (90mm) – both sides		
Hebel1299	Hebel1329	273mm	313mm	-/90/90	44/35	45/36	NIL - both sides	1 x 9mm CEMINTEL fibre cement sheet
Hebel1300	Hebel1330			90/90/90	67/55	70/58	90mm Bradford Gold Batt R2.0 - both sides	
Hebel1301	Hebel1331			66/53	69/56	Martini Prime ^ MSB3 (70mm) MSB5 (90mm) – both sides OR Martini Prime 50 (70mm) Martini Prime 75 (90mm) – both sides		

NOTES:

1. Timber framing to be in accordance to AS 1684 or AS 1720.1, and requires studs at 450mm maximum spacings and mid-height nogging for use of 10mm Gyprock Plasterboard wall linings (refer Acoustic Logic assessment 2010861.19/0508A/R3/GW). For steel framing, frames to be designed in accordance with AS 3623 or AS 4600.
2. Powerpanel^{XL} Intertency Discontinuous Wall Systems has been assessed to comply with the NCC requirements for 'Discontinuous Construction' - NCC Vol. 2, clause 3.8.6.2 and clause 1.2.2.
3. This table must be read in conjunction with all the information provided in this Design Guide, acoustic opinion 2010861.19/0508A/R3/GW provided by Acoustic Logic and fire assessment WFRA 45771.17 provided by Exova Warringtonfire (Aust) Pty Ltd.
4. Selection of the most suitable PowerPanel^{XL} Intertency Wall System should be undertaken with specialist consultant's advice.
5. 20mm separation between the frame and Hebel PowerPanel^{XL} with aluminium bracket connection.

1.2 STRUCTURAL PROVISIONS

STRUCTURAL PERFORMANCE

The PowerPanel^{XL} Intertency Wall System can be either a loadbearing or non-loadbearing wall. The Hebel PowerPanel^{XL} panel within the wall system is non-loadbearing with the exception of self weight.

CONSTRUCTION LOADINGS

During construction of intertenancy walls, the Hebel PowerPanel^{XL} panel could be subject to wind loading. The builder shall provide the necessary temporary bracing of the panel until both structural frames and external veneer and/or claddings are installed so as to prevent the Hebel panels from exposure to external wind pressures.

NOTE: The screw connections are not adequate to stabilise the panel against construction loadings.

CUTTING OF HEBEL POWERPANEL^{XL}

The standard Hebel PowerPanel^{XL} panel can be reduced in length by cutting 150mm maximum from each end, and to a minimum width of 270mm. All exposed steel reinforcement shall be liberally coated with Hebel anti-corrosion protection paint available through Hebel.

WALL FRAME

The wall framing presented in this guide for various wall systems are nominated for the acoustic and fire performance values. It is the designer's responsibility to determine an appropriate wall framing system to satisfy structural adequacy. Several items the designer must allow for are:

- lateral loadings
- wall height
- deflection limits
- offset distance (gap) from the panel
- building movement
- control joint locations.

WALL HEIGHT

The overall wall height limit is 12m for the PowerPanel^{XL} Intertency Wall System. The wall shall be constructed of Hebel PowerPanel^{XL} available up to 3300mm maximum length.

EARTHQUAKE LOADING

Earthquake loading has not been considered in this design guide. It is the designer's responsibility to ensure the connection system has adequate capacity to resist any imposed earthquake loading.

FIXINGS

Fasteners & fixings

Most screw fixings are timber type, which is sufficient for penetrating the metal thicknesses outlined in this design guide. Connections that have larger metal thicknesses may require a metal type screw and will need to be designed and approved by the project engineer.

Fixings – Deflection head track to substrate

The fixing to secure the angles and tracks to the concrete slab shall be capable of withstanding a shear load of 0.75kN. For high wind pressures during construction, the designer shall determine if mechanical fasteners are required:

- Drive pins and concrete nails (check size and suitability for fire rated situations with the manufacturer);
- 8mm diameter mechanical fasteners.

Table 1.2.1 outlines the connection type and requirements for constructing the PowerPanel^{XL} Intertency Wall System detailed in this guide.

Table 1.2.1 Fixings for PowerPanel^{XL} Intertency Wall System

Application	Fixing type	Number of fixings and spacing
Bottom angle / track to structure	M8 Dynabolt	600mm max. centres
Bottom angle to PowerPanel ^{XL} panel	14-10 x 90mm hex head type 17 screws	2 fixings per panel, 50mm min. from panel edge.
Track back-to-back	10-16 x 16mm wafer head screws	600mm max. centres
Aluminium bracket to timber frame	12-11 x 35mm hex head type 17 screws	2 fixing per bracket
Aluminium bracket to steel frame	10-16 x 16mm hex head self-drilling screws	2 fixing per bracket
Aluminium bracket to PowerPanel ^{XL} panel	14-10 x 65mm hex head type 17 screws	2 fixings per bracket
Gyprock™ Fyrchek to PowerPanel ^{XL} panel	10 x 50mm bugle head laminating screws	400mm max. centres
Plasterboard to framing	Refer to CSR Gyprock for additional information.	

1.3 DESIGN & DETAILING CONSIDERATIONS

CONTROL JOINTS

Control joints must be provided at a maximum of 6m spacing. Recommended control joint widths should be 10mm minimum between Hebel PowerPanel^{XL} panels and another building component. Control joints must also be provided to coincide with any control joint in the main structure. Larger joint width may be required to accommodate building movements, and these values shall be nominated by the designer.

WET AREA WALL CONSTRUCTION

Wet area wall construction requires a system that enables services to be installed in a cavity. All plumbing should be acoustically treated as required by the NCC. All wet area walls shall be lined and waterproofed in accordance with Australian standards and to NCC requirements. Gyprock[™] Aquachek[™] or Cemintel[®] Fibre Cement Wallboard are suitable lining materials for wet area applications. Refer to CSR Gyprock and Cemintel for additional information.

NON-HEBEL COMPONENTS USED IN INTERTENANCY WALL

Components, which are not manufactured by Hebel, such as Gyprock[™] plasterboard, timber and steel stud wall frames, Bradford insulation and others must be designed, installed and handled in accordance with their manufacturer's guidelines and recommendations.

CSR Building Products Limited, guarantees only the products that are manufactured by CSR Building Products Limited, not the components, products or services supplied by others.

1.4 SYSTEM COMPONENTS

Product	Description	Supplied by CSR Hebel																												
Hebel PowerPanel ^{XL} panel	<p>The core component of PowerPanel^{XL} Intertency Wall Systems is the 75mm thick, steel mesh reinforced Hebel PowerPanel^{XL} panel. The panel is manufactured in a range of stock sizes as detailed below:</p> <table border="1"> <thead> <tr> <th colspan="3">Panel weight (kg)</th> </tr> <tr> <th>Length (mm)</th> <th>Width (mm)</th> <th>Weight (kg) at 35% M.C.</th> </tr> </thead> <tbody> <tr> <td>2400</td> <td>600</td> <td>58</td> </tr> <tr> <td>2550</td> <td>600</td> <td>62</td> </tr> <tr> <td>2700</td> <td>600</td> <td>66</td> </tr> <tr> <td>2800</td> <td>600</td> <td>68</td> </tr> <tr> <td>2850</td> <td>600</td> <td>69</td> </tr> <tr> <td>3000</td> <td>600</td> <td>73</td> </tr> <tr> <td>3300</td> <td>600</td> <td>80</td> </tr> </tbody> </table> <p>NOTE: Average panel weight calculated at 35% moisture content.</p>	Panel weight (kg)			Length (mm)	Width (mm)	Weight (kg) at 35% M.C.	2400	600	58	2550	600	62	2700	600	66	2800	600	68	2850	600	69	3000	600	73	3300	600	80	✓	
Panel weight (kg)																														
Length (mm)	Width (mm)	Weight (kg) at 35% M.C.																												
2400	600	58																												
2550	600	62																												
2700	600	66																												
2800	600	68																												
2850	600	69																												
3000	600	73																												
3300	600	80																												
Hebel Deflection Head Track	For positioning and restraining the bottom and mid connection of the panels.	✓																												
Hebel Wall Brackets	The brackets are proprietary components which enable the Hebel PowerPanel ^{XL} to be fixed to the wall frame. This provides a cavity space, which can result in increased acoustic insulation performance. The bracket is nominally 75 x 40 x 1.6mm x 50mm wide aluminium angle. Used in 75mm Hebel Intertency Wall System.	✓																												
Top Hat	The Top Hats are used to fix the Hebel PowerPanel ^{XL} panel to the structural support framing. There are two nominal widths available: 24mm and 35mm – incorporating perforated flanges for ease of installation.	✓																												
Hebel Adhesive	Hebel Adhesive is used for bonding the panels together at vertical joints. Supplied in 20kg bags.	✓																												
Hebel Mortar	Hebel Mortar is used to provide a level base for panel installation as well as providing acoustic and fire protection at the base of the panels. Used in some PowerPanel ^{XL} Intertency Discontinuous Wall base arrangements. Supplied in 20kg bags.	✓																												

Product	Description	Supplied by CSR Hebel	
Hebel Patch	Minor chips or damage to PowerPanel ^{XL} panels are to be repaired using Hebel Patch (supplied in 10kg bags).	✓	
Hebel anti-corrosion protection paint	To coat exposed reinforcement during cutting.	✓	

BRADFORD INSULATION

The PowerPanel^{XL} Intertency Wall System incorporates Bradford Insulation materials. Additional information regarding Bradford insulation materials is available from www.bradfordinsulation.com.au



GYPROCK™ PLASTERBOARD

The PowerPanel^{XL} Intertency Discontinuous Wall System incorporates Gyprock™ Plasterboard on both sides. The type, thickness and densities of plasterboard will be as per the specified wall requirements. Additional information is available from CSR Gyprock.

FIRE & ACOUSTIC SEALANT

To attain the specified FRL and / or R_w requirements, all perimeter gaps and penetrations must be carefully and completely sealed with a polyurethane fire and acoustic rated sealant installed to manufacturer's specifications.

BACKING ROD

Backing rod is used to enable correct filling of joints with sealant. It is recommended that backing rod be of open cell type to enable sealant to cure from behind. The diameter of backing rod must be appropriate for the width of the gap being filled.

2.1 REGULATORY ISSUES

DWELLINGS CONSTRUCTED SIDE-BY-SIDE ON A SINGLE ALLOTMENT

Where it is proposed to construct single dwellings side-by-side on a single allotment the internal wall between dwellings is a fire separating wall as defined in the NCC. The fire separating wall must start from the ground level (top of concrete footings or top of floor slab) and achieve a 60/60/60 FRL if load bearing, or -/60/60 FRL if non-load bearing. The wall must go to the underside of a non-combustible roof covering and any gaps be filled with fire-resisting material as described in Volume Two of the NCC.

DWELLINGS CONSTRUCTED SIDE-BY-SIDE ON SEPARATE ALLOTMENTS

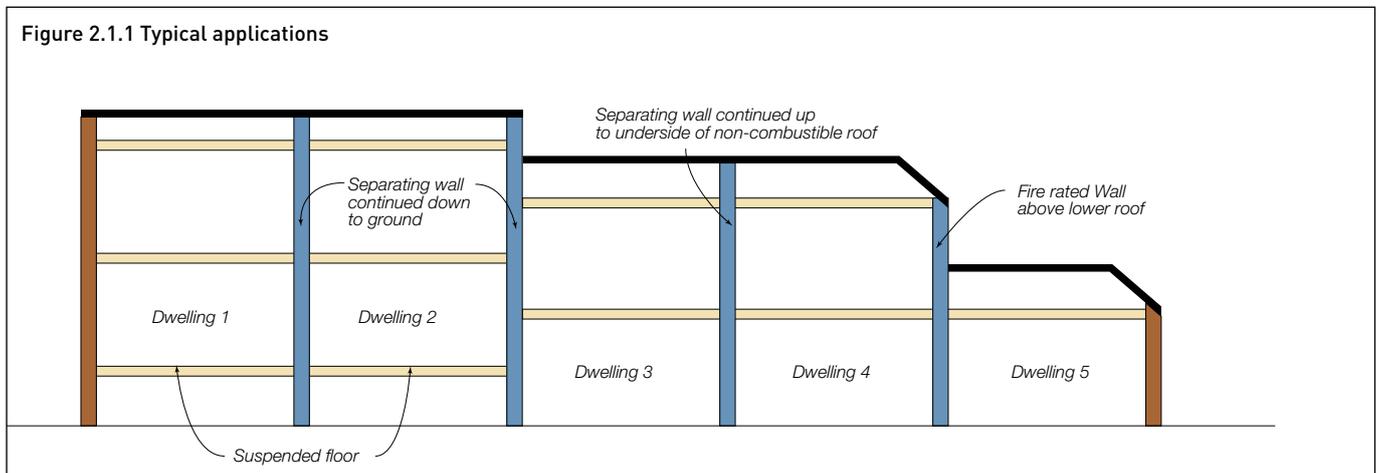
Where it is proposed to construct single dwellings side-by-side on separate allotments, or if subsequent subdivision is proposed, the wall might also be considered an external wall and each dwelling may be required to have its own wall starting from the ground level (top of concrete footings or top of floor slab) and each achieving a 60/60/60 FRL if load bearing, or -/60/60 FRL if non-load bearing. Contact your local authorities, as there may also be applicable legislation or discretionary powers available to vary these provisions.

DWELLINGS CONSTRUCTED SIDE-BY-SIDE ON A SINGLE ALLOTMENT WHERE SUBDIVISION MAY SUBSEQUENTLY OCCUR

Where it is proposed to construct single dwellings side-by-side on a single allotment the internal wall between dwellings is a fire separating wall as defined in the BCA. The fire separating wall must start from the ground level (top of concrete footings or top of floor slab) and achieve a 60/60/60 FRL if load bearing, or -/60/60 FRL if non-load bearing. The wall must go to the underside of a non-combustible roof covering and any gaps be filled with fire-resisting material as described in Volume Two of the NCC.

POWERPANEL^{XL} INTERTENANCY SOLUTIONS IN TIERED APPLICATIONS

Where the internal fire separation wall extends beyond the roof line on one side only and becomes an external wall, contact Hebel Engineering Services for advice on PowerPanel^{XL} external wall solutions.



COMPLIANCE WITH THE NATIONAL CONSTRUCTION CODE OF AUSTRALIA (NCC)

All building solutions such as walls, floors, ceilings, etc. must comply with the regulations outlined in the NCC or other authority.

The NCC is a performance based document, and is available in two volumes which align with two groups of 'Class of Building':

- Volume 1 – Class 2 to Class 9 Buildings; and
- Volume 2 – Class 1 & Class 10 Buildings – Housing Provisions.

Each volume presents Regulatory Performance Requirements for different Building Solutions for various classes of buildings and performance provisions.

These Performance Provisions include: Structure; Fire Resistance; Damp & Weatherproofing; Sound Transmission & Insulation; and Energy Efficiency.

This guide presents tables, charts and information necessary to assist in the design of a system incorporating Hebel PowerPanel^{XL} that complies with the Performance Requirements of the NCC. The designer must check the adequacy of the building solution for Performance Requirements outlined by the appropriate authority.

COMPLIANCE WITH AS 5146 REINFORCED AUTOCLAVED AERATED CONCRETE

All Hebel reinforced panel products conform with the Australian Standard for Reinforced Autoclaved Aerated Concrete (AAC), AS 5146.

The set of AS 5146 standards comprise of 3 parts:

- AS 5146 Part 1 – Structures
- AS 5146 Part 2 – Design
- AS 5146 Part 3 – Construction

These Standards are referenced in the Building Code of Australia making compliant AAC products Deemed-to-Satisfy (DTS) building materials.

AS 5146.3 – Construction, Section 5 contains details for 75mm reinforced AAC intertenancy walls in low rise multi residential buildings, considered a DTS building system.

This provides the endorsement and confidence to regulatory and building certification bodies that the Hebel Powerpanel^{XL} Intertenancy Wall System is a NCC compliant construction system.

2.2 ACOUSTIC PERFORMANCE

OVERVIEW

The National Construction Code (NCC) presents the Performance Requirements for sound insulation ratings. These acoustic performance ratings set minimum values to consider two types of sound: airborne sound and impact generated sound.

The Performance Requirements for airborne sound insulation and impact sound insulation ratings are dependent upon the form of construction (i.e., walls or floors), Class of Building, and the type of areas being separated.

The airborne sound performance requirement is a value that could be the weighted sound reduction index (R_w) or weighted reduction index with spectrum adaptation term ($R_w + C_{tr}$). The impact sound performance requirement is a value called the weighted normalised impact sound pressure level with spectrum adaptation term ($L_{n,w} + C_i$).

The NCC does provide Performance Requirements for the airborne sound and impact generated sound insulation ratings for a Intertenancy wall. Refer to Table 1.1.1 for sound insulation resistance level of the PowerPanel^{XL} Intertenancy Wall System.

IMPACT SOUND PERFORMANCE

Impact sound is caused by vibrations, which are transferred directly through the wall and re-radiated as sound in the adjacent room. These sound vibrations can be generated by actions such as closing of a cupboard door.

The transfer of impact sound can be minimised by ensuring no mechanical connection exists between the two sides of the wall. For impact rated walls the NCC requires walls to be of 'discontinuous construction'. This refers to a wall maintaining a cavity between two separate leaves except at the periphery.

ACOUSTIC PERFORMANCE DESIGN RECOMMENDATIONS

- 1) Hebel recommends engaging a specialist acoustic consultant on a project-by-project basis to provide design advice, confirmation of anticipated field performance, detailing and installation inspections.
- 2) When selecting the appropriate PowerPanel^{XL} Intertenancy Wall System, the designer or specifier must be aware that the laboratory R_w values are almost always higher than the field measured values. Therefore, allowances should be made for the lower expected field values during the selection of the system.

- 3) Separate advice from a specialist acoustic consultant should be sought to determine the effect on acoustic performance due to any changes to the PowerPanel^{XL} Intertenancy Wall System, and any required modification of the installation details pertaining to the systems.
- 4) Increasing of cavity widths, using higher density or thicker insulation or plasterboard, will generally maintain or increase the acoustic performance of the PowerPanel^{XL} Intertenancy Wall System.
- 5) The acoustic performance values of the PowerPanel^{XL} Intertenancy Wall System shown in Table 1.1.1 is a guide only as to consistently achievable field performance. They do not constitute a field performance guarantee as factors such as the presence of flanking paths, quality of installation of the system, on-site detailing of junctions, room shapes and size, etc can significantly affect field performance. Maximising the field performance depends on the following factors:
 - The systems are installed in accordance with the manufacturer's standard installation details.
 - Good quality installation practices including the sealing of all junctions and joints and maintaining specified clearances.
 - The systems are installed with all junctions acoustically sealed so that negligible sound transmission occurs at these points.
 - Flanking paths are eliminated and the structures into which the systems are installed are capable of allowing the nominated rating to be achieved.
 - Site testing conditions.
 - To minimise the transfer of sound through the PowerPanel^{XL} Intertenancy Wall System into the adjacent unit, it is suggested that a control joint be provided to break the mechanical path for the transmission of impact sound and other vibration.

2.3 FIRE RESISTANCE PERFORMANCE

FIRE RESISTANCE LEVEL (FRL) RATING OF INTERTENANCY SYSTEMS

The fire resistance level (FRL) rating performance of the PowerPanel^{XL} Intertenancy Wall System detailed in this guide have been derived from Exova Warringtonfire assessment WFRA - 45771.17.

This design guide has no recommendations for penetrations through the Intertenancy system. Hebel recommends contacting the appropriate consultant for design and detailing advice.

SYSTEM VARIATIONS

Certain variations to the installation of the PowerPanel^{XL} Intertenancy Wall System will not affect the fire-resistance levels listed in the Table on page 4. However these variations need to be approved by the project fire consultant or project certifier. The possible variations to the systems include:

- 1) Changing the type of insulation between polyester, glasswool and rockwool;
- 2) Putting the insulation on both sides of the PowerPanel^{XL} panel.

3.1 INSTALLATION GUIDELINES

GENERAL

Before commencing any installation work, clean and tidy up the work area. Mark out the location of the walls.

WALL FRAMING

Ensure frames are installed plumb and mechanically fixed to the substrate. All timber framework is to be fabricated and installed to the manufacturer's specifications and AS 1684 or AS 1720.1.

SERVICES

Ensure all services are installed within the wall frame and not on the face of the PowerPanel^{XL} panel.

DEFLECTION HEAD TRACK

When the wall locations have been set out, fix the deflection head tracks to the substrate. This is done using suitable fixings (see Table 1.2.1) at 600mm maximum centres and maximum 100mm from ends. At changes in wall directions, ensure deflection head track is mitred with no gaps at the corners. Seal all butt joints with fire and acoustic sealant.

HEBEL MORTAR

Mortar is placed on the DPC and should only be run out roughly 3 panels (1800mm) ahead of panel installation. The mortar bed fills the gap at the base. Generally, the mortar is 10mm thick and shall extend the full width of the panel. Mixing of the mortar should be done in accordance with the instructions on the bag.

WALL BRACKETS

Screw fix the wall bracket to the top and bottom plates of the wall frame and to the PowerPanel^{XL} panels at 600mm centres in the discontinuous wall system. Locate within 50mm of the centre width of each panel using fixings specified in Table 1.2.1.

HEBEL POWERPANEL^{XL} PANEL

The Hebel PowerPanel^{XL} panel in the Intertenancy Discontinuous Wall System must be installed vertically. The panels can be cut on-site using a circular saw equipped with diamond tipped cutting blade (for panel cutting limitations refer to Section 1.2). All the loose AAC particles should be brushed off the panel with a rough broom. Steel reinforcement that is exposed during cutting must be coated with a liberal application of corrosion protection coating (see Section 1.4). Any minor damage and chips to the panels must be repaired using Hebel Patch. Use packers at the base to maintain the gap and ensure gap is full of mortar (if specified). The preferred method of fixing should be to screw through the bracket into the panel. Fix the panel to the deflection head (if specified). For following panels, apply Hebel Adhesive to the vertical edge and install the next panel. Repeat the installation process until the wall is complete.

HEBEL ADHESIVE

Hebel Adhesive is applied to the panel with a 75mm Hebel notched trowel. When the panels are pushed together the joints are to be 2-3mm thick. Sufficient pressure must be applied to the panels when gluing to ensure the adhesive is fully bedded across the joint. Scrape off any excess adhesive protruding from the joints and fill any gaps. Adhesive is to be mixed to the proportions and consistency as per the instructions on the bag.

BRADFORD INSULATION

Installation of Bradford insulation should be completed in accordance with manufacturer's handling and installation guidelines. The insulation provided should completely fill the space between the stud framing and form a continuing barrier. If there is any gap in the insulation the acoustic performance of the system may be adversely affected.

GYPROCKTM PLASTERBOARD

Plasterboard sheets must be cut to fit neatly and should not be forced into position. The plasterboard is to extend the full height of the wall frame, with gaps at top and bottom for the specified sealant. Plasterboard is fixed directly to the stud framework in accordance with the GyprockTM Plasterboard Residential Installation Guide. Refer to CSR Gyprock for additional information.

SEALANTS

All movement joints and other gaps should be sealed off and finished neatly with polyurethane fire and acoustic rated sealants. Installation of sealants must be carried out in accordance with the manufacturer's specifications.

INSTALLATION OF ELECTRICAL, PLUMBING AND OTHER SERVICES

Installation of services into walls should be carried out at an appropriate construction sequence. This will allow easy access to cavities and wall frames, where services can be easily installed and neatly hidden.

Hebel suggests installing the plumbing and cabling after the panels have been installed. The builder or project manager should confirm appropriate construction sequence for services on a project-by-project basis.

FASTENERS & FIXINGS

All fixings and fasteners should be installed in accordance with the manufacturer's specifications.

3.2 CONSTRUCTION DETAILS – OVERVIEW

Table 3.2.1 Construction details overview

Overview	Typical layout of PowerPanel ^{XL} Intertenancy Wall System	Figure 3.3.1.1	Page 15
	Vertical cross section of PowerPanel ^{XL} Intertenancy Wall System	Figure 3.3.1.2	Page 16
Base connection	Base connection - Continuous deflection head track	Figure 3.3.2.1	Page 17
	Base connection - Continuous steel angle	Figure 3.3.2.2	Page 17
	Base connection - Wall bracket	Figure 3.3.2.3	Page 17
Wall bracket fixing	Bracket fixing	Figure 3.3.3.1	Page 17
Control joints	Horizontal joints - Option 1 (FRL: 90 minutes)	Figure 3.3.4.1	Page 17
	Horizontal joints - Option 2 (FRL: 90 minutes)	Figure 3.3.4.2	Page 18
	Horizontal joints - Option 3 (FRL: 60 minutes)	Figure 3.3.4.3	Page 18
	Horizontal joints - Option 4 (FRL: 60 minutes)	Figure 3.3.4.4	Page 18
	Horizontal joints - Option 5 (FRL: 90 minutes)	Figure 3.3.4.5	Page 18
	Vertical joints - Option 1 (FRL: 60 minutes)	Figure 3.3.4.6	Page 18
	Vertical joints - Option 2 (FRL: 90 minutes)	Figure 3.3.4.7	Page 18
Roof valley and parapet	Roof valley for PowerPanel ^{XL} Intertenancy Wall System	Figure 3.3.5.1	Page 19
	Roof parapet for PowerPanel ^{XL} Intertenancy Wall System	Figure 3.3.5.2	Page 19
Junction details	External wall junction for PowerPanel ^{XL} Intertenancy Wall System	Figure 3.3.6.1	Page 20
	External wall corner junction for PowerPanel ^{XL} Intertenancy Wall System	Figure 3.3.6.2	Page 20
	Blade wall junction detail	Figure 3.3.6.3	Page 21
	Party wall to external wall system	Figure 3.3.6.4	Page 21
Cantilevered construction	Powerpanel ^{XL} Intertenancy wall overhang	Figure 3.3.7.1	Page 22
	Figure 3.3.7.2 Cantilevered Soffit	Figure 3.3.7.2	Page 22

Project specific requirements: please contact CSR Hebel for advice on any project specific designs not covered in this Design and Installation Guide.

3.3 CONSTRUCTION DETAILS

3.3.1 OVERVIEW

Figure 3.3.1.1 Typical layout of PowerPanel^{XL} Intertency Wall System

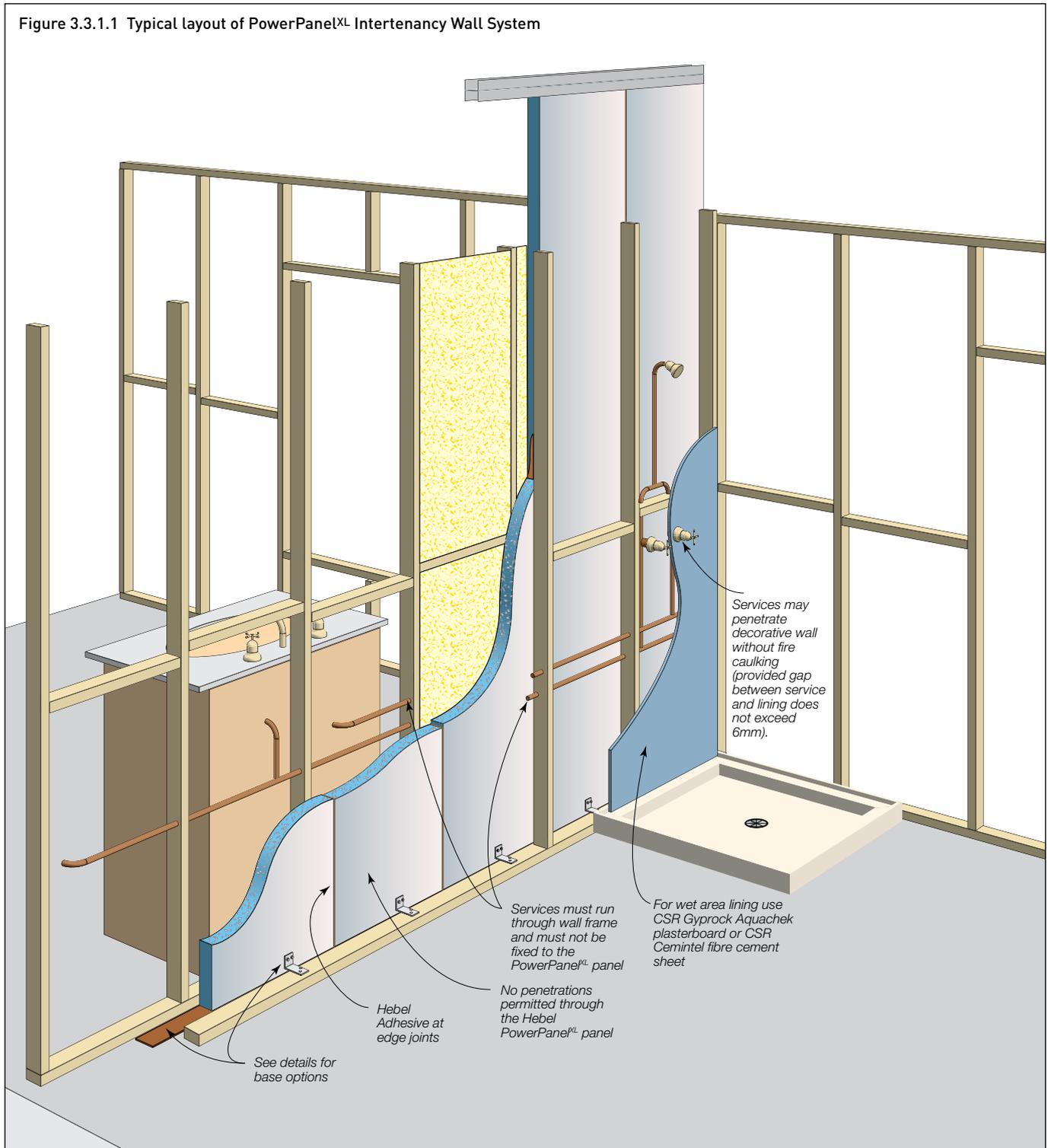
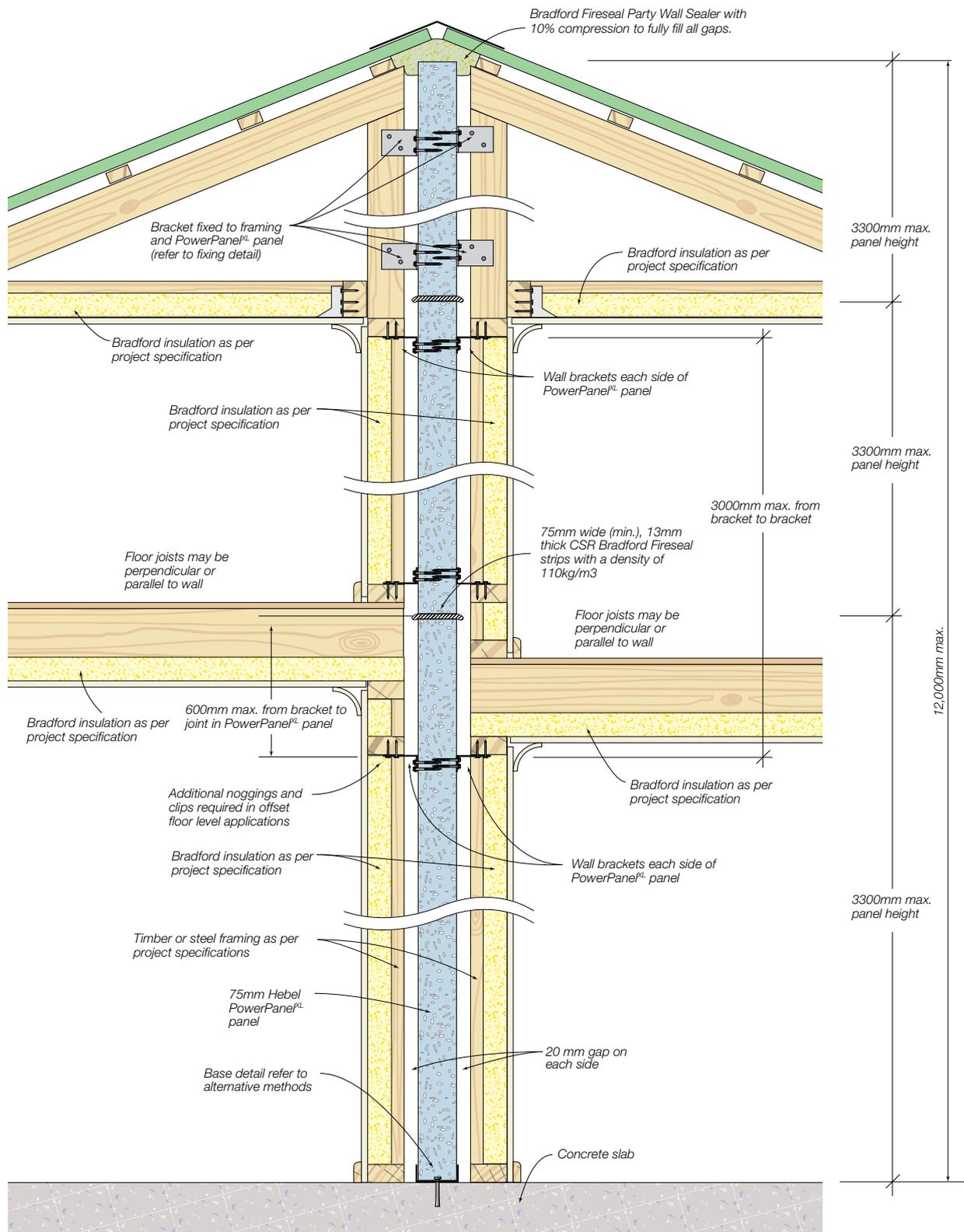


Figure 3.3.1.2 Vertical cross section of PowerPanel^{XL} Intertency Wall System



NOTE: Wall brackets can be fixed to studs or noggings within a distance of 150mm from ceiling or floor.

3.3.2 BASE CONNECTION

Figure 3.3.2.1 Base connection - Continuous deflection head track

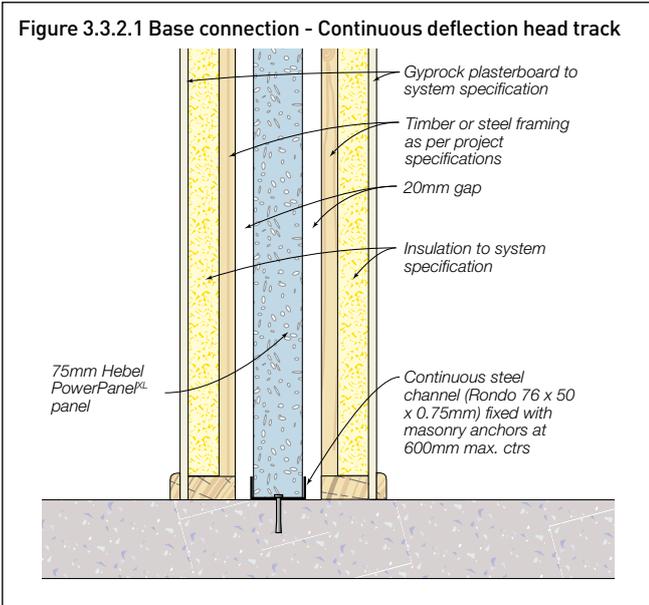


Figure 3.3.2.2 Base connection - Continuous steel angle

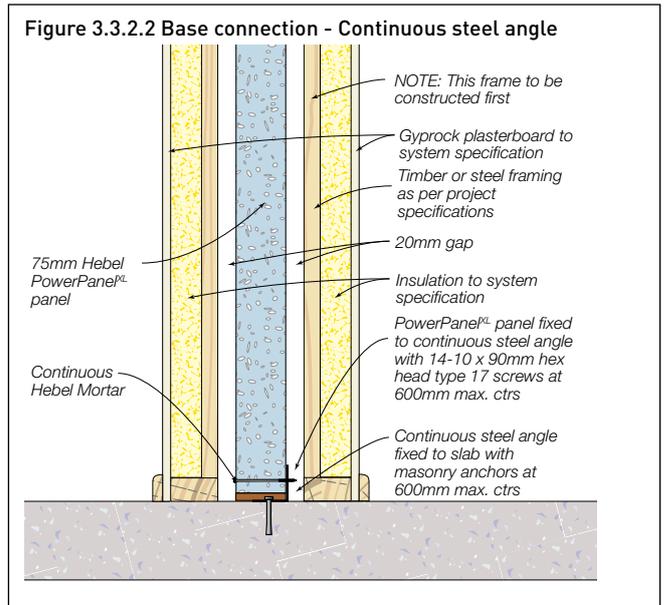
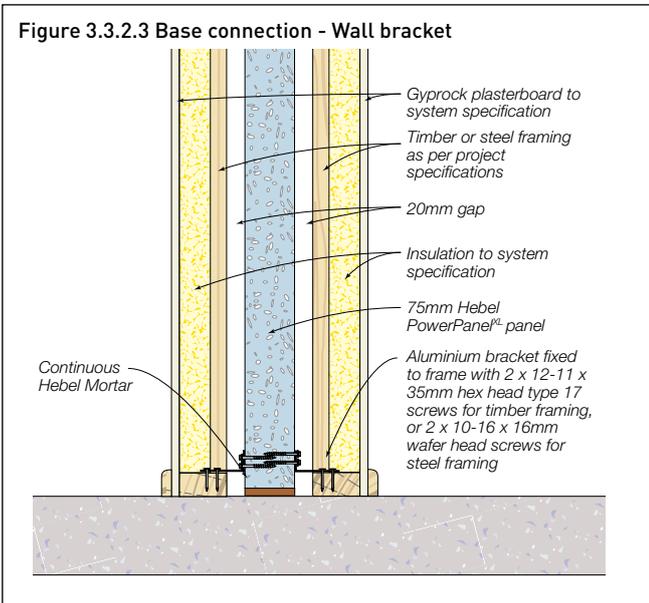
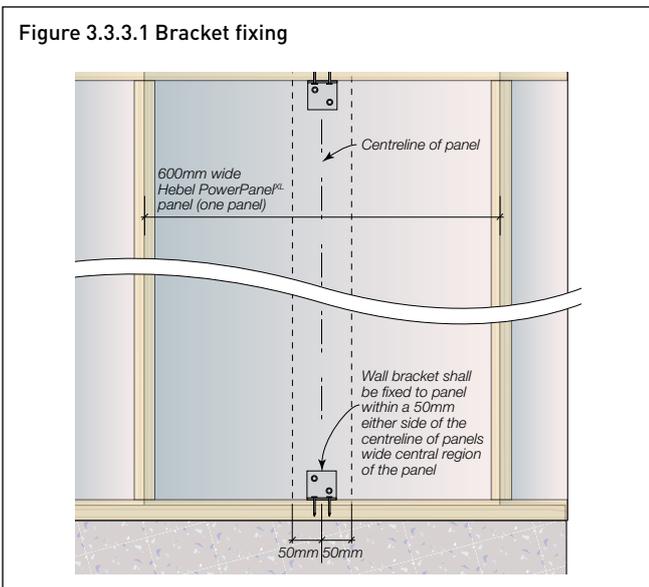


Figure 3.3.2.3 Base connection - Wall bracket



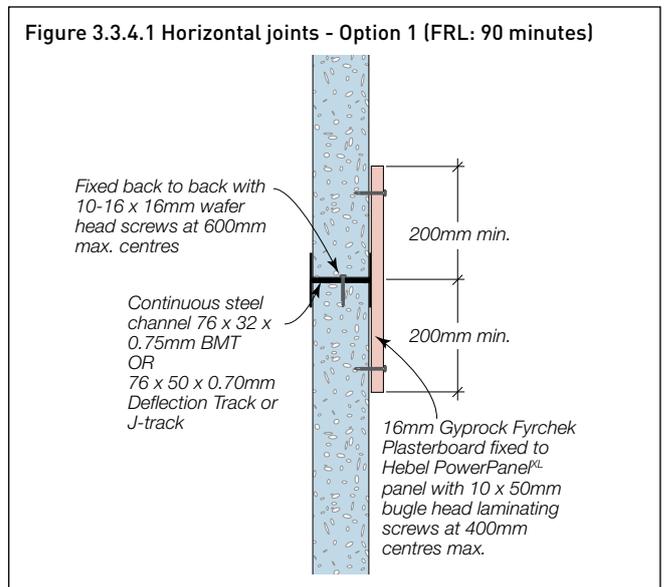
3.3.3 WALL BRACKET FIXING

Figure 3.3.3.1 Bracket fixing

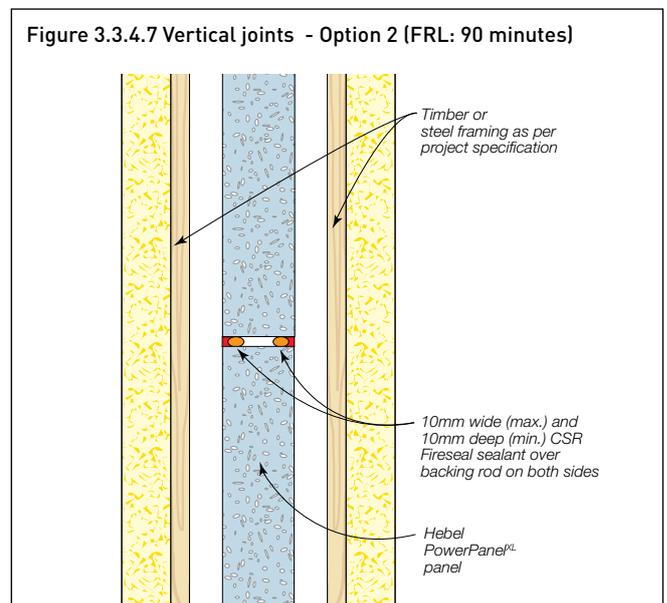
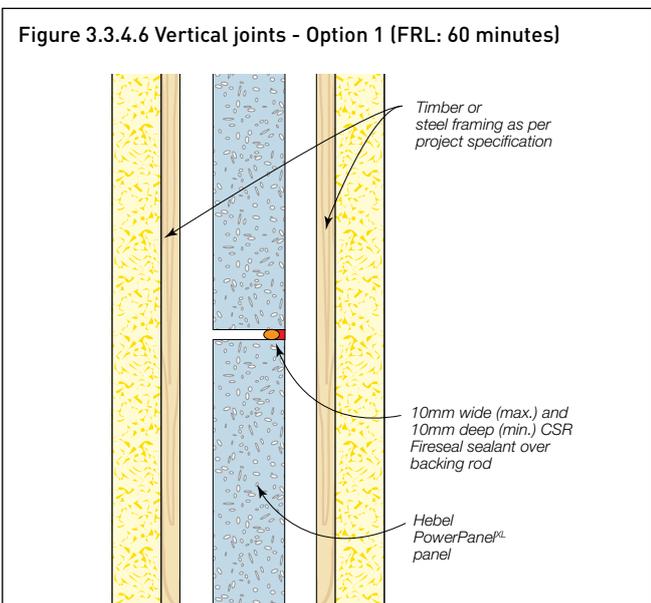
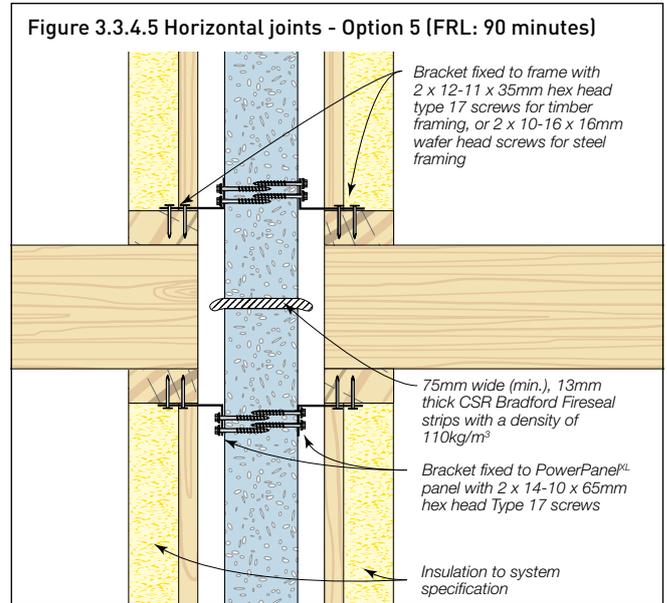
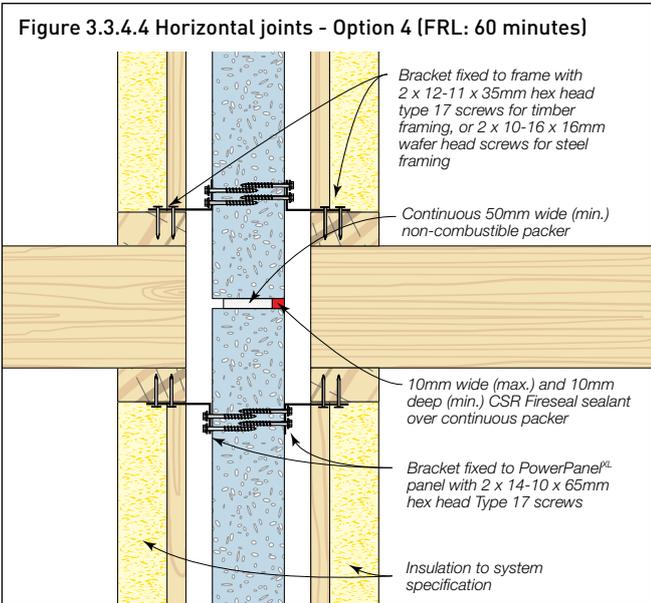
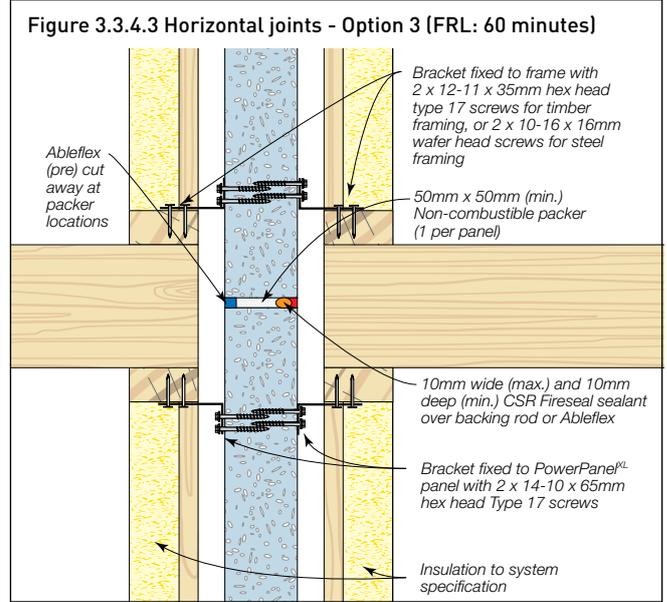
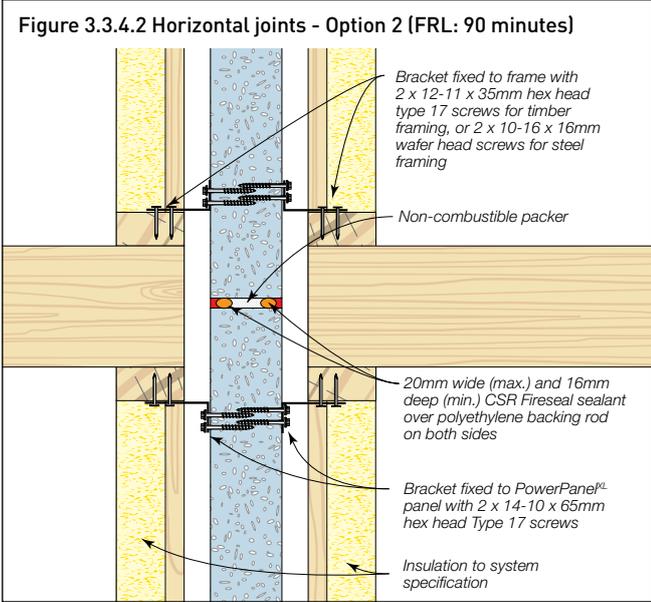


3.3.4 CONTROL JOINTS

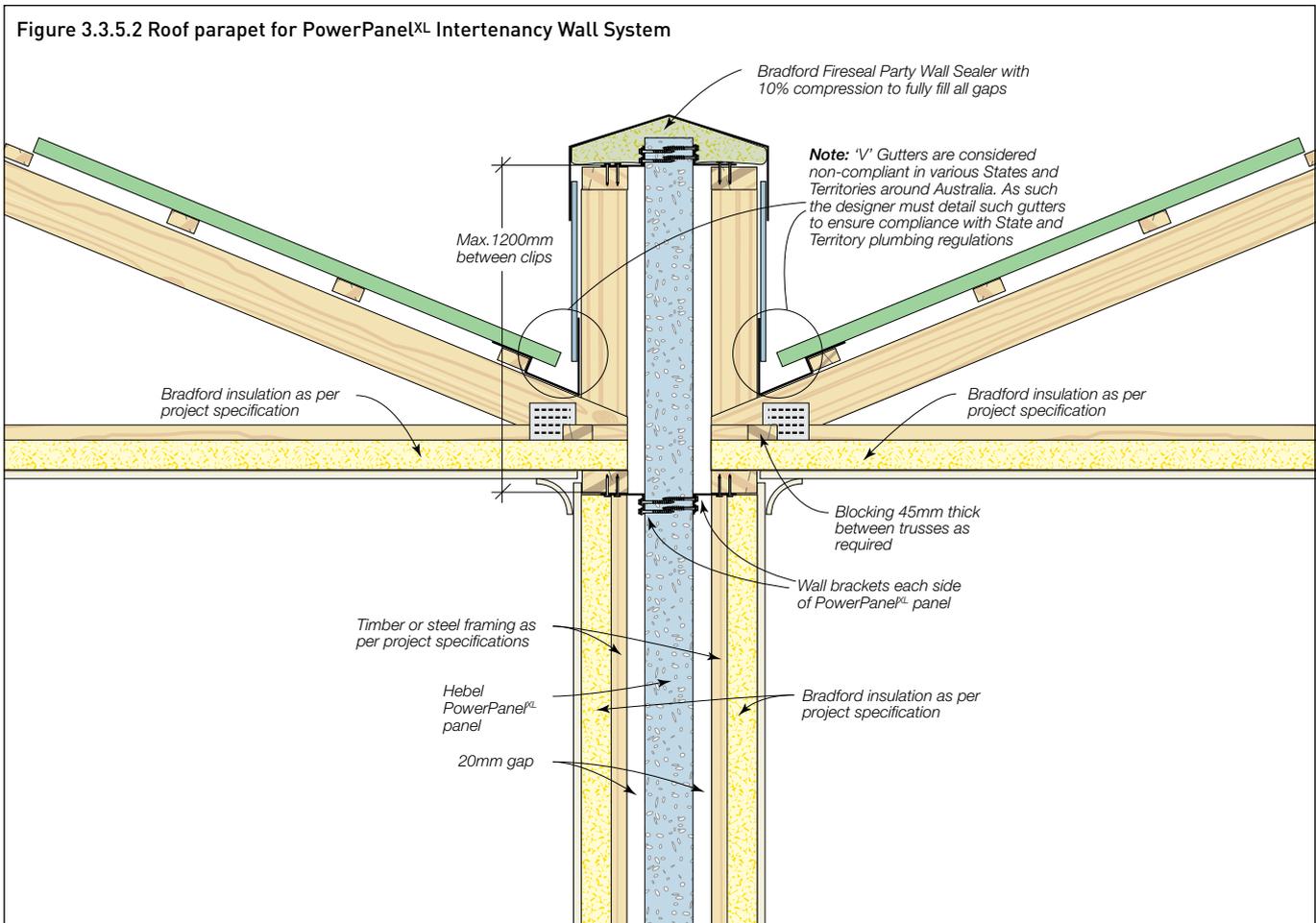
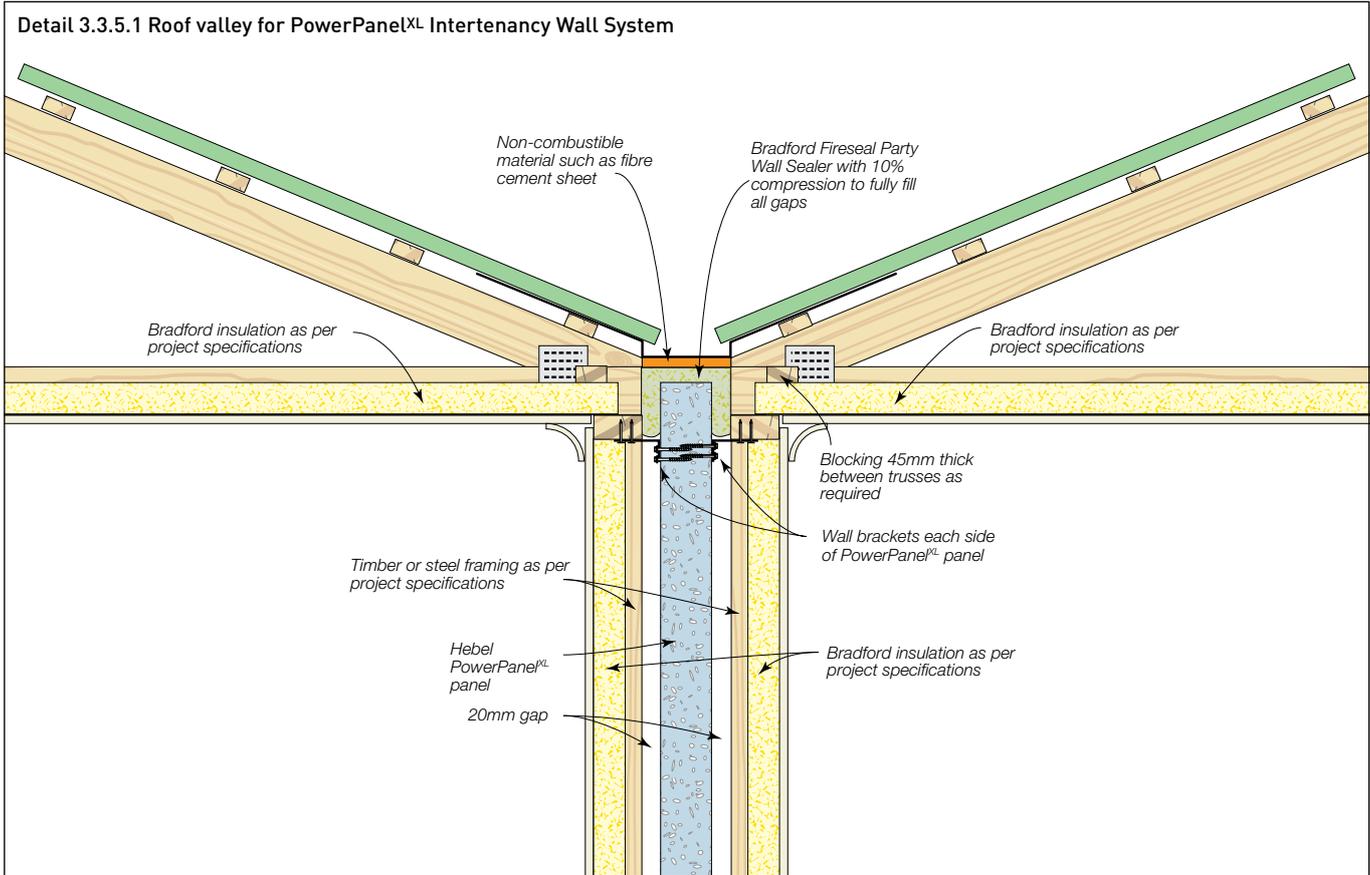
Figure 3.3.4.1 Horizontal joints - Option 1 (FRL: 90 minutes)



3.3.4 CONTROL JOINTS - CONTINUED



3.3.5 ROOF VALLEY AND PARAPET



3.3.6 JUNCTION DETAILS

Figure 3.3.6.1 External wall junction for PowerPanel^{XL} Intertency Wall System

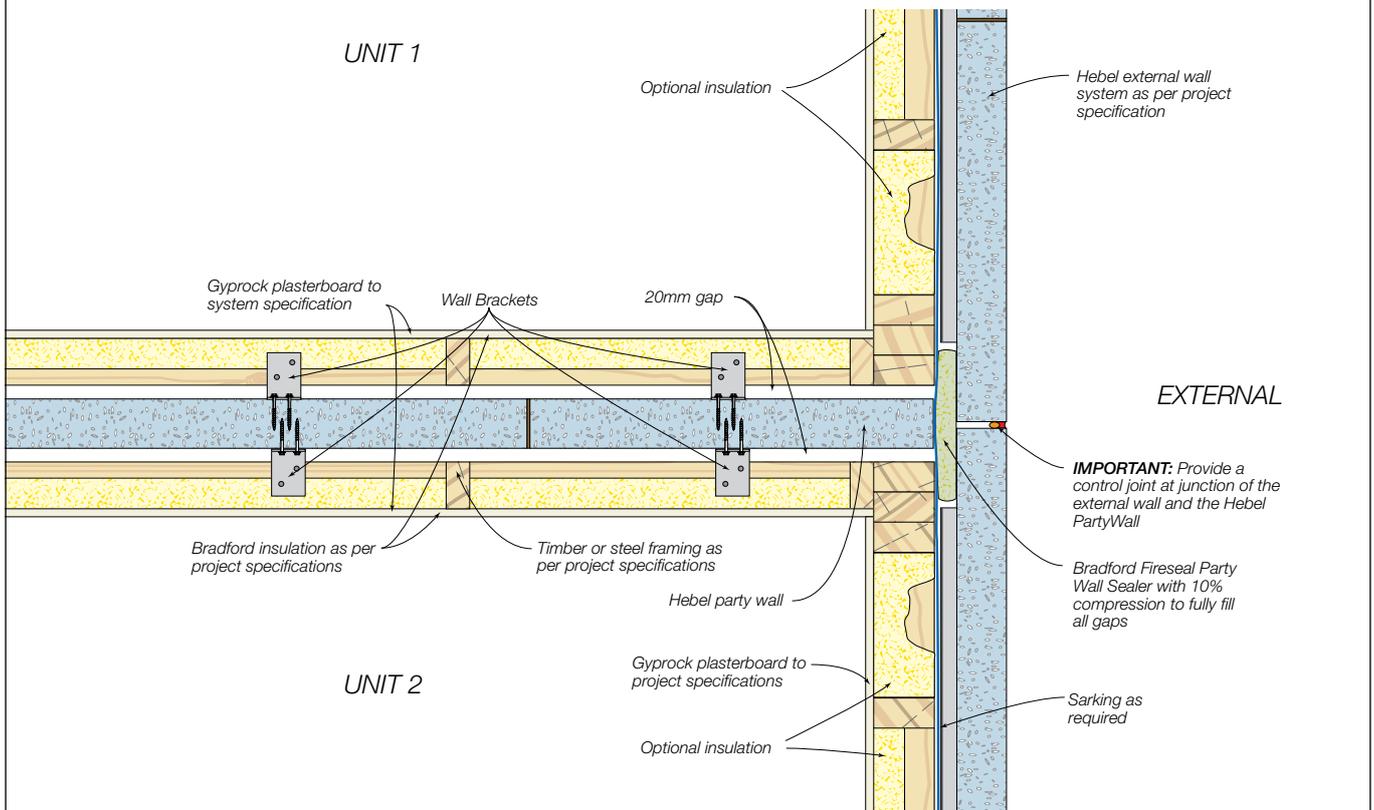
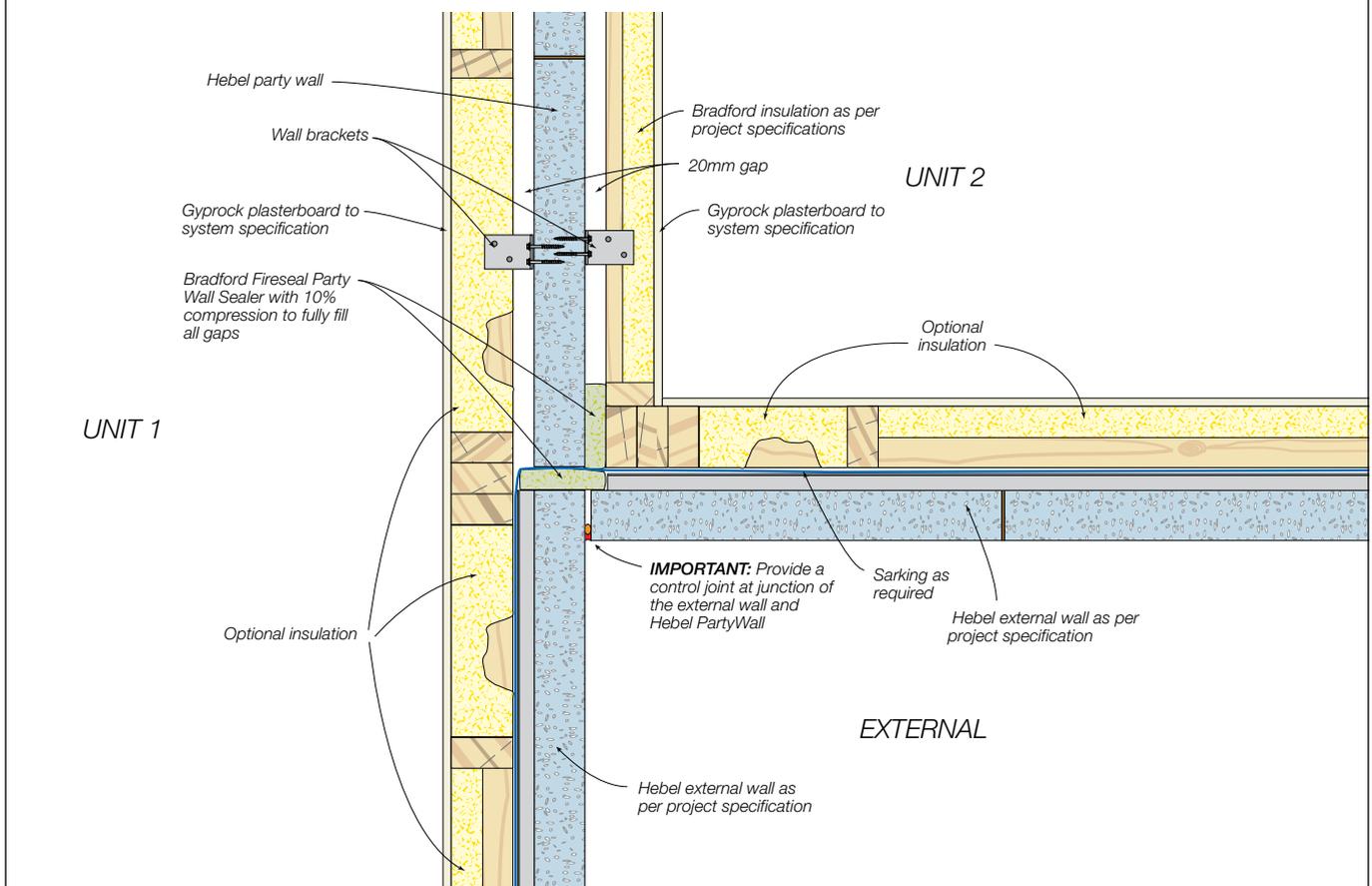


Figure 3.3.6.2 External wall corner junction for PowerPanel^{XL} Intertency Wall System



NOTE: Refer to Houses and Low Rise Multi Residential External Walls Design & Installation Guide for reference for fixings.

Figure 3.3.6.3 Blade wall junction detail

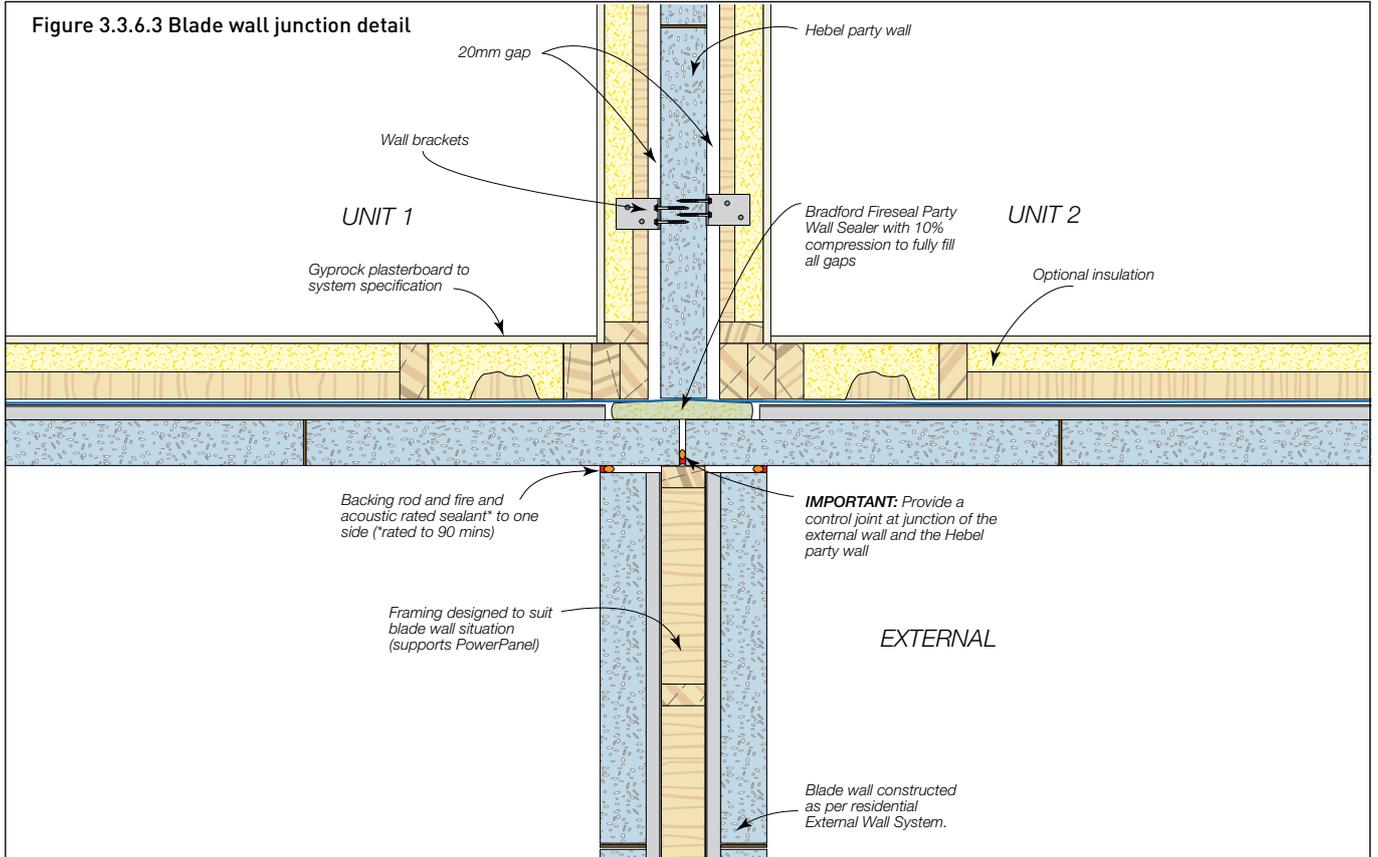
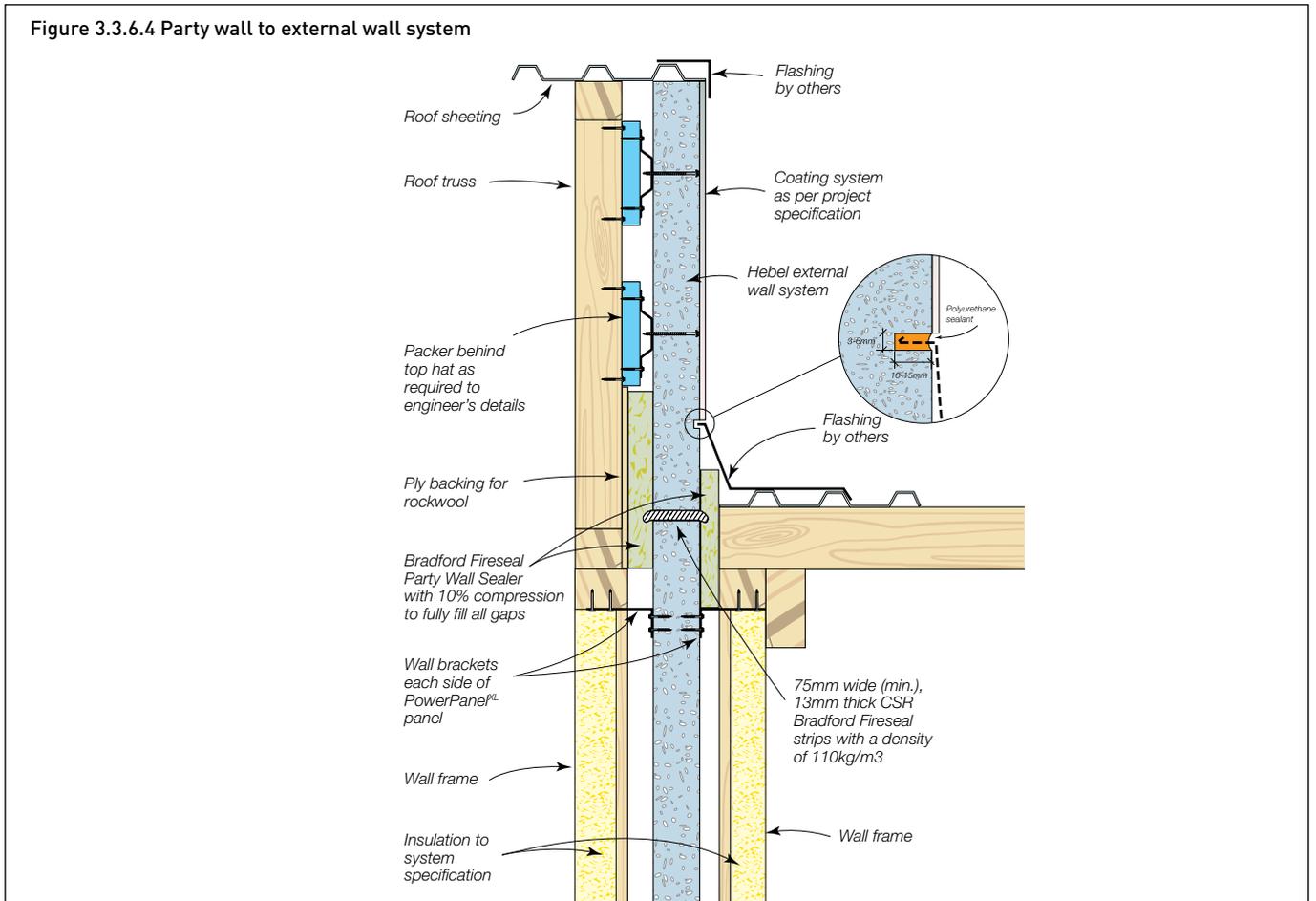
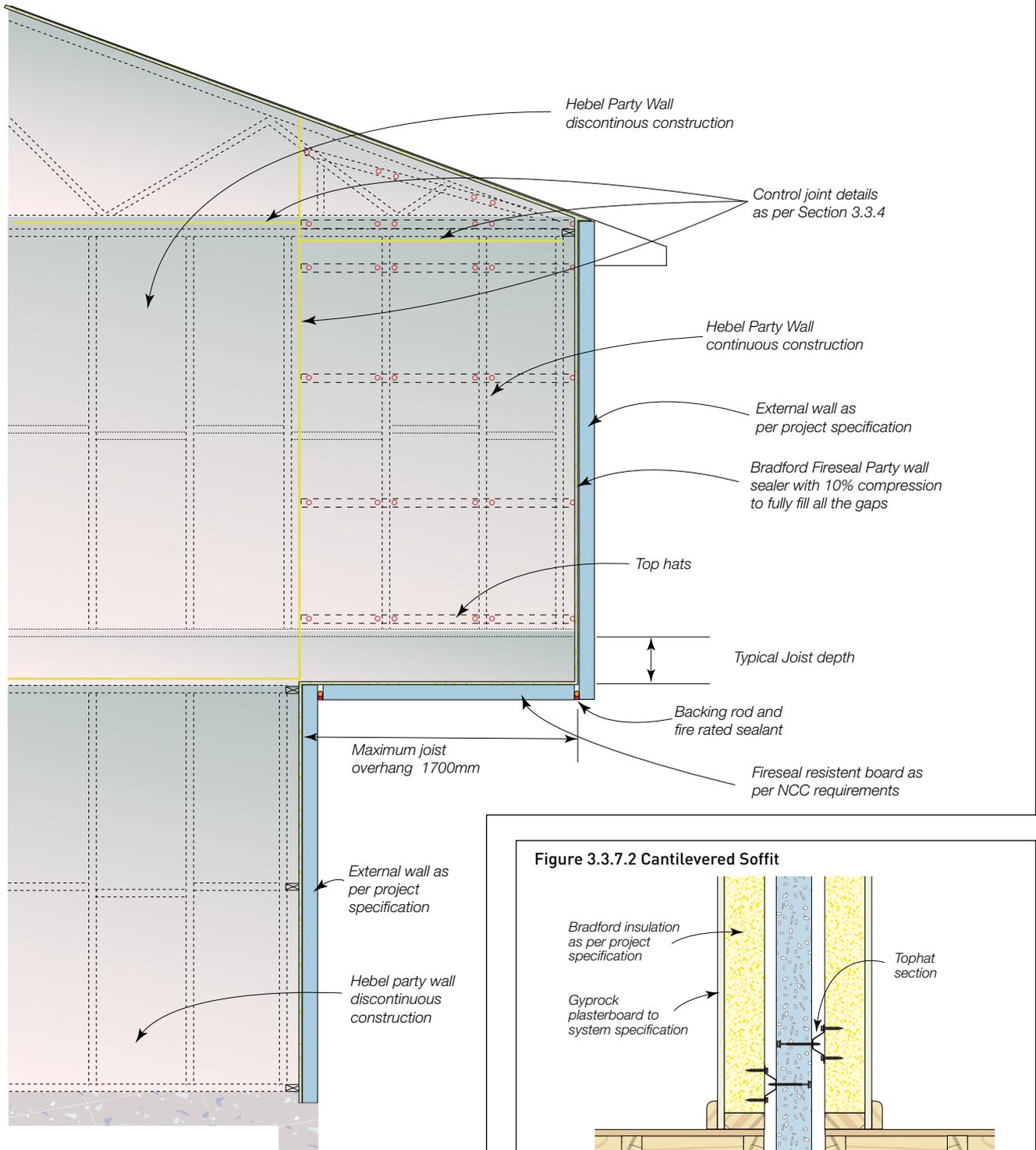


Figure 3.3.6.4 Party wall to external wall system



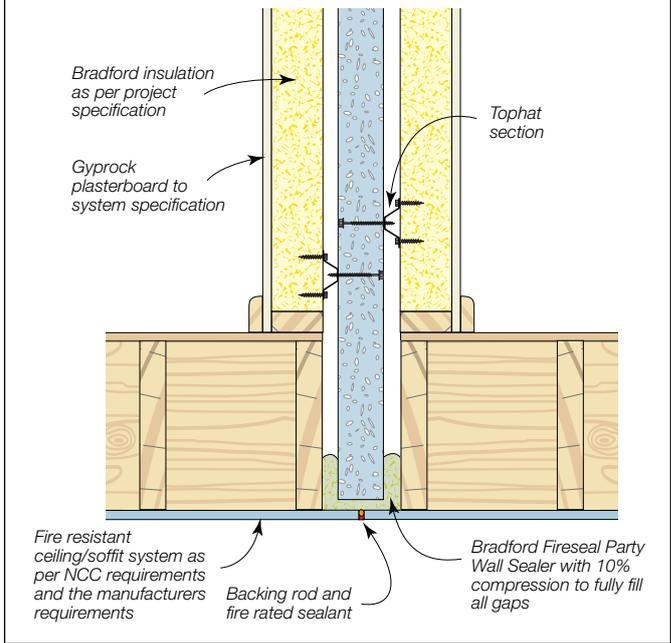
3.3.7 CANTILEVERED CONSTRUCTION

Figure 3.3.7.1 Powerpanel^{XL} Intertency wall overhang



NOTE:
 Max. panel length 3300mm.
 Max. span between support anchors 3000mm.
 Max. panel cantilever from restraint bracket 600mm.

Figure 3.3.7.2 Cantilevered Soffit



4.1 DELIVERY AND STORAGE

UNLOADING PANEL PACKS

Panel packs should only be unloaded and moved with approved lifting devices. Before use, the lifting devices should be checked for the required lifting tags. Packs should be unloaded as close as possible to the intended installation area. This will increase work efficiency and minimise the need for secondary lifting.

NOTE: Secondary handling increases the risk of panel damage. The repair of damage sustained during lifting and moving is the responsibility of the lifter. Where damage is excessive, PowerPanelXL panels must be replaced.

STORAGE

All materials must be kept dry and preferably stored undercover. Care should be taken to avoid sagging or damage to ends, edges and surfaces.

All Hebel products must be stacked on edge and properly supported off the ground, on a level platform. Panel bundles can be stacked two high. The project engineer should be consulted as to the adequacy of the structure to support the stacked bundles.

If outside, Hebel panels must be stored off the ground and protected from the weather. Only single bundles positioned

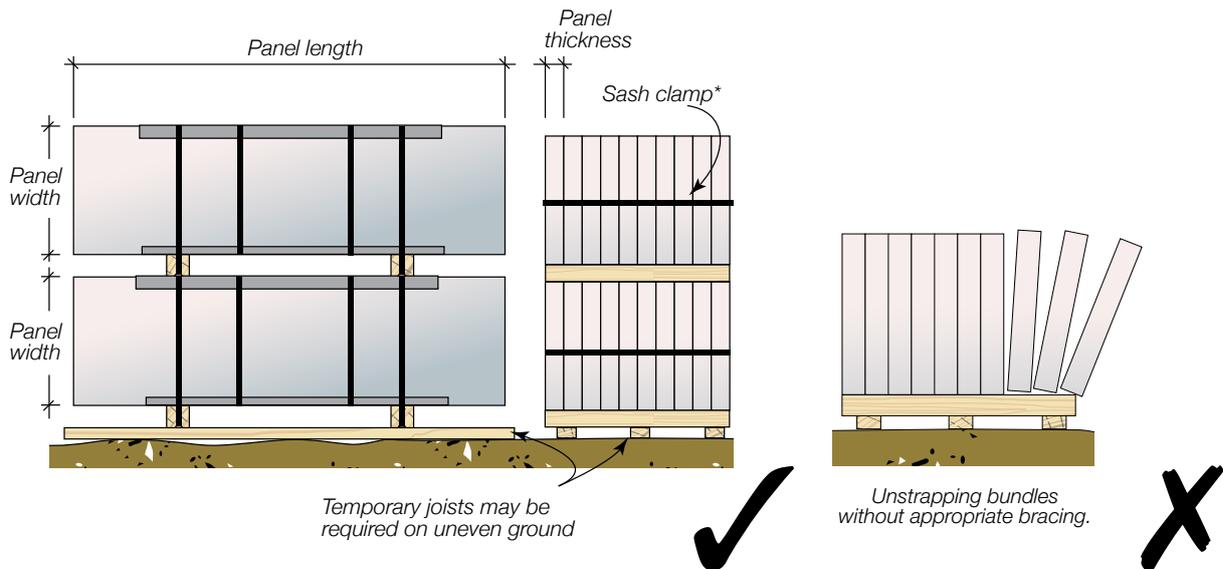
on the ground can be opened. To provide a level surface, we recommend placing temporary joists beneath the supporting cleats.

UNSTRAPPING PACKS

Ensure appropriate bracing is installed to packs prior to removal of strapping to prevent panels from falling. Panels can be held together with sash clamps, ratchet, straps or Hebel stabilising bars.



Figure 4.1.1 Stacking packs of Hebel PowerPanelXL



4.2 PANEL HANDLING

MANUAL HANDLING

Hebel recommends using a trolley or other mechanical apparatus to move the PowerPanel^{XL} panels around the work site. Manual handling where people physically move a panel should be kept to a minimum, with the weight being supported by an individual kept as small as possible. Any concerns regarding the weight to be handled should be discussed with the panel installation contractor.

To minimise the possibility of manual handling injuries, Hebel suggests the following:

- Use mechanical aids, such as trolleys, forklifts, cranes and levers, or team lifting to move panels
- Keep the work place clean to reduce the risk of slips, trips and falls, which can cause injury
- Plan the sequence of installation to minimise panel movements and avoid awkward lifts
- Train employees in good lifting techniques to minimise the risk of injury.
- Storage and handling of HebelPanel^{XL} must be in accordance with the recommendations of CSR to ensure the safety of workers on site. The panels are only to be lifted on edge and not to be handled flat. When storing, the panel orientation must be horizontal with the long edge supported on timber bearers. It is recommended to handle and store the panels as recommended above to ensure no overstress will occur.

HEBEL HOIST

Building back-to-back compliant zero boundary walls on site has been largely unachievable using traditional techniques. The difficulty includes ensuring that the walls are positioned correctly without overstepping their boundaries and that the installation techniques adopted do not in any way compromise fire performance of these walls.

Due to these issues and others such as ensuring that acoustic performance (as a minimum) achieves similar performance as that required of party walls, Hebel has developed an innovative hoisting solution that now makes it easy to install boundary walls and vastly improves the efficiency of installing intertenancy walls in areas with limited access.

This revolutionary patented lifting device attaches directly to the frame and features a rail and hoist which allows panels to be safely lifted, transported and placed precisely from above before being fixed from the inside of the building.

Suitable for steel or timber frames up to three storeys high, the Hebel Hoist allows builders to streamline their workflow by erecting all the frames first before installing the external panels. It also has the potential to allow builders to increase the footprint of their buildings by moving external walls right up to the boundary.

The Hebel Hoist is only available through trained and accredited Hebel installers. Please contact your local Hebel sales representative or the Hebel customer service centre to discuss the opportunity to improve your efficiency and profitability using Hebel Hoist.

Figure 4.2.1 Hebel PowerPanel^{XL} Trolley



Figure 4.2.2 Hebel Hoist



MECHANICALLY ASSISTED HANDLING

Moving and handling Hebel panels should be done as much as possible using mechanical aids such as forklifts, cranes and special panels lifting trolleys.

Guidelines for handling Hebel PowerPanel^{XL} using the PowerPanel^{XL} Trolley or PowerPanel^{XL} lifters are detailed in The Hebel Technical Manual Part 6.

HEALTH, SAFETY & PERSONAL PROTECTIVE EQUIPMENT (PPE)

Hebel products are cement-based, which may irritate the skin, resulting in itching and occasionally a red rash. The wearing of gloves and suitable clothing to reduce abrasion and irritation of the skin is recommended when handling Hebel products.

Approved respirators (AS/NZS 1715 and AS/NZS 1716) and eye protection (AS 1336) should be worn at all times when cutting and chasing. Refer to the Hebel Material Safety Data Sheets. Refer to the back of this Design & Installation Guide for further information regarding health and safety.

CUTTING

The use of power tools when cutting concrete products may cause dust, which contains respirable crystalline silica, with the potential to cause bronchitis, silicosis and lung cancer after repeated and prolonged exposure. When using power or hand tools, on Hebel products, wear a P1 or P2 respirator and eye protection. When cutting, routing or chasing Hebel products with power tools, use dust extraction equipment and wear hearing protection. Refer to the appropriate Hebel MSDS. For further information, contact Hebel or visit the website: www.hebel.com.au

Reinforcement exposed during cutting must be coated with a liberal application of Hebel Anti-corrosion protection paint.

Figure 4.2.3 Personal protective equipment



4.3 DESIGN, DETAILING AND PERFORMANCE RESPONSIBILITIES

Hebel engages independent testing laboratories to test and report on the performance of a wall in accordance with the relevant Australian Standards. Consultants use these reports as the basis for opinions (estimates of laboratory performance) they issue for variations or different arrangements to the tested system, and also to design and specify walls that meet appropriate criteria for a particular project. Using their experience, the consultant will make judgement about on-site installed performance of various walls. The performance levels of walls documented in this guide are either what is reported in a test or the documented opinion of consultants. Performance in projects is typically the responsibility of:

PROJECT CONSULTANTS (STRUCTURAL, FIRE, ACOUSTIC, ETC.)

These consultants are typically responsible for the following:

- Opinions on expected laboratory performance of wall configurations that vary from actual test configuration, such as substitution products and components
- Judgements about expected field performance using laboratory test reports and practical experience
- Design, specification and certification of structural, fire, acoustic, durability, weather tightness and any other required performance criteria for individual projects

This involves the design and selection of building elements, such as wall and floors and their integration into the building considering the following:

- Interface of different building elements and to the structure / substrate
- Wall and floor junctions
- Penetrations
- Flashing issues
- Room / building geometry
- Acoustic and water penetration field-testing.

PROJECT CERTIFIER AND/OR BUILDER

These professionals are typically responsible for:

- Identifying the performance requirements for the project in accordance with the National Construction Code and clearly communicating this to the relevant parties.
- Applicability of any performance characteristics supplied by Hebel including test and opinions for the project.
- The project consultant's responsibilities detailed above if one is not engaged in the project.

Hebel does not provide consulting services. Hebel only provides information that has been prepared by others and therefore shall not be considered experts in the field.

Any party using the information contained in this guide or supplied by Hebel in the course of a project must satisfy themselves that it is true, current and appropriate for the application, consequently accepting responsibility for its use.

It is the responsibility of the architectural designer and engineering parties to ensure that the details in this design guide are appropriate for the intended application.

The recommendations in this guide are formulated along the lines of good building practice, but are not intended to be an exhaustive statement of all relevant data.

Hebel is not responsible for the performance of constructed walls, including field performance, and does not interpret or make judgements about performance requirements in the NCC.

APPENDIX A: HEBEL POWERPANEL^{XL} MATERIAL PROPERTIES

A.1 Manufacturing tolerances

Length	±5mm
Width	±1.5mm
Thickness	±1.5mm
Diagonals (max.)	5mm
Edge Straightness Deviation (max.)	1.5mm

A.2 PowerPanel^{XL} physical properties

- Hebel PowerPanel^{XL} profile and nominal dimensions are shown in Section 1.4.
- Panel reinforcement is a single layer of steel mesh with 4 longitudinal wires of 4mm diameter.
- Nominal dry density = 400 kg/m³.
- Average working density = 540 kg/m³ at 35% moisture content.
- Average service life density = 440 kg/m³ at 10% moisture content.

A.3 PowerPanel^{XL} strength properties

- Characteristic Compressive Strength or AAC, $f'_{cm} = 2.38$ MPa.
- Average Compressive Strength of AAC = 2.8 MPa.
- Characteristic Modulus of Rupture, $f'_{ut} = 0.40$ MPa.

A.4 PowerPanel^{XL} acoustic properties

- Panel only with no plasterboard or other lining $R_w = 34$ dB, $R_w + C_{tr} = 30$ dB (refer to Acoustic Logic test report 2010861.15/2602A/R2/GW).

A.5 PowerPanel^{XL} thermal properties

- R-Value of PowerPanel^{XL} with no plasterboard or other lining = 0.52 m².K/W (4% moisture content).

A.6 Fire hazard indices

Hebel products have BCA Group Number 1 and also the following early fire hazard indices, determined in accordance with AS1530.3:1990:

Ignitability Index	0
Spread of Flame Index	0
Heat Development Index	0
Smoke Development Index	0-1

A.7 Fire Resistance Level (FRL) Ratings

For fire performance characteristics of Hebel PowerPanel^{XL}, refer to Section 2.3 of this guide.

ASSESSMENT METHODS

Test Reports

Assessment reports on the PowerPanel^{XL} Intertency Discontinuous Wall System have been prepared in accordance with relevant Australian Standards.

Fire assessments have been issued by Exova Warringtonfire Research (Aust) Pty Ltd.

Assessments and opinions quoted in this design guide are available on request from Hebel.

APPENDIX B: POWERPANEL^{XL} SYSTEM DESCRIPTIONS

B.1: Hebel PowerPanel^{XL} Intertency Wall System

System		Wall thickness		Cavity insulation	Wall lining both sides
Stud depth		Stud depth			
70mm	90mm	70mm	90mm		
Hebel1287	Hebel1317	275	315	Nil - both sides	1 x 10mm GYPROCK plasterboard
Hebel1288	Hebel1318			90mm Bradford Gold Batt R2.0 - both sides	
Hebel1289	Hebel1319			Martini Prime ^ MSB3 (70mm) MSB5 (90mm) - both sides Martini Prime 50 (70mm) Martini Prime 75 (90mm) - both sides	
Hebel1290	Hebel1320	281	321	Nil - both sides	1 x 13mm GYPROCK plasterboard
Hebel1291	Hebel1321			90mm Bradford Gold Batt R2.0 - both sides	
Hebel1292	Hebel1322			Martini Prime ^ MSB3 (70mm) MSB5 (90mm) - both sides Martini Prime 50 (70mm) Martini Prime 75 (90mm) - both sides	
Hebel1293	Hebel1323	281	321	Nil - both sides	1 x 13mm GYPROCK SOUNDCEK
Hebel1294	Hebel1324			90mm Bradford Gold Batt R2.0 - both sides	
Hebel1295	Hebel1325			Martini Prime ^ MSB3 (70mm) MSB5 (90mm) - both sides Martini Prime 50 (70mm) Martini Prime 75 (90mm) - both sides	
Hebel1296	Hebel1326	275	315	Nil - both sides	1 x 10mm GYPROCK AQUACHEK
Hebel1297	Hebel1327			90mm Bradford Gold Batt R2.0 - both sides	
Hebel1298	Hebel1328			Martini Prime ^ MSB3 (70mm) MSB5 (90mm) - both sides Martini Prime 50 (70mm) Martini Prime 75 (90mm) - both sides	
Hebel1299	Hebel1329	273	313	NIL - both sides	1 x 9mm GYPROCK CEMINTEL fibre cement sheet
Hebel1300	Hebel1330			90mm Bradford Gold Batt R2.0 - both sides	
Hebel1301	Hebel1331			Martini Prime ^ MSB3 (70mm) MSB5 (90mm) - both sides Martini Prime 50 (70mm) Martini Prime 75 (90mm) - both sides	



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Health & safety

Information on any known health risks of our products and how to handle them safely is on product packaging and / or the accompanying documentation.

Additional information is listed in the Material Safety Data Sheet (MSDS). To obtain a copy of a MSDS, download from www.hebel.com.au. Contractors are required by law to perform their own risk assessments before undertaking work.

Performance & certification

Hebel® products and systems are developed in Australia by CSR Building Products. ABN. 55 008 631 356. It is a manufacturer and supplier of Hebel Autoclaved Aerated Concrete (AAC) products. Because it is a manufacturer and supplier only, CSR does not employ people qualified as Accredited or Principal Certifiers.

CSR is therefore unable to provide Construction Compliance Certificates or Statements of Compliance. CSR conducts appropriate testing of its products and systems to determine performance levels. These include structural, fire and acoustic tests. Testing is conducted and certified by appropriate specialists in these fields. When using Hebel products and systems in specific projects, such specialists should be consulted to ensure compliance with the Building Code of Australia and relevant Australian Standards.

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Other

The design of a wall, floor or fence system requires the services of professional consultants. This document has been prepared as a source of information to provide general guidance to those consultants – and in no way replaces the services of the professional consultant and relevant engineers designing the project.

No liability can therefore be accepted by CSR or other parties for the use of this document. Hebel products and systems undergo constant research and development to integrate new technology and reflect ongoing performance enhancement.

Hebel systems are constantly reviewed so as to reflect any changes in legislative building requirements and or general developments in common building practice, due to our commitment to continual development and improving our building systems.

We advise that all users of this document should regularly check that this document is current, and they are applying our latest design information.

The latest editions of our documents are available on our website:
www.hebel.com.au

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For more information visit our website:

www.hebel.com.au

For sales enquiries or further information, please telephone us from anywhere in Australia:

1300 369 448

