

High Rise Multi-Residential and Commercial

Service Shaft and
Scissor Stair Walls

PowerPanel SP

Design & Installation Guide



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This Design 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 the relevant data.

Front Cover photo:

The Hyde Apartments, Sydney.
Developer - Stockland.
Builder - Grocon.

Better buildings are constructed with Hebel



Hebel is a lightweight steel reinforced Autoclaved Aerated Concrete (AAC) that has been used in Europe for over 70 years and here in Australia for over 20 years.

Hebel. A high-performance lightweight concrete panel system

Hebel is the innovative and sustainable, high-performance lightweight concrete panel system of the future – available today.

Easy to install, strong and solid, Hebel steel reinforced panels are highly versatile and can be used on all sites to provide safe and secure internal walls.

Hebel systems can achieve (and often exceed) BCA requirements, with excellent fire resistance, acoustic and thermal properties that assist in improved energy ratings for buildings and have been independently certified as meeting the requirements of Good Environmental Choice Australia. (www.geca.org.au)

Hebel. Proven and scientifically tested. Trusted by leading builders.

Hebel systems have a solid track record of trusted performance and reliability characteristics that make it an acceptable industry standard for internal wall systems. Building a Hebel internal wall results in simpler construction methods, delivers faster construction timetables and lowers risk of non-compliance with the BCA.

Australian made and backed by CSR

Hebel is 100% manufactured and warranted in Australia by CSR Building Products Limited, so you can rely on Hebel product quality, technical expertise, after sales service, warranty, support and stocked supplies.



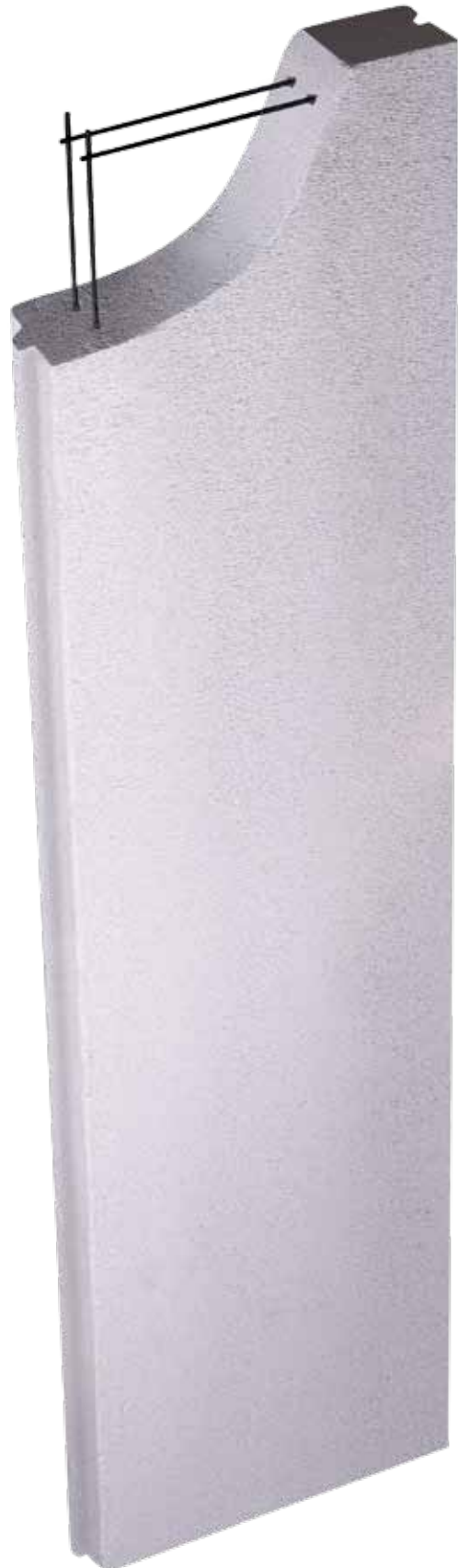
HEB - 2010
Environmentally Innovative Products

Hebel PowerPanel. Better to build with...

At the heart of this system is Hebel PowerPanel SP (Special Purpose) - a 75mm thick, steel reinforced building panel made from AAC (Autoclaved Aerated Concrete) available in various lengths to suit non-load bearing service shaft walls and scissor stair spine walls.

PowerPanel SP features a 300mm wide panel with a tongue and groove profile. It contains double reinforced steel (caged mesh) and is available in lengths up to 4800mm, fully cuttable.

The unique Hebel attributes are best summarised with the Hebel 'tick' below:



for all the best reasons



Faster construction period

Hebel internal wall systems are fast to construct and require significantly less labour compared to traditional masonry construction techniques. Building with Hebel results in savings, less mess

on-site, a cleaner, safer work area and less clean-up at completion of building.



Fire resistant for compliance, added security and peace of mind

Hebel is non-combustible and renowned for its highly fire resistant properties. PowerPanel SP achieves a

fire rating (FRL) of -/120/120 which satisfies and in some cases exceeds BCA requirements for non-load bearing internal walls.

When building with Hebel, you're building with peace of mind for your own future, as well as the ultimate occupants of your building.



Lightweight yet solid and tough as masonry

Hebel PowerPanel ensures lighter loads on structures compared to traditional masonry. This can lead to substantial savings in supportive concrete floors

in multi-storey developments. Hebel PowerPanel also provides a high degree of security between units with the application of direct fixed plasterboard or render providing the solid feel associated with masonry.



A sound reason for better acoustic qualities

Hebel pioneered the introduction of lightweight wall panels providing acoustic performance levels at or above $R_w + C_{tr} = 50$ in high rise

multi-residential buildings.

BCA acoustic compliance is simple and easy to achieve with a system that has the benefits of lightweight construction with steel reinforced masonry between the walls.



A comforting thought for a comfortable living environment

Hebel's unique AAC construction provides superior insulation qualities for a masonry product. The unique

combination of thermal resistance, along with thermal mass, makes building with Hebel a smart choice for meeting Australia's increasing building efficiency regulations.

For unit owners, the thermal efficiencies of Hebel reduce the reliance on heating and cooling appliances – the combined effects of using a heater less in winter and fans or air conditioning less in summer can have a big impact on rising energy costs.



Sustainability for a better world in the long term starts today

Hebel delivers a diverse number of environmental benefits over brick and concrete. In an independent

Life Cycle Assessment (the leading methodology used to quantify the environmental impacts of a product's entire life) undertaken by Good Environment Choice Australia in accordance with international standard ISO 14 024, Hebel was found to have clear environmental benefits across all key environmental criteria.

To be awarded the label, products must have a 30% lower impact than alternatives. Hebel uses 61% and 64% less embodied energy and 64% and 55% less greenhouse gas emissions than the comparative products, concrete and brick veneer.

As environmental consciousness and social responsibility increases, Hebel is striving to set new sustainability standards in building materials and residential living.

Hebel PowerPanel SP is ideal for use in Service Shafts and Scissor Stairs

Easier handling and installation

- 300mm panel width is lighter and easier to manoeuvre
- Tongue and groove profile ensures a snug fit
- No sealant or thin bed adhesive required between joints*

* unless acoustic performance required

Flexibility in tight access areas

- Install vertically or horizontally
- Cuttable lengths up to 4800mm
- Clear spans up to 2400mm**

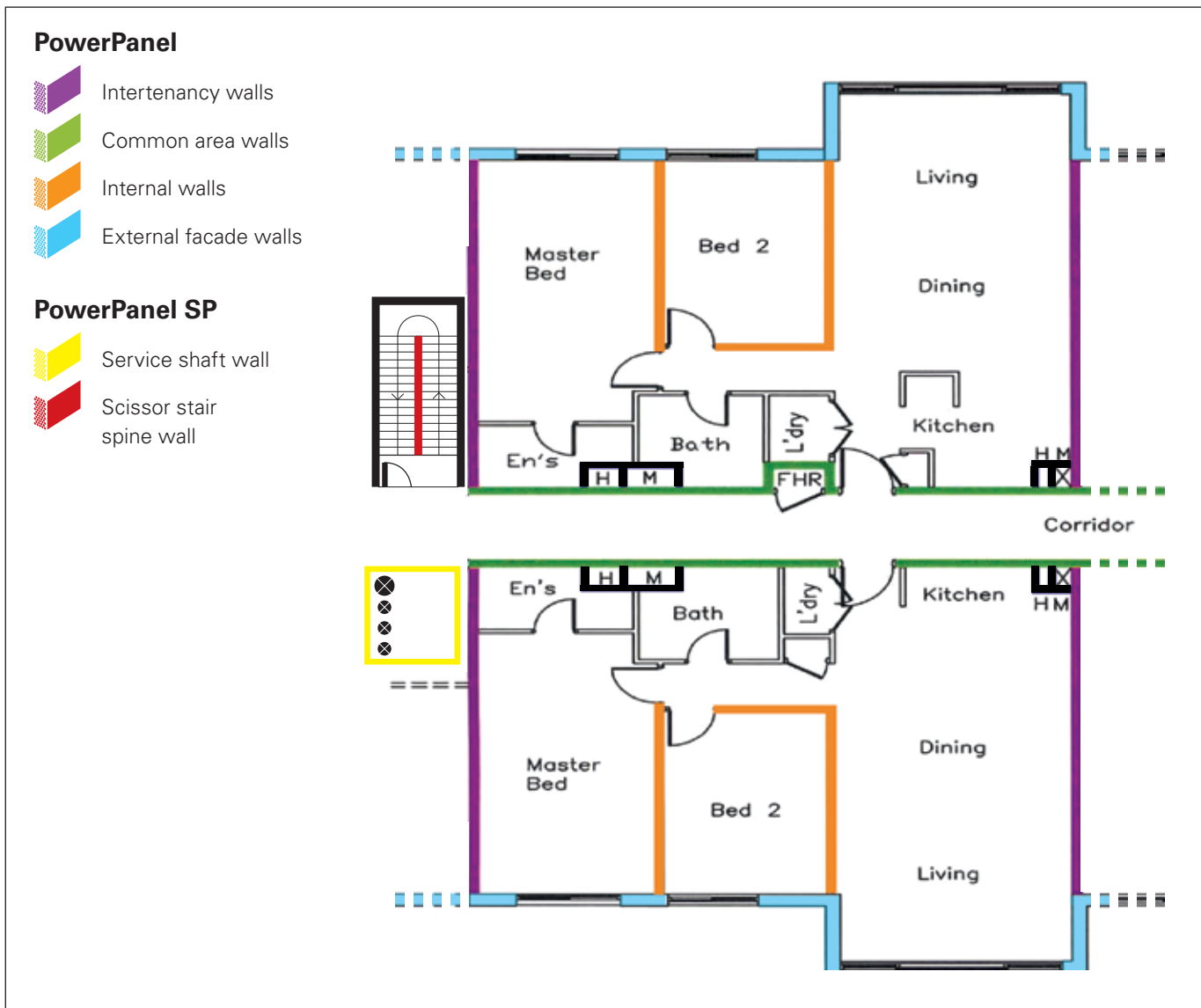
** with minimum 300mm bearing each end

Savings

- No wet trade required, less mess
- Fast to install
- Fewer trades on site

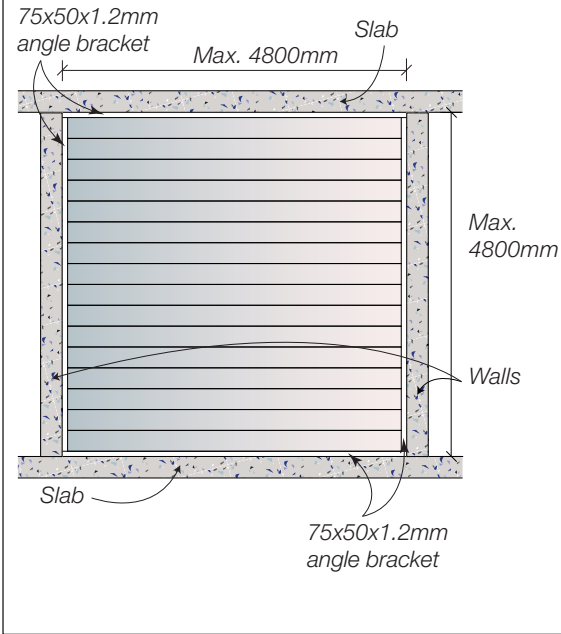
Compliance

- Bare system achieves FRL of -/120/120
- Satisfies BCA requirements for non-load bearing internal walls (Type A & B construction), Class 2 to 9 buildings
- Extends the versatility of Hebel into even more applications

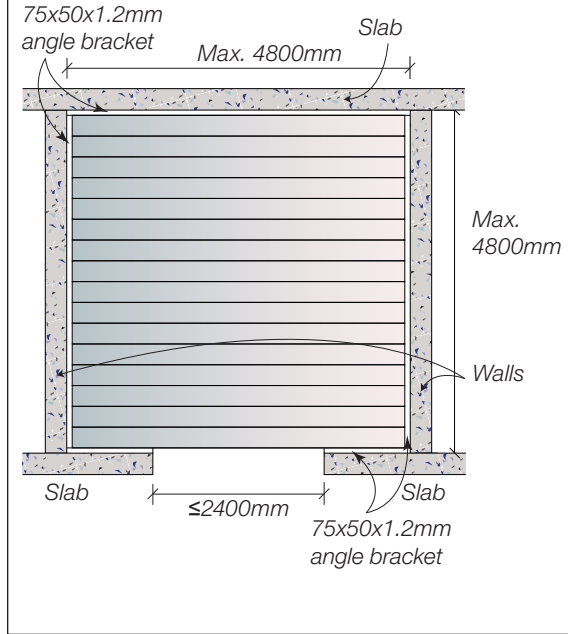


1.1 Application in Service Shafts and Scissor Stairs

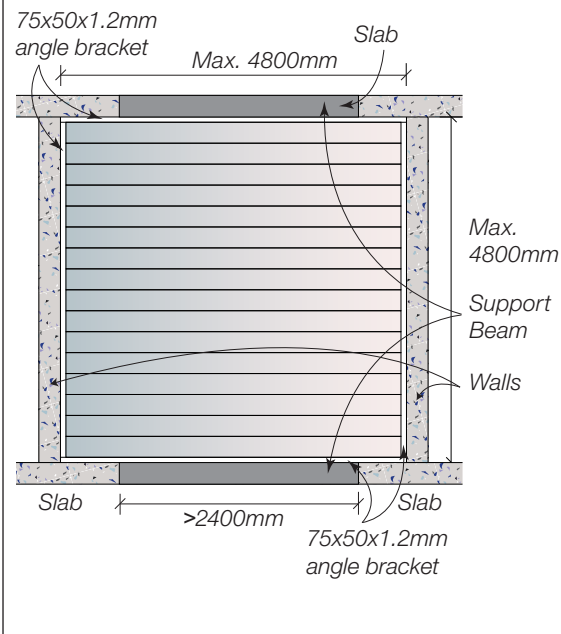
**Figure 1. Service Shaft
Horizontal Installation**



**Figure 2. Service Shaft with ≤ 2400 mm
Opening - Horizontal Installation**

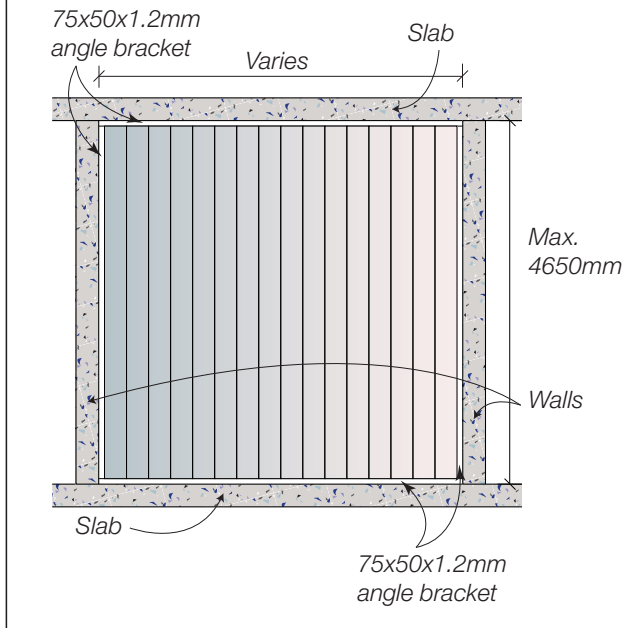


**Figure 3. Service Shaft with > 2400 mm
Opening - Horizontal Installation**

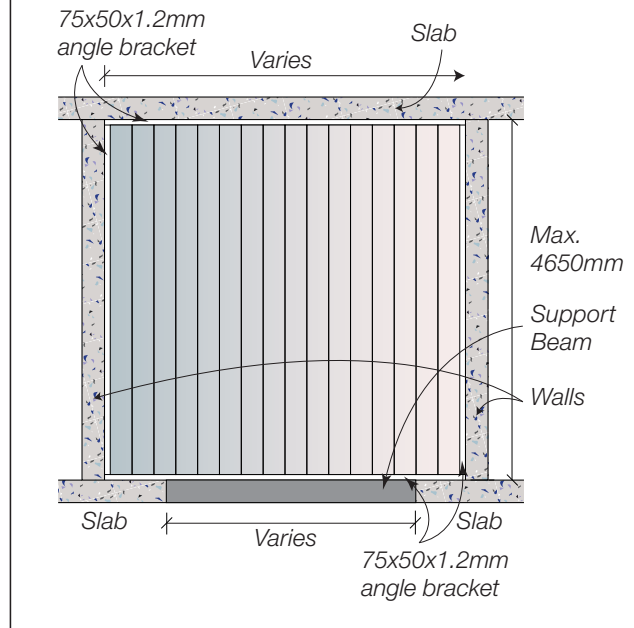


Application in Service Shafts and Scissor Stairs

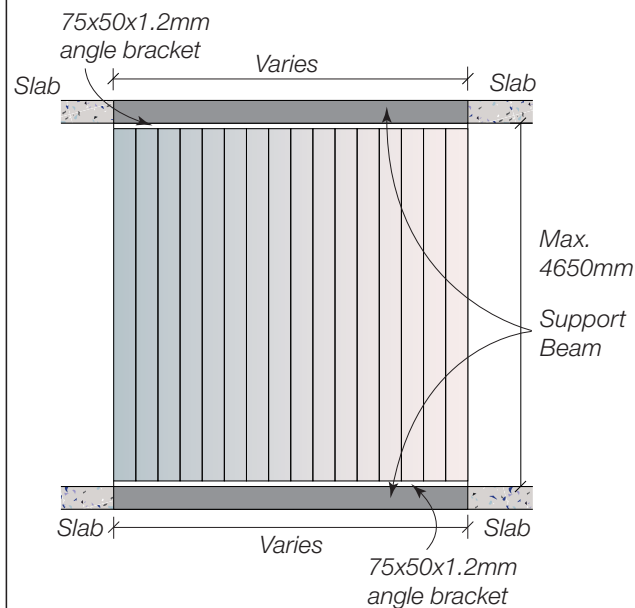
**Figure 4. Service Shaft
Vertical Installation**



**Figure 5. Service Shaft with Opening
Vertical Installation**

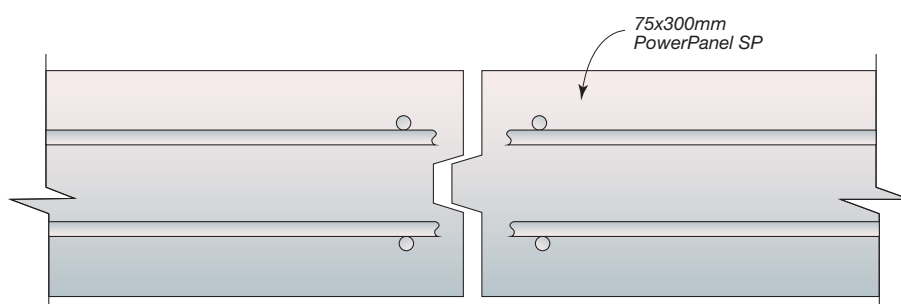
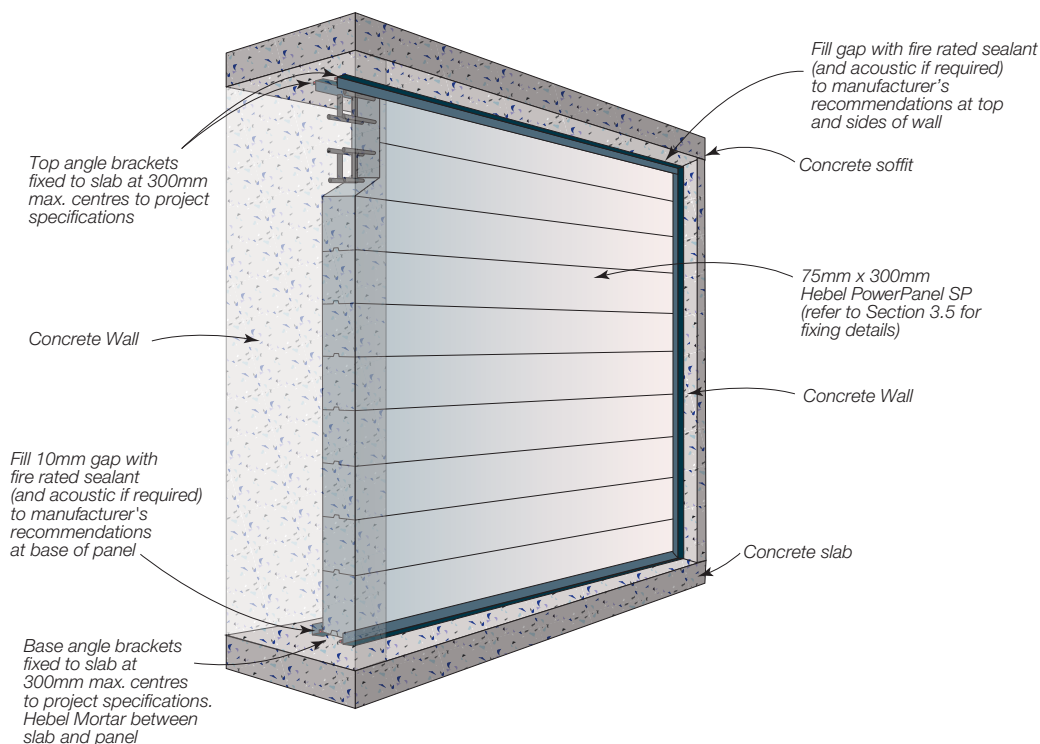


**Figure 6. Scissor Stair Spine Wall
Vertical Installation**



Service Shaft Wall - Option 1 (Horizontal Panel Installation)

Recommended for: Shafts up to 4800mm high.



Code	Application	Wall Thickness	Max. Wall Height	Max. Wall Length	FRL ^(A)	R _w ^(B)	Paint Finish	Panel
HEB1206	Bare Shaft	75mm	4800mm	4800mm	-/120/120	36.7	Optional	75mm PowerPanel SP Tongue & Groove (caged mesh)

Maximum panel span is 2400mm with minimum 300mm bearing each end.

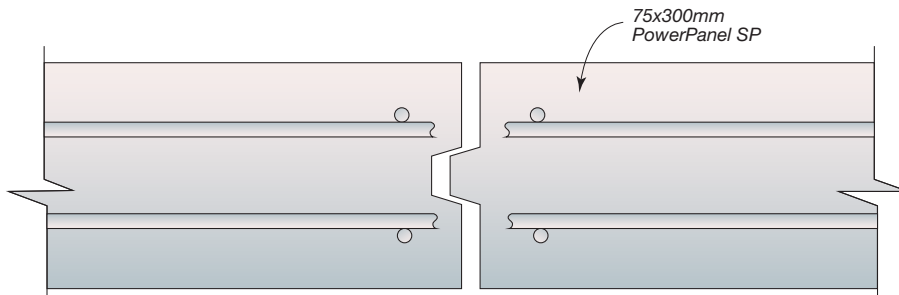
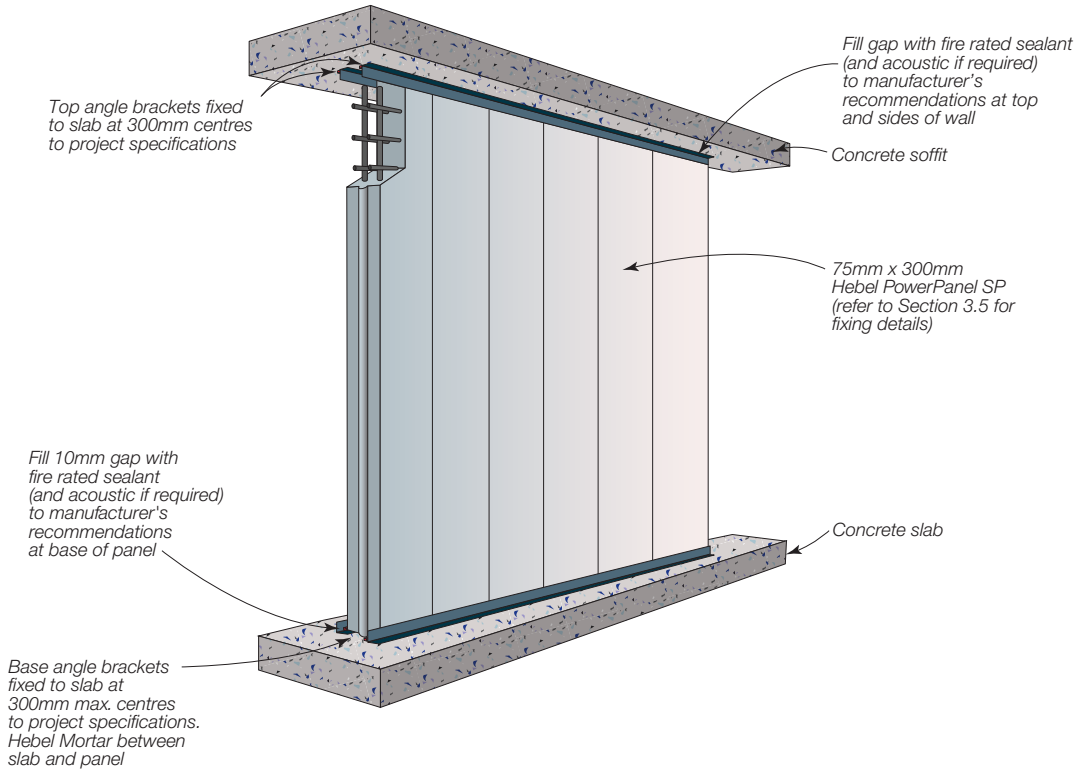
Spans over 2400mm require a support beam - contact Hebel Technical Services.

(A) FRL values are based on results from the Exova Warringtonfire Assessment Report 26095-01 issued on 13th February, 2012.

(B) Result achieved when sealant applied on wall perimeter and Hebel Adhesive at all panel joints. R_w values are based on acoustic opinion 2010 861.3/2305A/RO/GW provided by the Acoustic Logic Consultancy Pty Ltd.

Service Shaft Wall – Option 2 (Vertical Panel Installation)

Recommended for: Shafts up to 4650mm high, where access may be limited.



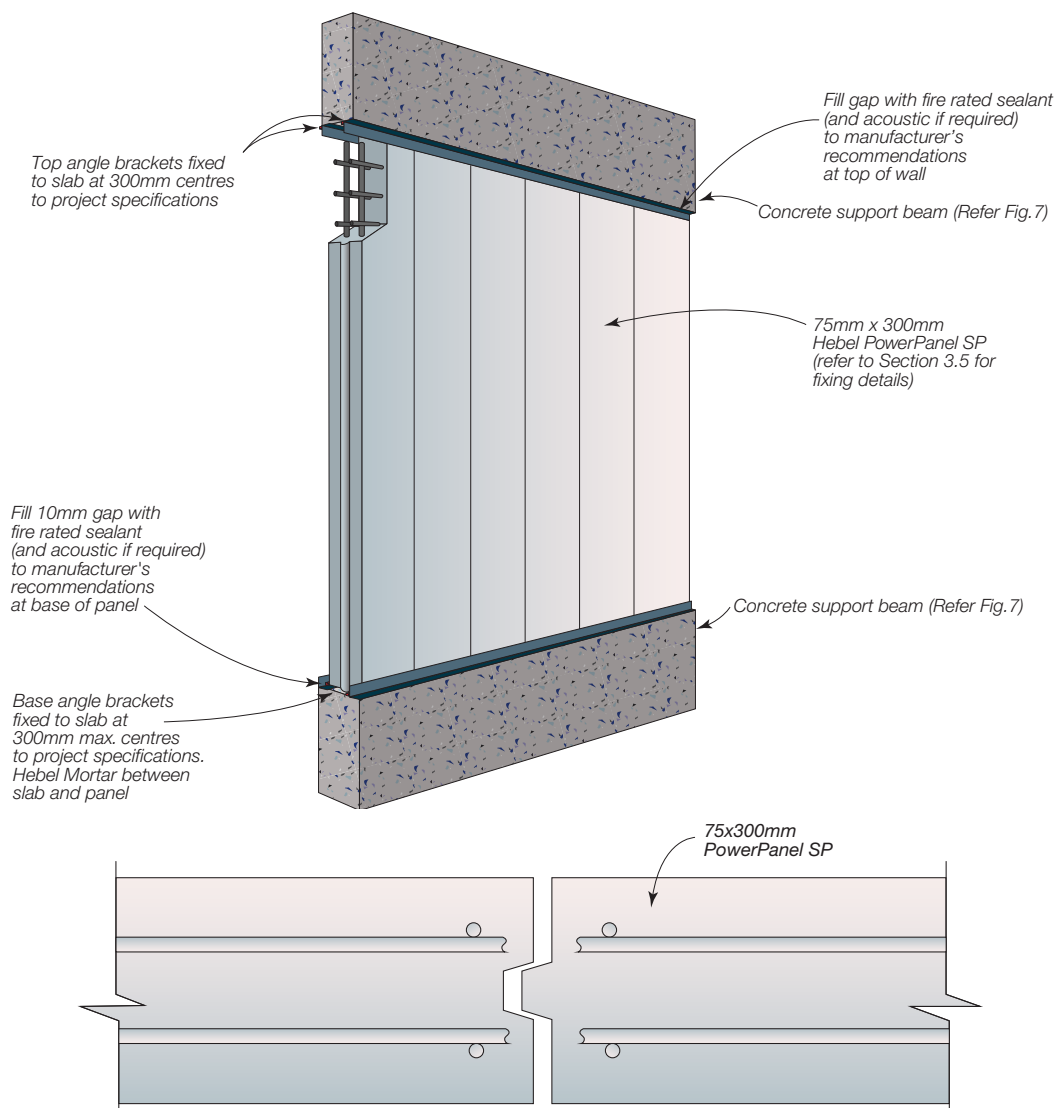
Code	Application	Wall Thickness	Max. Wall Height	Max. Wall Length	FRL ^(A)	Rw ^(B)	Paint Finish	Panel
HEB1207	Bare Shaft	75mm	4650mm	varies	-/120/120	33	Optional	75mm PowerPanel SP Tongue & Groove (caged mesh)

(A) FRL values are based on results from the Exova Warringtonfire Assessment Report 26095-01 issued on 13th February, 2012.

(B) Result achieved when sealant applied on wall perimeter and Hebel Adhesive at all panel joints. Rw values are based on acoustic opinion 2010 861.3/2305A/RO/GW provided by the Acoustic Logic Consultancy Pty Ltd.

Scissor Stair Spine Wall – (Vertical Panel Installation Only)

Recommended for: Spine wall construction in fire stairs where a two hour fire rating is required.



Code	Application	Wall Thickness	Max. Wall Height	Max. Wall Length	FRL ^(A)	Rw ^(B)	Paint Finish	Panel
HEB1300	Spine Wall	75mm	4650mm	varies	-/120/120	33	Optional	75mm PowerPanel SP Tongue & Groove (caged mesh)

(A) FRL values are based on results from the Exova Warringtonfire Assessment Report 26095-01 issued on 13th February, 2012.

(B) Result achieved when sealant applied on wall perimeter and Hebel Adhesive at all panel joints. Rw values are based on acoustic opinion 2010 861.3/2305A/RO/GW provided by the Acoustic Logic Consultancy Pty Ltd.

Figure 7 - Scissor Stair Spine Wall Construction



1.2 System Components

Hebel PowerPanel SP

The primary component of Hebel Service Shaft and Scissor Stair Spine Walls is the 75mm thick Hebel PowerPanel SP.

PowerPanel SP is 300mm wide with a tongue and groove profile, and contains double reinforced steel (caged mesh).

Other PowerPanel products are manufactured in a range of standard and custom sizes; please refer to the High Rise Multi-Residential Intertency and Service Walls Guide for details of other systems not contained here (Reference HEB 1354 - March 2012).

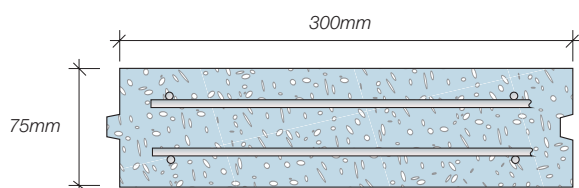


Table 1.1 Standard PowerPanel SP Sizes

Thickness	Length (mm)	Width (mm)	Weight* (kg/m ²)
75mm	2700	300	53
	2850	300	53
	3000	300	53
	3300	300	53
	3600	300	53
	3900	300	53
	4200	300	53
	4500	300	53
	4650	300	53
	4800	300	53

Note:

- Tongue and groove profile, caged mesh panel, cuttable to any length.
- *Average panel weight calculated at 30% moisture content.
- Max. panel length 4800mm - weight 75kg.

Table 1.2 Typical Hebel Internal Wall Components for PowerPanel SP

Components	Required Performance Attributes	
	Fire	Fire and Acoustic
Hebel PowerPanel SP: 300mm T&G caged mesh panel	✓	✓
Angle Bracket (Perforated 75mm):	✓	✓
Fasteners/Fixings: <ul style="list-style-type: none"> • 14-10 x 65mm Hex Head Type 17 screws • 14-10 x 100mm Hex Head Type 17 screws • 14-10 x 150mm Hex Head Type 17 screws 	✓	✓
Hebel Mortar or Non-Compressible Packers	✓	✓
Backing Rod	✓	✓
Polyurethane Fire Sealant	✓	✓
Hebel Anti-Corrosion Protection Paint	✓	✓
Hebel Adhesive or Acoustic Rated Sealant		✓
Hebel Patch	✓	✓

Angle Bracket (Perforated 75mm)

For positioning and restraining (with added screw fixings) the top, bottom and sides of the panels. The following angles are recommended for use in Hebel internal walls:

Perforated Angle Bracket - galvanized steel angle for head and base connection 75x50x1.2 BMT.

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 by the project engineer.

Figure 8 - Hex Head Type 17 screw

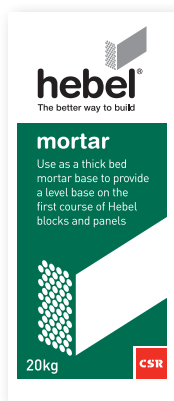


- 14 - 10 x 65mm Hex Head Type 17 screws
- 14 - 10 x 100mm Hex Head Type 17 screws
- 14 - 10 x 150mm Hex Head Type 17 screws

Hebel Mortar

Hebel Mortar is used to provide a level base for panel installation as well as providing fire protection at the base of the panels.

Hebel Mortar (supplied in 20kg bag) is used as a mortar base.



Packers

Use as an alternative to Hebel Mortar to provide a level base for panel installation. Non-compressible packers must be used.

Backing Rod

Use to contain application and depth of fire sealant at control joints to ensure it conforms to sealant manufacturers' recommendations.

Fire Sealant

To attain the specified FRL requirements, all perimeter gaps and penetrations must be carefully tooled and completely filled with an appropriate flexible polyurethane fire sealant installed to the manufacturers' specifications.

Hebel Anti-Corrosion Protection Paint

Reinforcement exposed when panels are cut must be coated with a liberal application of Hebel Anti-Corrosion Protection Paint.



Hebel Adhesive or Acoustic Rated Sealant at panel joints (optional)

If a higher acoustic rating is required, Hebel Adhesive (supplied in 20kg bag) or acoustic rated sealant is used for bonding the panels together at vertical and horizontal joints.

Hebel Patch

Minor chips or damage to panels are repaired using Hebel Patch (supplied in 10kg bag).



2.1 Performance and Structure of Hebel Internal Walls

End Bearing

If an opening of up to 2400mm is required, the Hebel panels that form the base of the wall need a minimum bearing length of 300mm between steel/concrete supports.

Cut Panels

All exposed reinforcement to be painted with a liberal coating of Hebel Anti-Corrosion Protection Paint.

Internal Walls

For internal walls, a maximum lateral ultimate load of 0.375kPa has been assumed.

Building Tolerances

During the construction of the building, there are tolerances to control the accuracy of the building dimensions and locations to an acceptable standard. Additionally, control joints are required in the walls to tolerate and accommodate the movement of the structure (see Fig 18, Page 30). These tolerances are nominated in the appropriate specification of the project.

Hebel recommends that tolerances be specified in the project documents to ensure that support elements, such as steel and concrete columns and slab edges, are fabricated within the surface plane. This will minimise on site trimming of panels and other unnecessary work.

Control Joints

Control joints are necessary to accommodate building movements and to relieve any induced stresses due to thermal expansion and contraction, differential movements between differing materials and support structure movements (i.e. lateral sway or vertical deflection).

Control Joint Placement

Vertical control joints should coincide with control joints in the supporting structure and anywhere that significant structural movement is expected, where the wall abuts a vertical structure, such as a column, or adjacent to large openings.

Horizontal control joints should be placed between the top of the wall and slab soffits/angles or roof structures. The horizontal joints should accommodate any expected vertical deflection from the structure.



Control Joint Width

The designer shall determine the joint width so that the sealant configuration can accommodate the calculated movements.

Typically the control joint widths are as follows:

- 10mm minimum for vertical control joints.
- 20mm minimum for horizontal control joints.

All control joints must be filled with an appropriate flexible, fire rated polyurethane sealant and backing rod.

IMPORTANT

- The building designer must confirm all control joint widths as the magnitudes of expected horizontal and vertical movements (deflections) might vary from project to project.
- Control joint locations and geometry must be confirmed by the building designer.
- Minimum specification for control joint details must include:
 - 6m maximum distance between control joints on straight wall runs.
 - At all corners in walls where movement and/or expansion and contraction is possible.
 - At all junctions where Hebel wall panels abut a structure of different material.

Sealants

All control joints and gaps between the panels and infill or penetration framing must be filled with an appropriate flexible, fire rated polyurethane sealant. The sealant should be designed and installed in accordance with the sealant manufacturer's specifications. The specifications will provide information regarding priming the surface, geometry of sealant (width/depth ratio), sealant surface profile (i.e. concave), substrate preparation, etc. Typically a backing rod is used to control the depth of sealant and the sealant is bonded on two sides only.

NOTE

- Where different types of sealant come in contact, the designer must ensure the sealants are compatible.
- Depending on the type of sealant used, the surface of Hebel wall panels might require some preparation and/or priming.

Condensation

Condensation is a complex problem, and can occur under a variety of conditions, not just cold conditions. Literature on this subject is available from CSIRO/BRANZ/ASHRAE and must be consulted when building in areas where condensation is likely to occur.

Penetrations

Small service penetrations through the panel of the Hebel internal wall should allow for differential movement between the panel and the service. All penetrations are a potential source of water ingress and should be sealed with an appropriate flexible, fire rated polyurethane sealant.

Non Hebel Components

Components which are not manufactured by Hebel, such as the structural support elements, Gyprock™ plasterboard, sealants, coatings and others, must be designed, installed and handled in accordance with their manufacturers' guidelines and recommendations.

Additional Steel Supports

For large openings or to allow connection of Hebel wall panels to the main support structure, additional structural steelwork may be required. The project engineer shall design this steelwork.

2.2 Fire Rating Performance

Fire Resistance Level (FRL) Rating of Hebel Internal Walls

The maximum wall heights for this system in Table 2.1 are taken from the Exova Warringtonfire Assessment Report 26095-01 issued on 13th February, 2012.

Fire Certificates & Reports

Copies of the fire test reports and/or opinions can be obtained by contacting Hebel Technical Services.

Fire Protection of Penetrations

The FRL rating of the wall can be affected by the penetrations and the method adopted to protect these penetrations.

Penetrations through Hebel PowerPanel to accommodate pipework, electrical cabling or ductwork will have to be protected (fire stop), to prevent the spread of fire through the penetration.

The penetration can be protected with proprietary products such as:

- fire rated sealants;
- fire collars and intumescent wraps;
- fire rated mortars; fire rated pillows;
- fire rated switch boxes.

Hebel recommends contacting the manufacturer to obtain the appropriate product/solution and installation method for the application and wall configuration.

Table 2.1 Internal Walls

System	Maximum Wall Height FRL (minutes) -/120/120
HEB 1206 Service Shaft Wall Installed Horizontally	4800mm
HEB 1207 Service Shaft Wall Installed Vertically	4650mm
HEB 1300 Scissor Stair Spine Wall Installed Vertically	4650mm

2.3 Structural Performance

Pressurisation

Hebel internal walls are non-load bearing walls used in internal applications. The walls are designed to resist a maximum ultimate pressure of 0.375kPa.

Cutting of Hebel PowerPanel

For the load parameter outlined above (uniformly distributed load) UDL 0.375kPa, the standard Hebel panels can be reduced in width by cutting to a minimum width of 150mm. For UDL greater than 0.375kPa, Hebel PowerPanel will need to be designed to ensure structural adequacy when cut.

Earthquake Loading

Earthquake loading has not been considered in this Design and Installation Guide

2.4 Acoustic Performance

This system has been tested for acoustic performance. If acoustic performance is required, refer to opinion 2010861.3/2305A/RO/GW provided by the Acoustic Logic Consultancy Pty Ltd. Selection of Hebel walls should be taken with specialist consultant's advice.

Internal Walls Acoustic Performance Design Recommendations

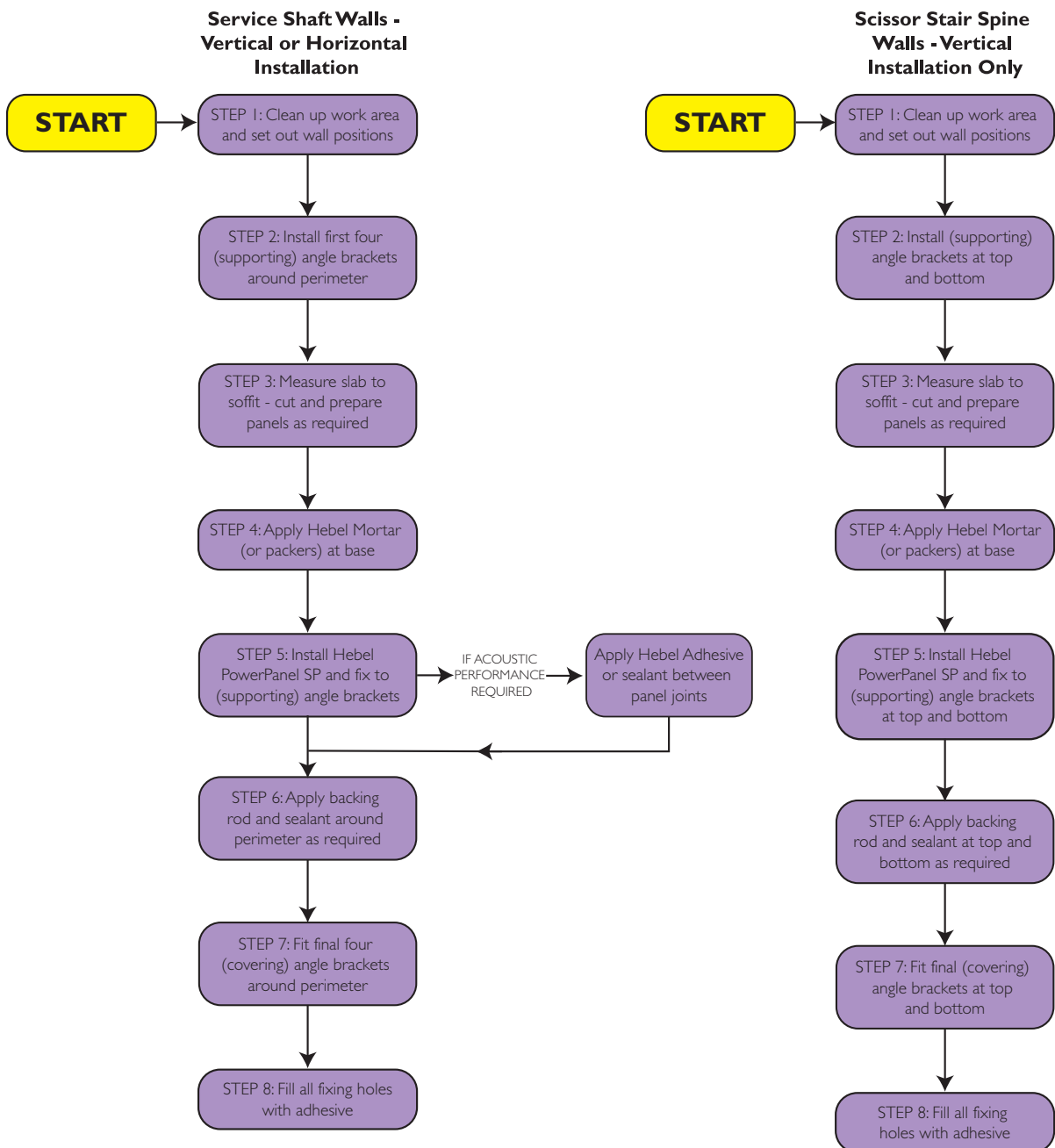
- 1) Hebel recommends engaging a specialist acoustic consultant on a project by project basis to provide design advice, confirmation of anticipated field performance, detailing and installation inspections.
- 2) When selecting the appropriate Hebel wall, the designer or specifier must be aware that the 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 Hebel wall systems, and any required modification of the installation details pertaining to the systems.

4) The acoustic performance values of the Hebel walls shown here are a guide only as to expected lab test 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.
- All services penetrations, etc are acoustically sealed and treated so that negligible sound transmission occurs through 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.

3.1 Installation Flowchart for Hebel Internal Walls

Installation Flowchart for PowerPanel SP* High Rise Multi-Residential and Commercial



*Refer also to Installation Detail Sections 3.2 to 3.5

3.2 Installation of Hebel PowerPanel SP

Setting out and positioning of walls

Before commencing any installation work, clean and tidy up the work area.

Hebel Angle Bracket Installation

When the wall locations have been set out, fix the angle brackets to the concrete support structures. This is done using suitable fixings (see Details in Section 3.5) at 300mm maximum centres and maximum 100mm from ends. At changes in wall directions, ensure angle brackets are mitred with no gaps at the corners. Seal all butt joints with fire rated polyurethane sealant.

Gaps between the angle brackets and irregular soffit surfaces should be sealed with a 5mm minimum diameter bead of fire sealant as per project specifications.

Backing Rod and Fire Sealant Installation

The backing rod is positioned inside the angle brackets. Tape or contact adhesive may be used to temporary secure the rod in place prior to installation of the panel. Select the appropriate diameter rod to suit the deflection gap at the top and sides of the wall.

The rod should be continuous, but where connections are unavoidable, the rod shall be spliced by overlapping a minimum of 200mm.

If a backing rod is used, then as the panel is positioned into place the rod must be compressed the specified minimum distance. A 22mm diameter rod shall be used in a 15mm gap and shall be compressed 7mm minimum.

Hebel Mortar Installation

Mortar is placed after the base supporting angle is installed. It should only be run out roughly 3 panels ahead of panel installation ie. 900mm for vertical installation. For horizontal installation run the mortar out to the panel length. The mortar bed fills the gap at the base of all panels. Generally, the mortar bed is 10mm thick and extends the full 75mm thickness of the panel.

Mixing of the mortar must be done in accordance with the instructions on the bag.

Packers Installation (optional)

If packers are used instead of mortar, non compressible 50x50mm packers are recommended.

Set back 20mm to allow for sealant to fill the gap. For vertical installation, use one packer at either edge of the panel. For horizontal installation, place at 600mm centres. Refer to Figs 21-24 on page 31.

Hebel PowerPanel SP Installation

If needed, the panels can be cut on-site using a circular saw equipped with diamond tipped turbo cutting blade (for panel cutting limitations refer to Section 2.3). All the loose AAC particles should be brushed off the panel with a stiff broom. Steel reinforcement that is exposed during cutting must be coated with a liberal application of anti-corrosion protection paint (see Section 1.2). Any minor damage and chips to the panels must be repaired using Hebel Patch.

Fix the ends of each panel to the supporting angle with one screw per panel, placed centrally (see Section 1.2 for screw types).

Hebel Adhesive Application (optional)

Where acoustic performance is required, Hebel Thin Bed Adhesive must be applied to the joints between panels 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.

Installation of Final Sealants

Where control joints are required, they should be sealed off with fire rated polyurethane sealants (and acoustic if required). Installation of sealants must be carried out in accordance with the manufacturers' specifications.

Installation of Penetrations

Installation of penetrations into Hebel internal walls shall be carried out in an appropriate construction sequence so as not to damage the panel. This will allow easy access to cavities, steel framed elements and Hebel panels, 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 and penetrations on a project by project basis.

Neat finishes for all penetrations are necessary to maintain the fire integrity of the wall (and acoustic integrity if required). For more information regarding installation penetrations, refer to Figures 19 and 20 on page 30 of this Design Guide.

Installation of Fasteners and Fixings

All fixings and fasteners shall be installed in accordance with the manufacturers' specifications.

3.3 Coatings

Typically in Commercial applications, the surface finish of Hebel internal walls is determined according to project specifications and the intended use of the building. Hebel service shaft walls and scissor stair spine walls can be left in their manufactured finish or simply and cheaply coated with a paint or textured paint.

If a coating is required, products such as Dulux Professional Total Prep may be used. Total Prep is a high quality, white or tintable 100% acrylic primer/sealer/undercoat with excellent opacity, adhesion, flow, sealing and filling properties. It can be applied using airless/conventional spray or brush and roller. Refer to dulux.com.au for more information and other paint finishes.

All substrate preparation and coating applications shall be in accordance with the coating manufacturers' specification.

3.4 Design and Installation Considerations

Penetrations

Hebel internal walls can accommodate penetrations provided not more than 150mm of the panel width is removed in locating the penetration and there is no reduction of structural performance of the Hebel panel. The edge of the penetration shall be 15mm maximum from the service passing through the wall. Contact your fire consultant for detailing of penetrations to ensure the nominated fire performance is achieved.

Wall Chasing

Wall chasing is not permitted in accordance with the BCA (Volume 1 Specification F5.2) in any acoustic or fire rated wall system. If chasing is required, contact Hebel Technical Services.

Fire & Acoustic Integrity

Penetrations in walls for electrical fittings, telecommunications, large ductwork, or plumbing systems can be a substantial source of sound leakage, which can affect the acoustic and fire performance of the wall.

When electrical, telecommunication or plumbing services are required, the contractor shall install these services neatly and, when passing through the wall, shall provide a close fitting hole, sealed with an approved fire rated polyurethane sealant (and acoustic if required). Detail of stopping material is to be provided by an appropriate consultant and installed in accordance with the manufacturer's recommendations.

To prevent water noise degrading the acoustic amenity of the wall system, water-bearing pipes should be acoustically wrapped and resiliently fastened.

Hebel recommends the use of fire rated switch boxes and collars (such as those manufactured by PROMAT, CLIPSAL or HPM) as these assist in maintaining the acoustic integrity of wall systems. When installing these devices please consult with the manufacturer for design and installation recommendations.

Where acoustic integrity is important, electrical switches must not be installed back to back as this could be a source of sound leakage.

Fire Dampers

Hebel internal walls can accommodate penetration for fire dampers provided penetration guidelines are followed. The gap between the fire damper and the wall is to be treated in accordance with fire damper manufacturers' recommendations.

Fasteners

The correct sized fasteners for the construction of the wall system must always be used. When fitting large or heavy fixtures, guidance on the correct fasteners can be found in Section 8 of the Hebel Technical Manual and/or from the fastener manufacturers' recommendations.

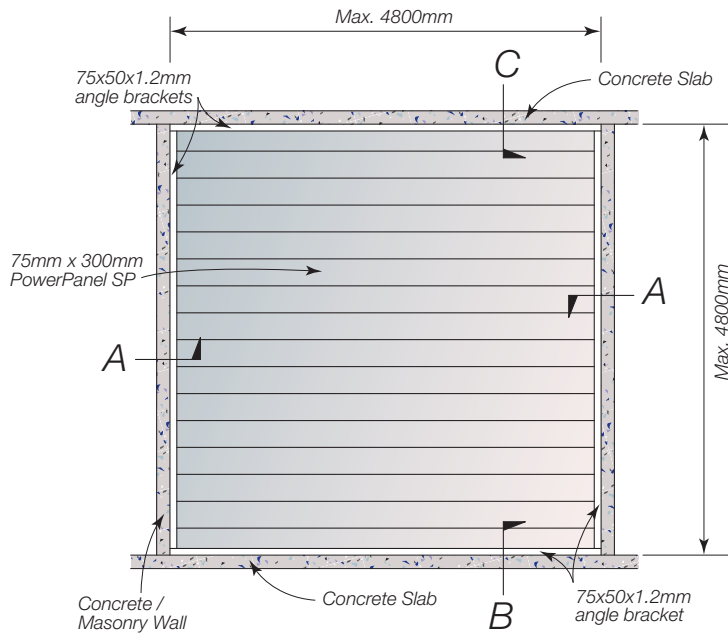


Meriton Serviced Apartments
Campbell Street, Sydney

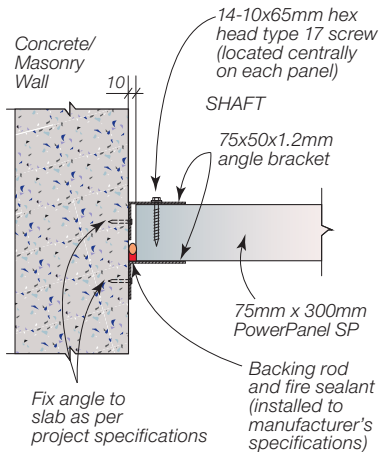
3.5 Construction Detail

Service Shaft Wall - Horizontal Panel Installation

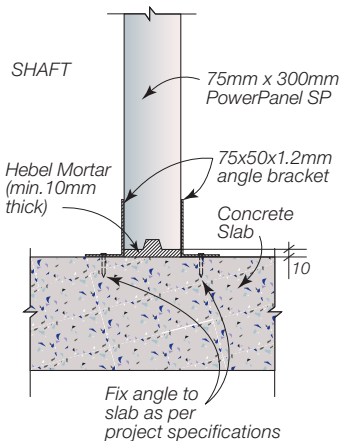
Figure 9 - Horizontal Panel - Service Shaft Wall Elevation



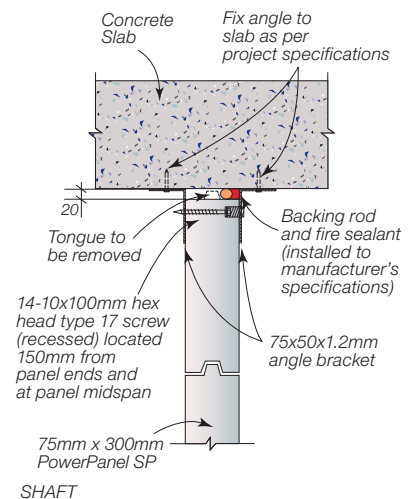
Section A - Horizontal Panel to Concrete/Masonry Wall Detail



Section B - Horizontal Panel to Concrete Slab Detail - Base of Wall

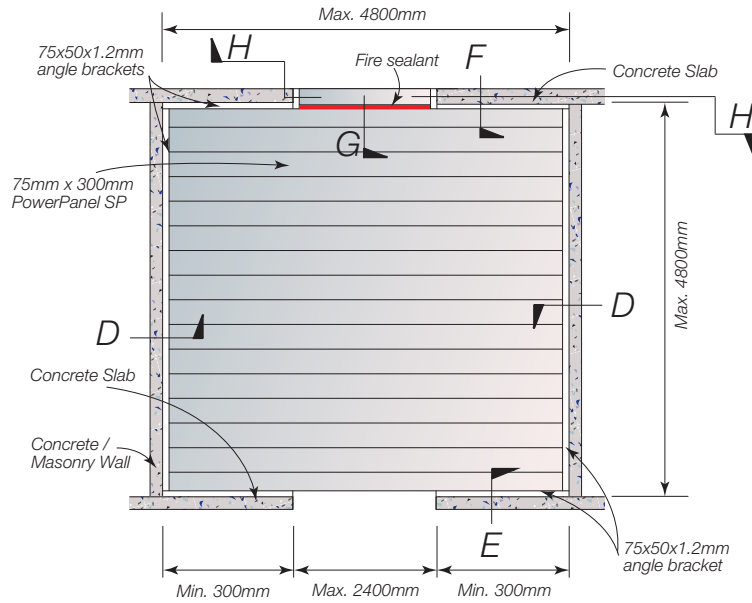


Section C - Horizontal Panel to Concrete Slab Detail - Top of Wall

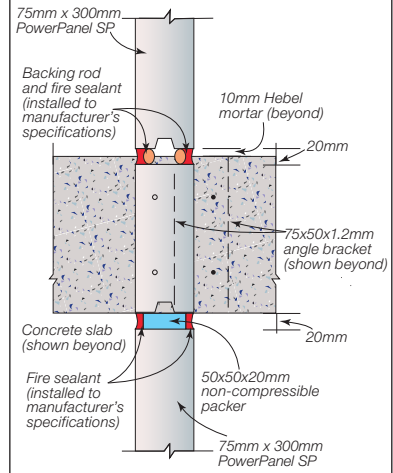


Service Shaft Wall with Opening ≤2400mm- Horizontal Panel Installation

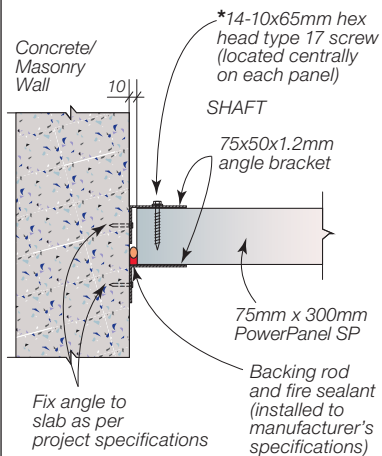
Figure 10 - Horizontal Panel - Service Shaft Wall Elevation (Opening ≤ 2400mm)



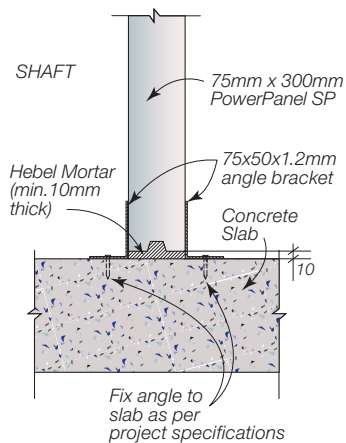
Section G - Top of Wall Opening Infill Detail



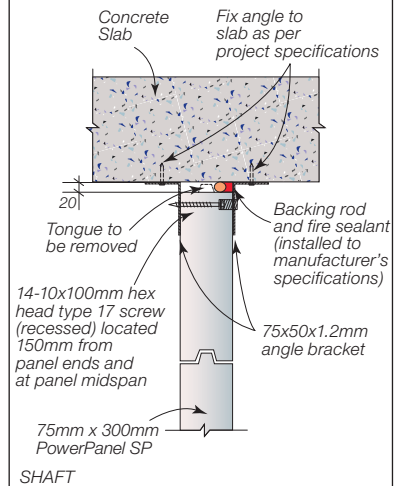
Section D - Horizontal Panel to Concrete/Masonry Wall Detail



Section E - Horizontal Panel to Concrete Slab Detail - Base of Wall



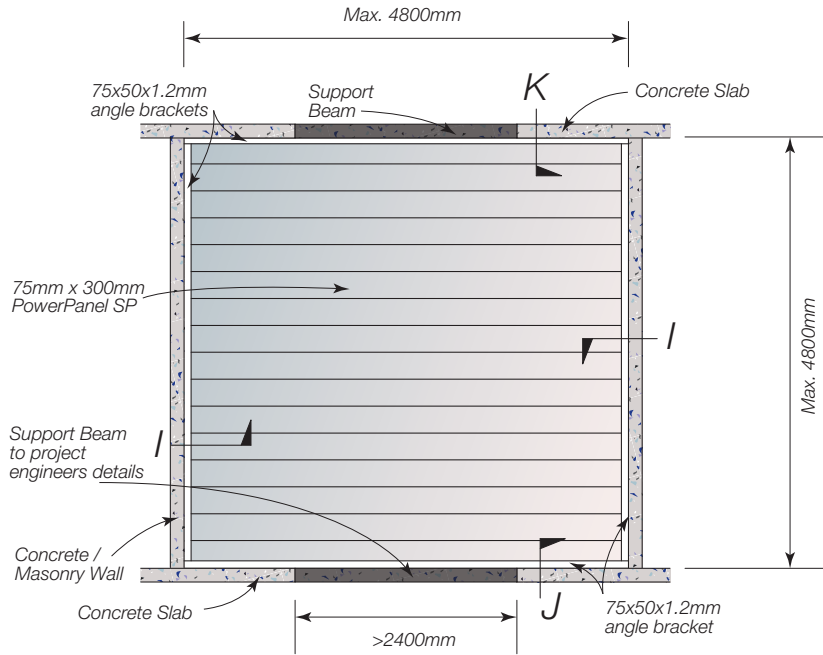
Section F - Horizontal Panel to Concrete Slab Detail - Top of Wall



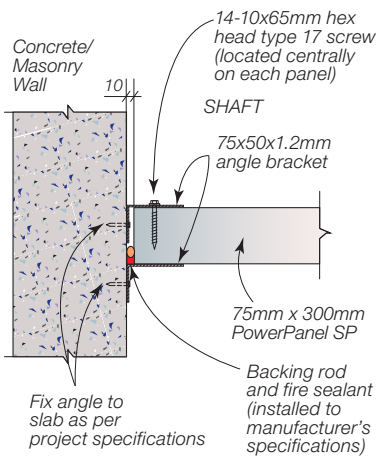
* Note: Section H same as Section D but omit screw

Service Shaft Wall with Opening >2400mm - Horizontal Panel Installation

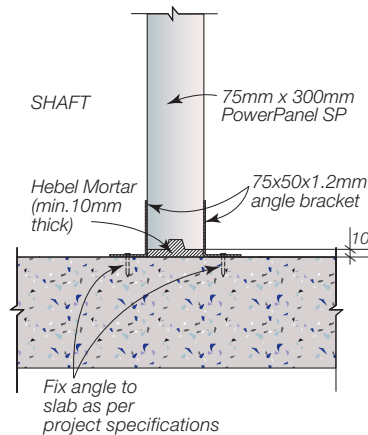
Figure 11 - Horizontal Panel - Service Shaft Wall Elevation (Opening > 2400mm)



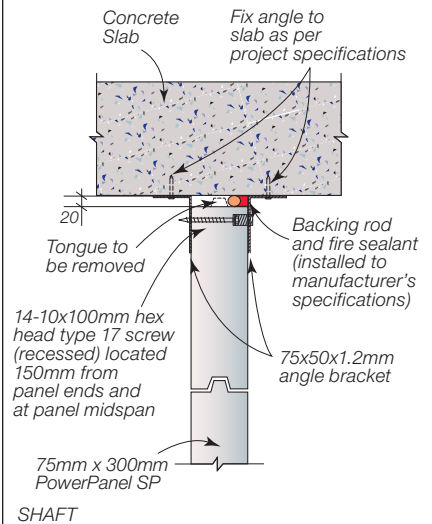
Section I - Horizontal Panel to Concrete/Masonry Wall Detail



Section J - Horizontal Panel to Concrete Slab Detail - Base of Wall

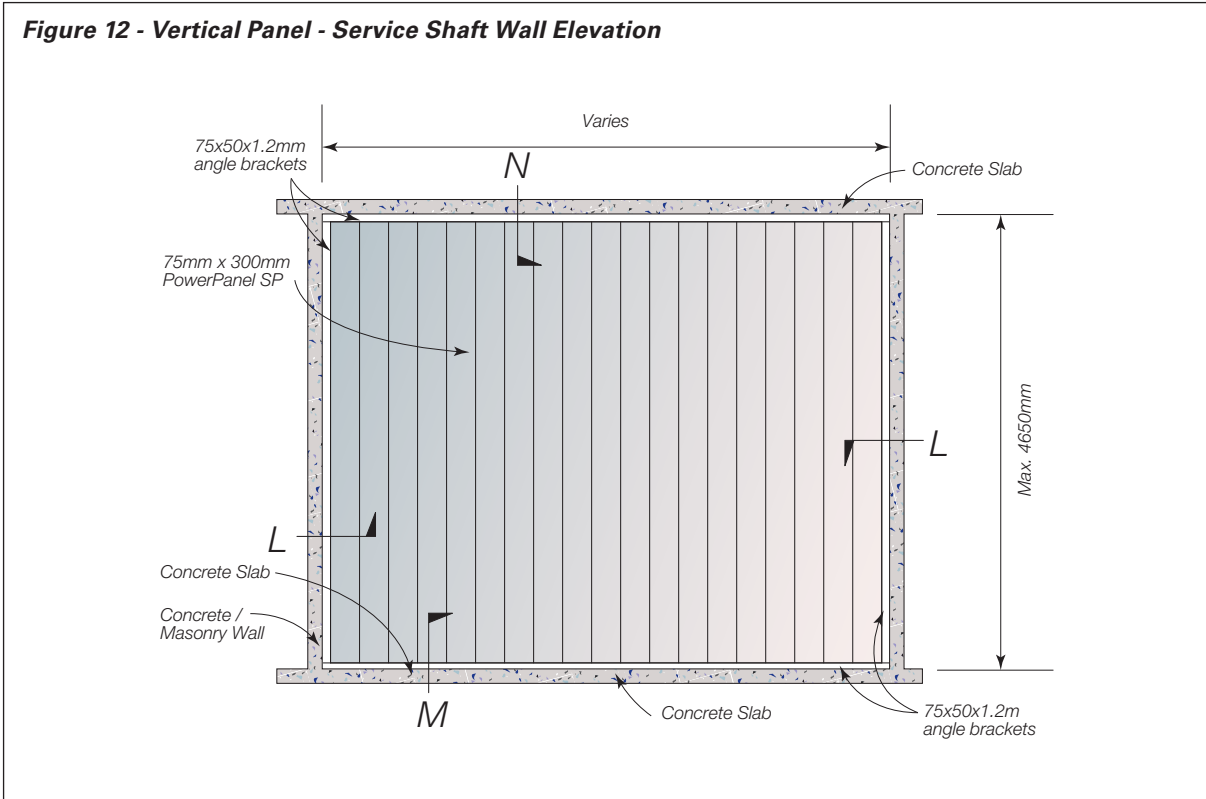


Section K - Horizontal Panel to Concrete Slab Detail - Top of Wall

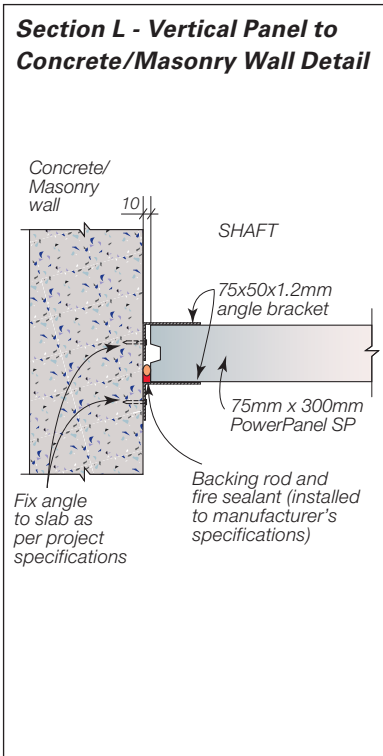


Service Shaft Wall - Vertical Panel Installation

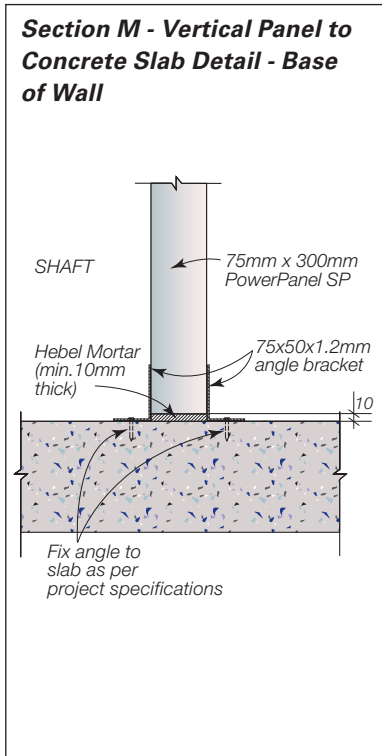
Figure 12 - Vertical Panel - Service Shaft Wall Elevation



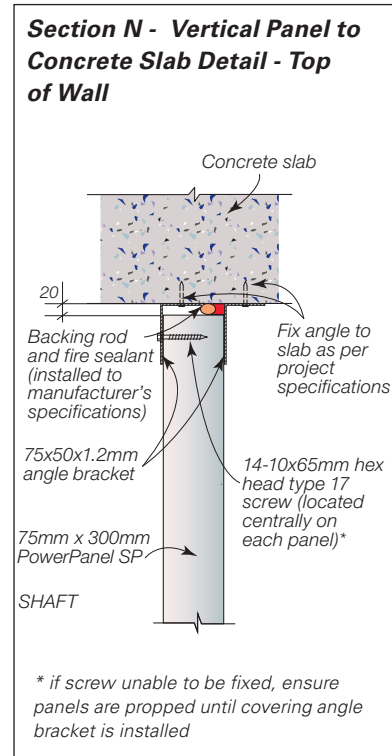
Section L - Vertical Panel to Concrete/Masonry Wall Detail



Section M - Vertical Panel to Concrete Slab Detail - Base of Wall

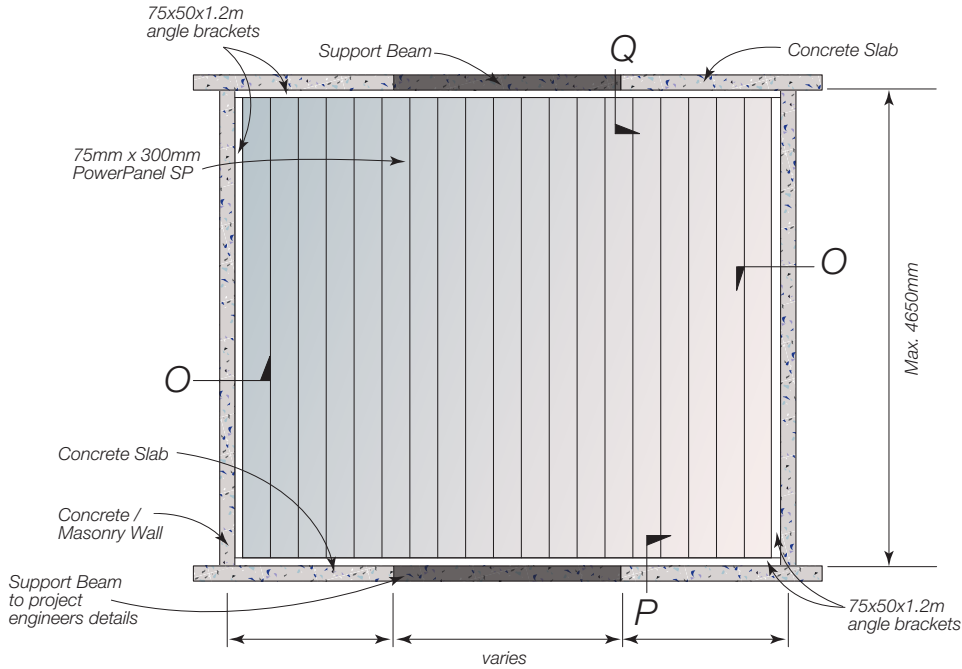


Section N - Vertical Panel to Concrete Slab Detail - Top of Wall

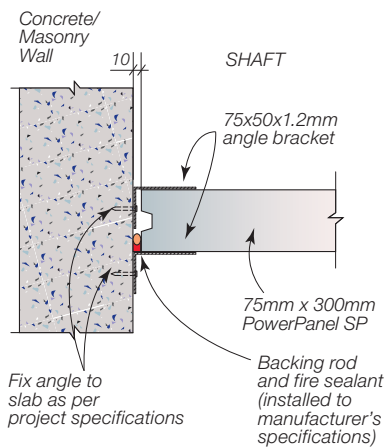


Service Shaft Wall (Varying Opening) - Vertical Panel Installation

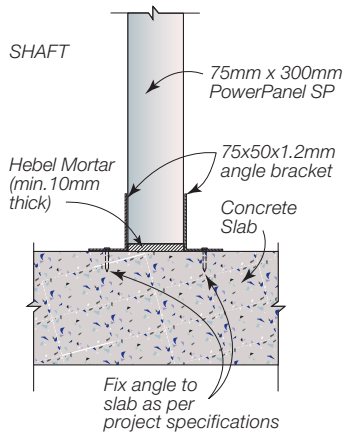
Figure 13 - Vertical Panel - Service Shaft Wall Elevation (Opening Varies)



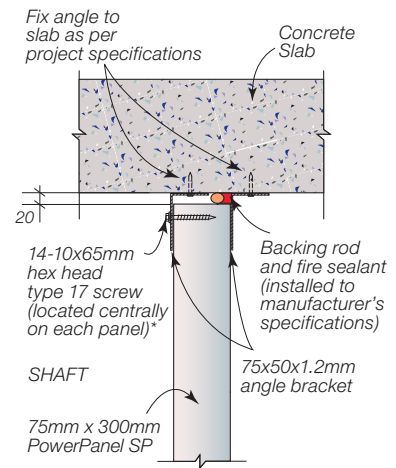
Section O - Vertical Panel to Concrete/Masonry Wall Detail



Section P - Vertical Panel to Concrete Slab Detail - Base of Wall



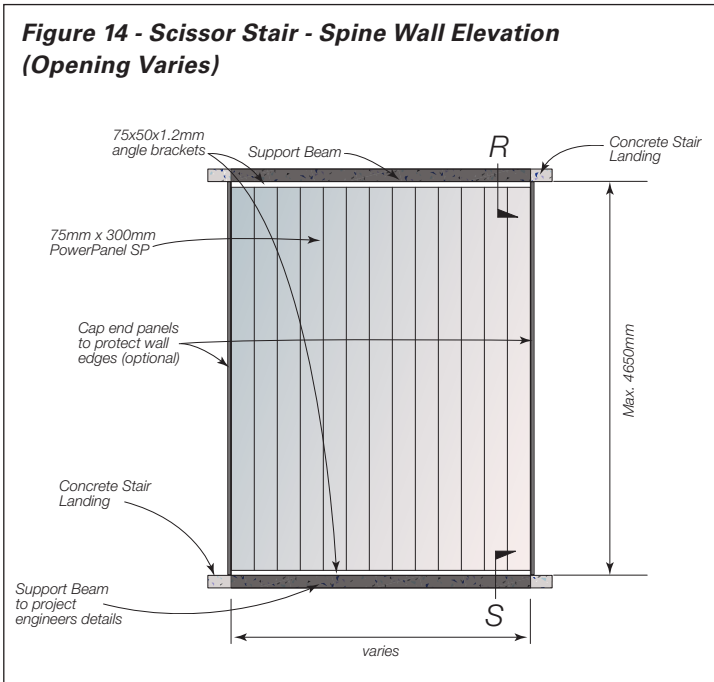
Section Q - Vertical Panel to Concrete Slab Detail - Top of Wall



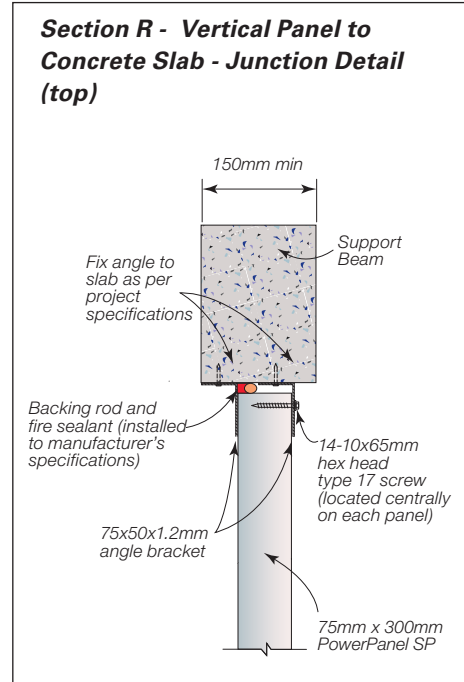
* if screw unable to be fixed, ensure panels are propped until covering angle bracket is installed

Scissor Stair Spine Wall (Varying Opening) - Vertical Panel Installation

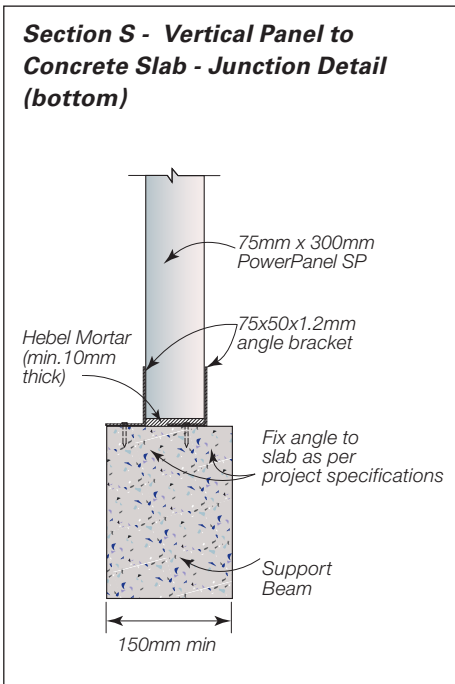
Figure 14 - Scissor Stair - Spine Wall Elevation (Opening Varies)



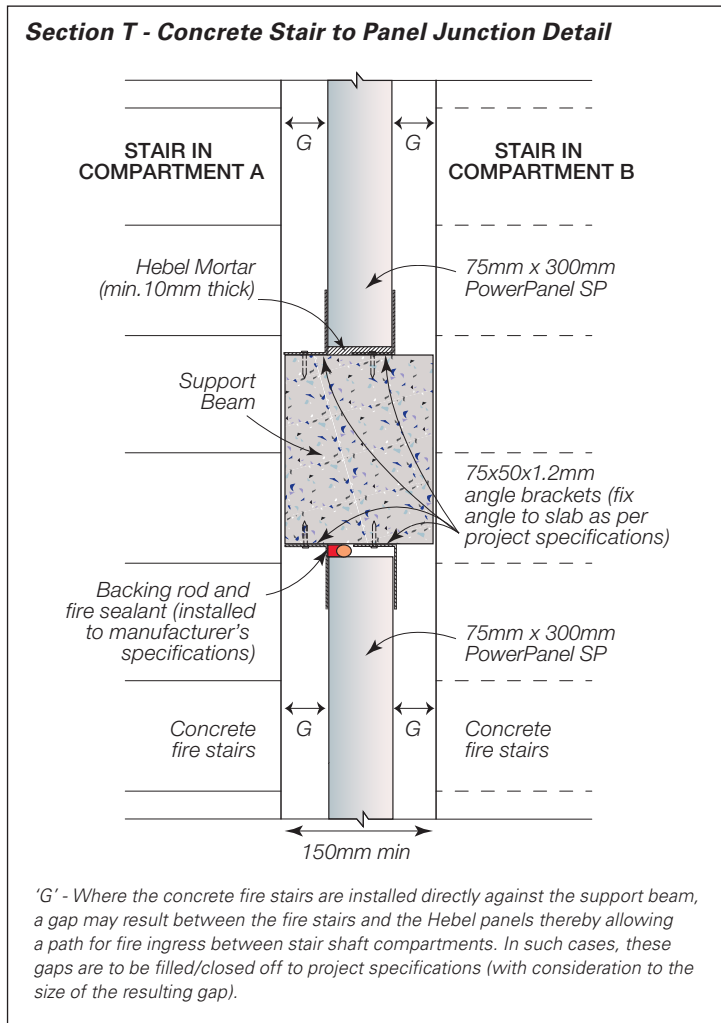
Section R - Vertical Panel to Concrete Slab - Junction Detail (top)



Section S - Vertical Panel to Concrete Slab - Junction Detail (bottom)



Section T - Concrete Stair to Panel Junction Detail



Panel Joint Detail Options

Figure 15 - Bare Joint

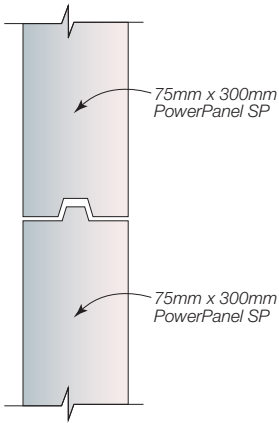


Figure 16 - Fire Sealant to One Side

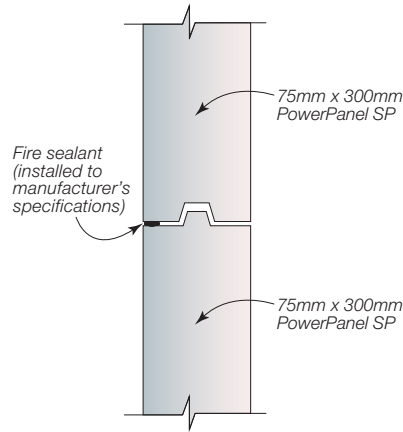
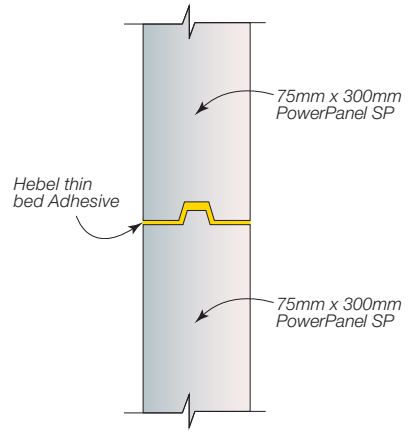


Figure 17 - Hebel Thin Bed Adhesive



Control Joint (C.J.) and Penetration Detail

Figure 18 - Fire Rated C.J.

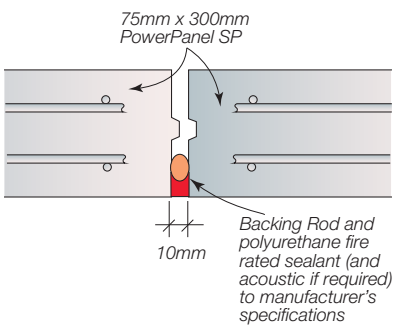


Figure 19 - Metal Pipe Penetration

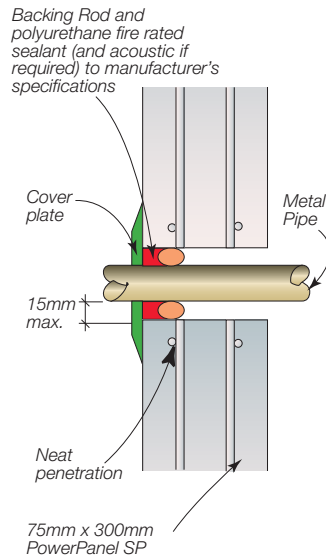
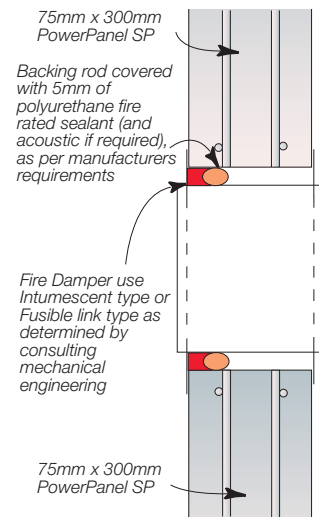


Figure 20 - Fire Damper Penetration



Alternative Base Detail - Packers

Figure 21 - Horizontal Panel Packer Elevation Detail

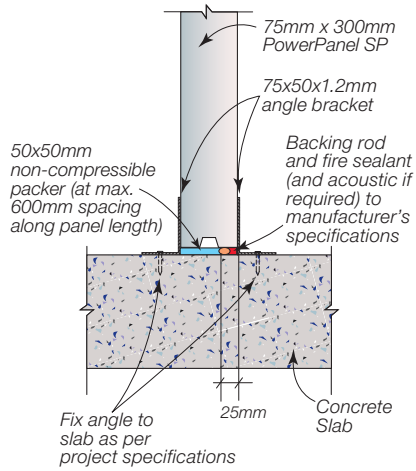


Figure 22 Vertical Panel Packer Elevation Detail

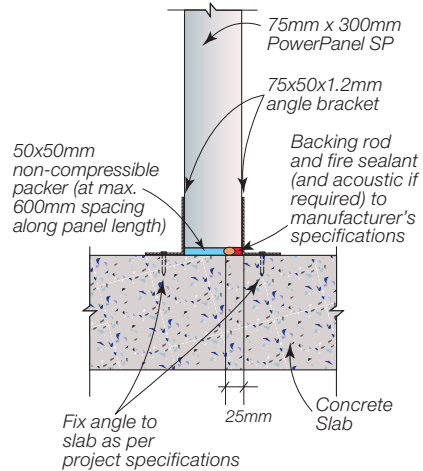
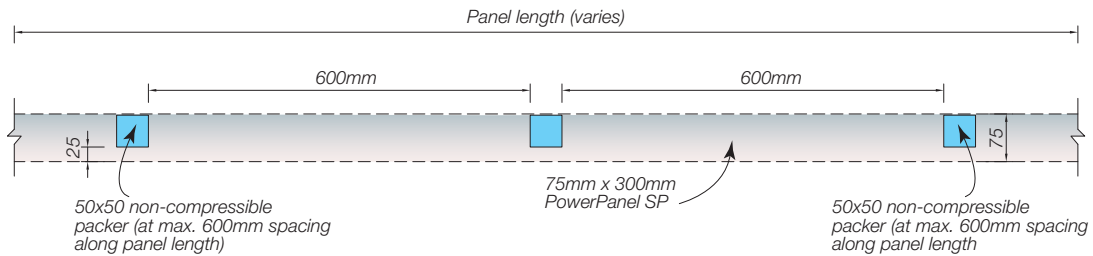


Figure 23 - Horizontal Panel Packer Elevation Detail



Junction Detail

Figure 24 - Vertical Panel Packer Elevation Detail

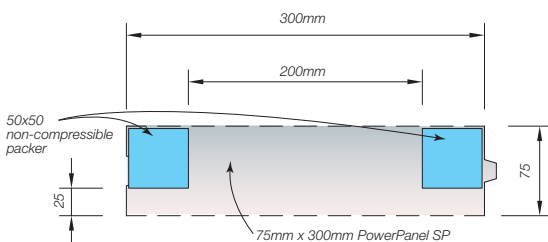
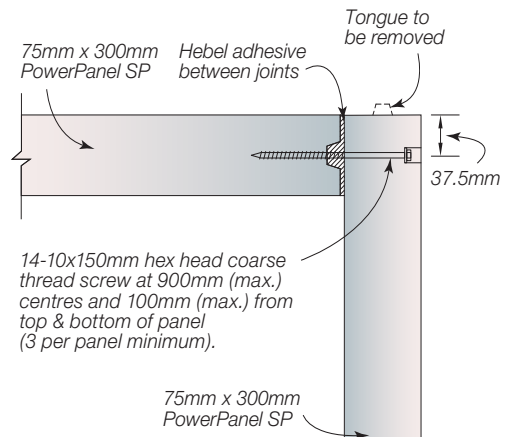


Figure 25 - Vertical Panel to Panel Junction Detail



4.1 Delivery and Storage

Unloading Panels

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

Storage

All materials must be kept dry and preferably stored under cover. 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.

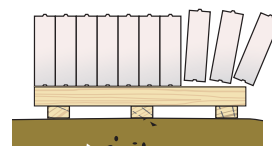
The project engineer should be consulted as to the adequacy of the structure to support the stacked bundles. Each bundle contains 10 panels. Where bundles are stacked two high, the supporting cleats must be vertically aligned, to ensure minimal bending of the lower panels.

Refer to Figure 26. If Hebel PowerPanel SP is stored outside, they must be stored off the ground and protected from the weather.

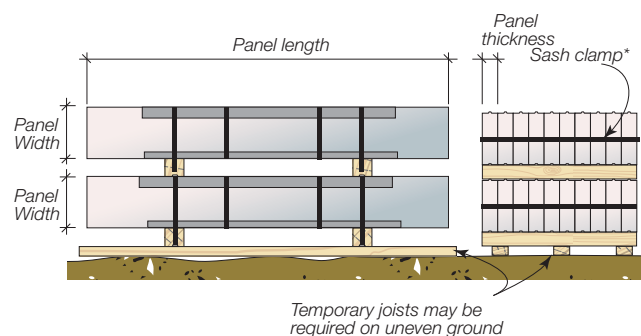
Only single bundles positioned on the ground can be opened. To provide a level surface, we recommend placing temporary joists beneath the supporting cleats.

Figure 26 - Stacking bundles of Hebel PowerPanel SP

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, panels must be replaced.



Unstrapping bundles without appropriate bracing.



4.2 Panel Handling

Manual Handling

Hebel recommends using a trolley or other mechanical apparatus to move the 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, levers, scissor lifts 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.

Health and Safety

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/NZS1715 and AS/NZ1716) and eye protection (AS1336) should be worn at all times when cutting and chasing. Refer to the Hebel Material Safety Data Sheets.

Refer to the back page of this Design and Installation Guide for further information regarding health and safety.

4.3 Design, Detailing and Performance Responsibilities

Hebel engages independent acoustic testing laboratories to test and report on the acoustic performance of a wall in accordance with the relevant Australian Standards. Acoustic 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 acoustic consultant will make judgements about on-site installed performance of various walls. The performance levels of walls documented in this Design Guide are either what is reported in a test or the documented opinion of an acoustic consultant.

Responsibility for acoustic performance in projects is typically:

Project Acoustic Consultant:

- 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 acoustic performance for individual projects. This involves the design and selection of building elements, such as walls and floors and their integration in the building considering the following:
 - Interface of different building elements and to the structure/substrate
 - Wall junctions
 - Penetrations
 - Flanking issues
 - Room/building geometry
 - Acoustic field testing

Project Certifier &/or Builder:

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

Hebel does not provide acoustic consulting services and does not offer acoustic advice. Hebel only provides information that has been prepared by others and Hebel therefore shall not be considered experts in the field. Any party using the information contained in this Design and Installation Guide or supplied by Hebel in the course of a project must satisfy themselves that it is true, accurate and appropriate for the application, consequently accepting responsibility for its use. Hebel is not responsible for the acoustic performance of constructed walls, including field performance, and does not interpret or make judgements about acoustic performance requirements in the Building Code of Australia.

The above is applicable to other design criteria such as fire and structure.

Appendix A1.

Hebel PowerPanel SP Material Properties

Manufacturing Tolerances

Length	+/- 5mm
Width	+/- 1.5mm
Thickness	+/- 1.5mm
Diagonals (max)	5mm
Edge straightness deviation	1.5mm

- Standard panel profile is tongue and groove (T&G).
- Panel is reinforced with a double layer of steel mesh.
- Nominal Dry density of AAC = 510kg/m³
- Average working density of AAC = 688kg/m³ at 30% moisture content.
- Average working density of panel (AAC + reinforcement) = 688kg/m³ at approx 30% moisture content.
- Average service life density of AAC = 605kg/m³ at 10% moisture content

Hebel Wall Panel Strength Properties

- Minimum characteristic Compressive Strength of AAC, $f'_m = 2.8\text{MPa}$
- Mean Compressive Strength of AAC = 3.2MPa
- Characteristic Modulus of Rupture of AAC, $f'_{ut} = 0.60\text{MPa}$

Hebel Wall Panel Fire Resistance Level (FRL) Rating

For fire performance ratings of Hebel internal walls refer to Section 2.2. A.5 Fire Hazard Indices Hebel AAC products have the following early fire hazard indices, determined in accordance with AS1530.3:1990:

Hebel Wall Panel Acoustic Ratings

75mm thick wall panel only with no plasterboard or other lining ie. bare, single leaf system, with Hebel Adhesive between joints and sealant around perimeter.

Installed horizontally: $R_w = 36.7$

Installed vertically: $R_w = 33$

Hebel Wall Panel Thermal Ratings

R-Value of Hebel PowerPanel SP with no plasterboard or other lining = 0.42m² K/W at 10% moisture content.

Terminology & Assessment Methods

Weighted Sound Reduction Index (R_w)

Australian building regulations have recently adopted the European acoustic rating system, the 'Weighted Sound

Reduction Index' (R_w), which is the International Standard. The R_w value replaces the former 'Sound Transmission Class' (STC) as a measure of the acoustic performance of a wall.

C_{tr} Adaptation Term

The R_w provides a convenient single number performance rating for 'normal' sounds such as speech. Where low frequency sound insulation performance is important, as may be the case with traffic noise or music and DVD systems, a correction factor is added to the R_w number. This factor de-rates the wall system's performance according to its ability to insulate low frequency sound. The factor is called C_{tr} and it is a negative value. Therefore, a wall having an R_w of 55dB with a C_{tr} of -5dB has an $R_w + C_{tr}$ rating of 50dB.

Test Reports

All acoustic test reports have been issued by the National Acoustic Laboratory or other NATA Registered Laboratories. All fire test reports have been issued by Exova. Test reports quoted in this Design and Installation Guide are available on request from Hebel.

Sound Insulation Estimates

Acoustic consultants often use computer models to determine sound transmission estimates for specific wall system configurations. These are known as 'Acoustic Assessments' or 'Acoustic Opinions'. The computer model predicts the R_w performance expected from a laboratory test on the system. All acoustic opinions quoted in this Design Guide are available on request from Hebel.

Fire Resistance Level (FRL) Index

The Fire Resistance Level (FRL) of the systems detailed in this Design Guide have been determined from Exova Warringtonfire fire opinions based on testing conducted at laboratories in Victoria.

The FRL rating consists of three performance criteria, structural adequacy/integrity/ insulation. For non-load bearing walls, there is no requirement for 'structural adequacy' rating. For example, the FRL of a non-load bearing wall may be expressed as -/120/90. Where the 'dash' indicates no rating for a 'structural adequacy' rating, followed by 'integrity' for 120 minutes, and 'insulation' for 90 minutes.

These tests and opinions refer to a range of wall heights. Please refer to Table 2.1 in this guide for confirmation of the FRL values for the selected systems.

Acoustic and Fire Tests

All tests performed on Hebel walls have been done in accordance with relevant Australian Standards at the time of testing.

Appendix A2.

Architectural Specification

This specification should be adopted as a guide only, and shall be superseded by the contract specifications* of the project.

* Insert or select appropriate specifications.

Scope

The contractor shall furnish all material and equipment required to satisfactorily complete the installation and jointing of the non-load bearing Hebel internal walls where indicated in the contract specification and/or on the layout drawings.

Materials

All AAC material shall be Hebel PowerPanel SP panels, as manufactured by Hebel.

All accompanying fixings shall be those supplied by Hebel or approved by the project engineer.

Wall System

The contractor shall install 75mm thick Hebel PowerPanel SP as detailed in the project drawings and/or specifications and in accordance with the current High Rise Multi-Residential and Commercial - Service Shaft and Scissor Stair Walls - PowerPanel SP Design & Installation Guide (HEB1414 February 2012).

Internal Lightweight Steel Framing

Internal Lightweight steel framing *is/is not required. The lightweight steel framing should consist of the following:

*.....mm offset from the face of Hebel wall panels.

*.....mm steel stud/furring channel of

*.....mm BMT

PowerPanel SP Walls Fire Performance Requirements

Hebel internal walls *are/are not required to have a Fire Resistance Level (FRL) rating. The wall shall have a Fire Resistance Level rating of *FRL/...../..... for an external fire source, and/or *FRL/...../..... for an internal fire source, in accordance with the requirements of AS1530.4.

Coatings and Finishes

Prior to application of coatings (if required), the contractor shall ensure that:

- i) The panels are installed within the tolerances of the project specifications.
- ii) All panel-to-panel joints are completely filled with Hebel Adhesive or sealant (if acoustic performance required).
- iii) Minor chipping of panels is patched with Hebel Patch.
- iv) All sealants are installed as per manufacturer's specifications.

*Hebel wall panels/ linings. Hebel internal walls shall be internally coated with *.....

 coating system,
 which shall be installed to the manufacturer's specifications.

Sealing and Caulking

All control, control and abutment joints shall be caulked with

*.....backing rod and

*..... sealant installed in accordance with the sealant manufacturer's recommendations.



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Health & Safety

Information on any known health risks of our products and how to handle them safely is on their packaging and/or the documentation accompanying them. Additional information is listed in the Material Safety Data Sheet (MSDS). To obtain a copy of a MSDS, telephone 1800 807 668 or download from www.hebelaustralia.com.au. Contractors are required by law to perform their own risk assessments before undertaking work. Hebel has sample Safe Work Method Statements (SWMS) to assist in this. To obtain a sample SWMS, refer also to the above sources.

Performance & Certification

Hebel® products are manufactured in Australia by CSR Building Products. A.B.N. 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.

Other

The design of a wall, floor or fence system requires the services of professional consultants. This Design Guide 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 Design Guide. Hebel products and systems undergo constant research and development to integrate new technology and reflect ongoing performance enhancement.

Hebel systems are also 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 manual: HEB1414 February 2012 should regularly check that this manual is current, and they are applying our latest design information.

The latest editions of our Design Guides and supplementary diagrams and technical data are always available on our website: www.hebelaustralia.com.au

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The better way to build

Hebel is a quality building product, and is backed by CSR Building Products Limited.

Further details on engineering and building with Hebel systems are available in the Hebel Design Guides and Technical Manual. To obtain a copy, or for further sales or technical assistance, please visit our website.

Hebel website:
www.hebelaustralia.com.au

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

1300 369 448

Warranty

Hebel continues to lead the market with premium quality products, which are the preferred choice of many building professionals. All CSR products are designed to achieve optimal performance when installed in accordance with published Design and Installation Guides using recommended products, accessories and other components. For details of product and system warranties provided by Hebel, contact a CSR Hebel representative on 1300 369 448 or visit www.hebelaustralia.com.au

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HEB1414 February 2012

