

High Rise Facades

Design and Installation Guide



Contents

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 relevant data.

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Better buildings are constructed with Hebel



Hebel is a lightweight steel-reinforced Autoclave 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 and lightweight steel reinforced panel system that provides total design flexibility so you can build the design you want, the way you want.

Added to this Hebel Facade system is the pressure equalised system making this facade system inherently robust from a weatherproofing viewpoint. They easily meet BCA requirements being extremely fire-resistant, have thermal absorbing properties and acoustic compliance surety.

A highly efficient and modular building system that reduces your total cost to build

Hebel systems require smaller crews and their speed of installation (with less reliance on bricklaying trades) assists in reducing your overall building costs and maximising your construction efficiencies. These cost reductions can be further improved if you construct your internal walls by also using Hebel.

With minimal component use and reduced need for cranes, along with continuity of on-site trades and lower wastage, building with Hebel will reduce your overall cost to build.

Australian made and backed by CSR

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

In addition Hebel will help you manage the entire end-to-end process, providing technical support and 'after sales' on-site service to assist you so that your construction with Hebel is seamless and efficient.



HEB-2006
GECA 08-2005-
Environmentally
Innovative Products

Hebel. Better to build with...

At the heart of the Hebel system is the Hebel PowerPanel - a 75mm thick, steel reinforced building panel made from AAC (Autoclaved Aerated Concrete) which is supplied in various lengths and profiles to suit external and internal walls for framed construction.

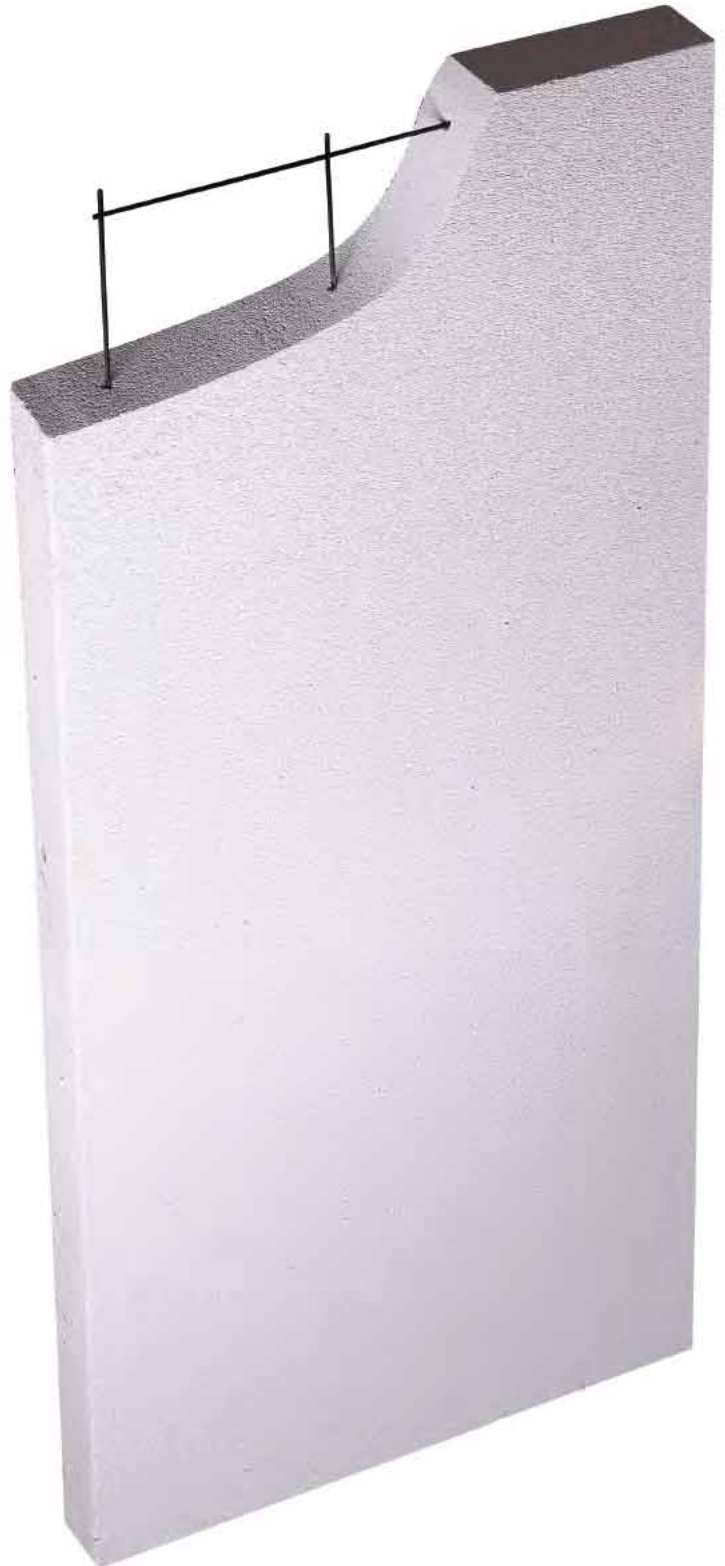
The unique Hebel attributes are best summarised with the Hebel 'tick' below:



Faster construction period

Hebel wall panels are faster to construct and require significantly less labour compared to traditional masonry construction techniques which leads to substantial savings in site costs.

Building with Hebel means less mess on-site, a cleaner, safer work area during construction and less clean-up at completion of building.





Lightweight yet solid and tough

Lightweight Hebel PowerPanels ensure lighter loads on structures compared to traditional bricks and pre-cast concrete panels. This can lead to substantial

savings in supportive concrete structure in multi-storey units.

As strong and tough as masonry – Independent tests show that a rendered Hebel PowerPanel has comparable impact resistance to brick (Report 0164 Orica 06.09.05).



Highly fire resistant for peace of mind and added security

Hebel is non-combustible and renowned for its highly fire resistant properties and achieves a FRL (Fire Resistance Levels) from 120 minutes through to

180 minutes* (tested at CSIRO).

Another reason when building with Hebel, you're building with peace-of-mind for your own future as well as the ultimate home owners of your building.

**Note: Fire Resistance Levels were achieved with the overall PowerPanel system.*



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, make building with Hebel a smart choice for meeting Australia's increasing energy 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.



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. The unique AAC qualities of Hebel provide significantly reduced sound transmission for enhanced privacy in their daily living make Hebel the ideal building material for external walls.



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 accord 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 respectively.

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

...for all the best reasons

With the attributes and benefits shown above this innovative and versatile masonry product provides confidence that Hebel is ideal for external walls as detailed throughout the remainder of this Design Guide.

The many applications of Hebel PowerPanel



Hebel PowerPanel can be used on a wide range of building construction applications including but not limited to the following: For more information on the applications not covered in this Design Guide please refer to www.hebelaustralia.com.au or contact your Hebel representative.

- External facade walls**
Hebel PowerPanel can also be used for External Facade Walls. This lightweight product provides substantial cost savings compared to traditional masonry.
- Intertency wall - dry to wet/dry**
Hebel Intertency wall systems for maximum floor space with concealed services on one side.
- Intertency wall - wet to wet/dry**
Hebel wall systems can be utilised where back to back wet areas are to be installed.
- Corridor walls**
Hebel wall systems can be used as corridor walls to separate apartment units from common area spaces.
- Shaft walls - dry areas**
Hebel shaft wall systems enclose service shaft penetrations between floors on multi-residential constructions to dry habitable rooms.
- Shaft walls - wet areas**
Hebel wall systems are commonly used in service shaft areas to wet non-habitable rooms.
- Service walls - PowerPanel SP**
Hebel wall systems are commonly used as separating walls to isolate and secure plant rooms from other areas of the building.
- Boundary Walls**
Hebel offer a range of residential and commercial boundary wall solutions.
- Balcony Blades**
Hebel walls can also be used for balconies.



Overview of the Hebel PowerPanel system for Facades

Hebel Facades

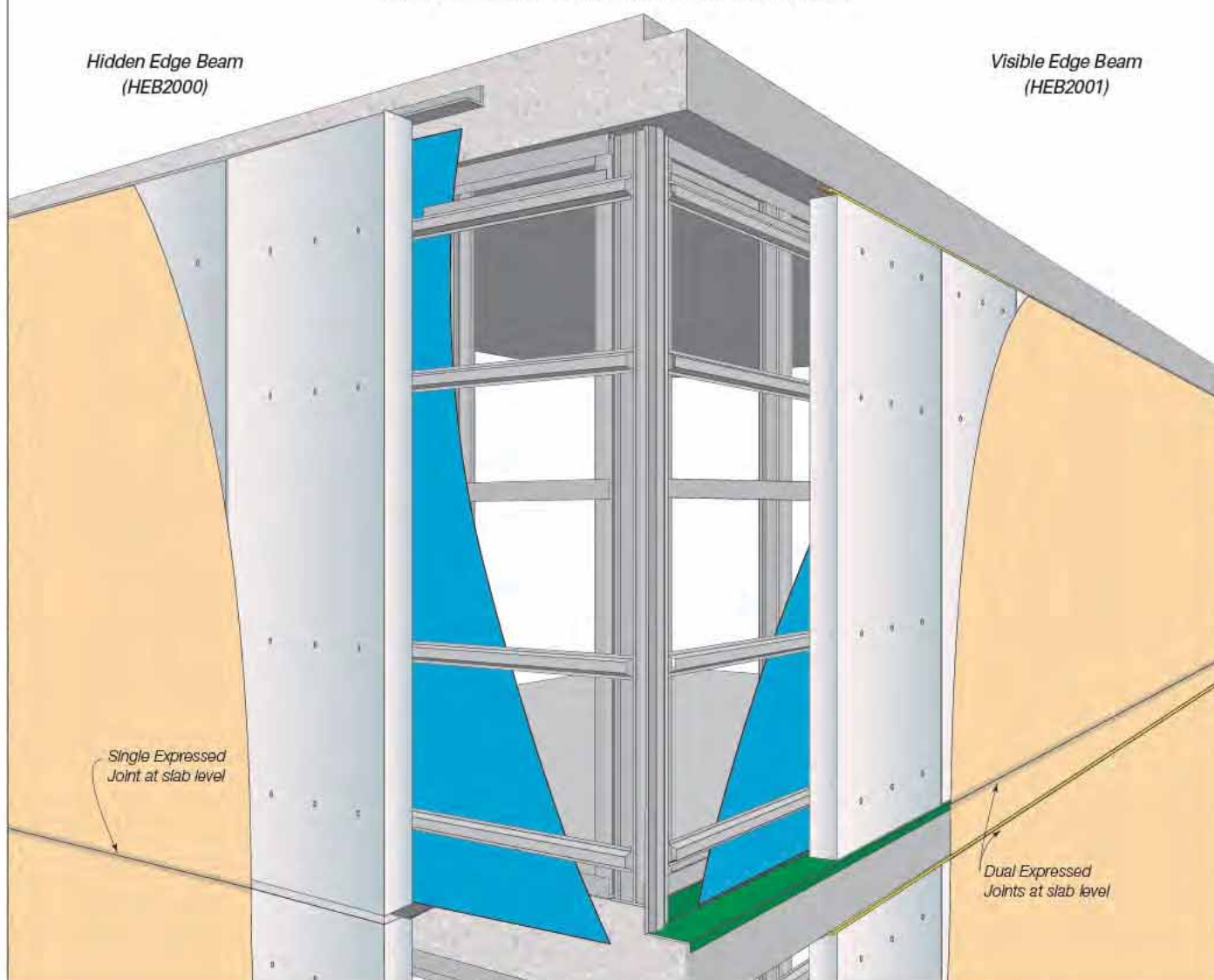
Hebel PowerPanel Systems for Facades are non-loadbearing external wall solutions. These wall configurations consist of a Hebel PowerPanel secured to a lightweight structural (cold formed) steel support framing. The Systems suits applications ranging from low-rise industrial/commercial developments to high-rise office or medium density residential buildings.

The Hebel PowerPanel Systems for Facade have been developed for framed construction following the principles of pressure equalisation. Pressure equalisation refers to the wall cavity being allowed to experience the same pressure as that acting on the outside wall.

The system comprises an external rain screen and an internal air seal. The internal air seal is dry and not exposed to the atmosphere or UV light energy, so sealants have the best opportunity to perform well over a long design life. On the external surface, the weather tightness of the Facade does not rely on the integrity of coatings and sealants as there is no pressure differential. This prevents water from being sucked into the cavity, even if there are minor holes or imperfections in the sealant.

Hebel PowerPanel Systems for Facades are divided into two systems: a Visible Slab Edge (HEB2001) and a Hidden Slab Edge (HEB2000).

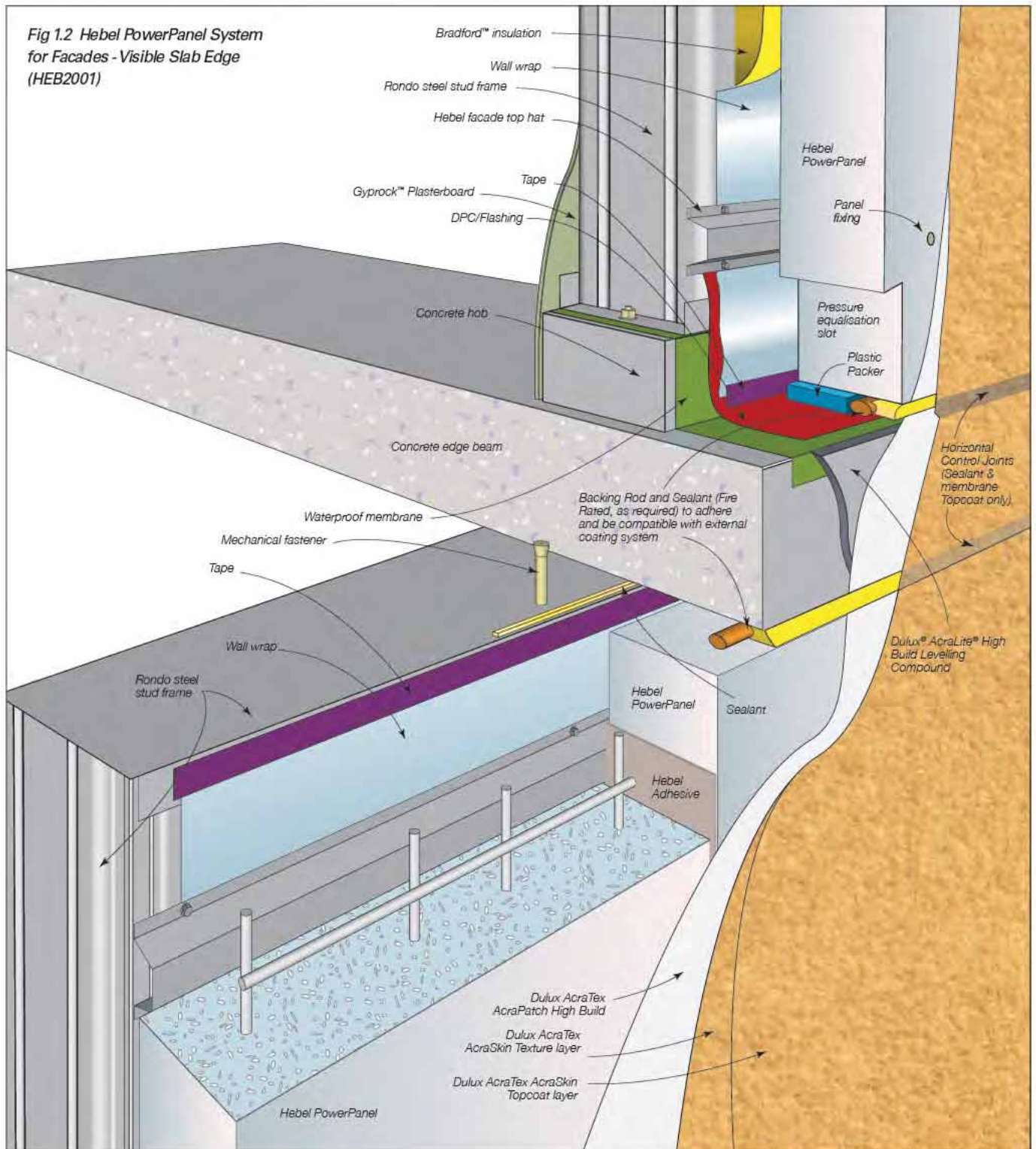
Fig 1.1 Overview of Hebel PowerPanel System for Facades



1.1 Typical applications

Hebel PowerPanel System for Facades - Visible Slab Edge

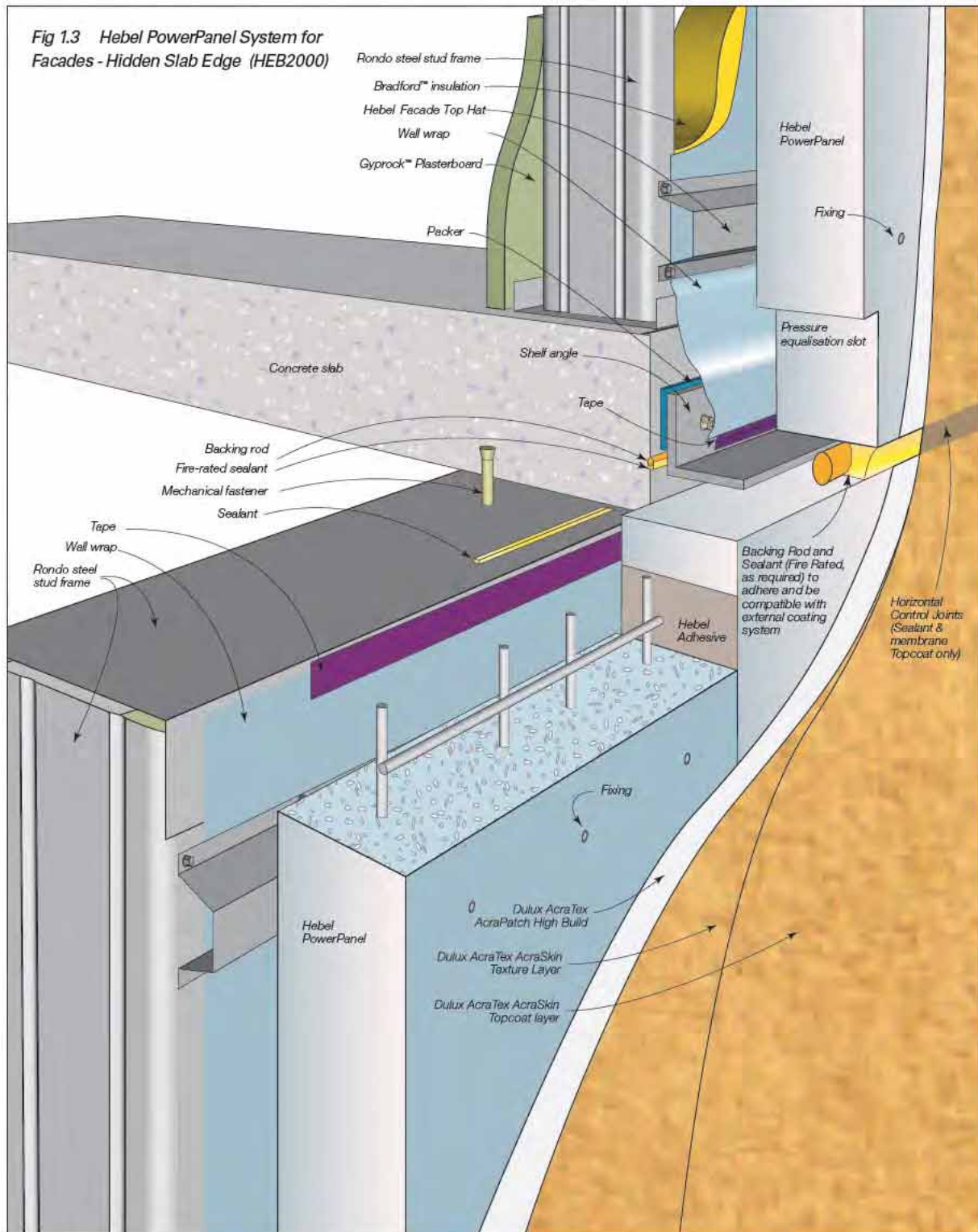
This offers a conventional system to edge beam detailing where the panel is positioned on the slab edge providing excellent performance.



IMPORTANT NOTE: Always refer to current details available in the AutoCAD and pdf versions on the website: www.hebelaustralia.com.au

Hebel PowerPanel System for Facades - Hidden Slab Edge

This is an alternative system to edge beam detailing where the panels are positioned in front of the slab edge. Locating the panels proud of the slab edge produces a single rebated external line at slab level, and provides a more flexible slab edge tolerance.



IMPORTANT NOTE: Always refer to current details available in the AutoCAD and pdf versions on the website: www.hebelaustralia.com.au

Hebel PowerPanel. Better by design

1.2 System design

How to Design a Hebel Facade Wall

STEP 1. Determine edge beam location: visible edge beam (HEB2001) or hidden edge beam (HEB2000)

STEP 2. Determine the distance between supporting members (slab to soffit) to optimise the supporting structure (Top Hats and stud framing). Note that panels are one-way spanning vertically and supported by the horizontal Top Hats

STEP 3. Design Criteria. Identify the BCA Performance Requirements, and any additional project requirements.

- Purpose of structure (Class and importance).
- Imposed design actions (wind, local pressure regions).
- Damp and Watertightness.
- Fire Resistance Level (FRL).
- Sound insulation performance (R_w , C_{tr} values).
- Energy Efficiency (R-Value).
- Durability.

STEP 4. Select spacing for the Top Hats and studs, (to be determined by stud frame manufacturer or project engineer) and construction tolerances.

STEP 5. Specify Bradford Enviroseal ProctorWrap™ or DuPont™ Tyvek® HomeWrap® as the wall wrap for condensation control, weatherproofing and improving the thermal insulation performance.

STEP 6. Check adequacy of structural support framing, sound insulation, fire resistance level, and construction tolerances.

STEP 7. Check the Performance Requirements of the Design Criteria (deflection criteria, damp and watertightness, fire resistance level (FRL), sound insulation performance (R_w , C_{tr} values), energy efficiency (R-Value), and durability

STEP 8. Complete detailed design and documentation.

IMPORTANT: A facade engineer must be involved in the selection, detailing and integration of a Hebel PowerPanel System for Facades into all projects.

IMPORTANT NOTES

1. A significant benefit of the pressure equalisation slots is a point of egress for water which may access the cavity space should a failure occur in an element of the facade.

However the cavity should not be used as a means of draining other building elements such as openings and penetrations.

2. Earthquake loading has not been considered in this Design Guide.

Compliance with the Building Code of Australia (BCA)

All building solutions, such as walls, floors, ceilings, etc. must comply with the regulations outlined in the Building Code of Australia (BCA) or other authority.

The BCA 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
- Energy Efficiency
- Durability

This Design Guide presents tables, charts and information necessary to design a Hebel PowerPanel System for Facades that complies with the Performance Requirements of the BCA. The designer must check the adequacy of the building solution for Performance Requirements outlined by the appropriate authority.

1.3 Design & detailing considerations

Building Tolerances

During the construction of a building, there are tolerances to control the accuracy of the building dimensions and locations to an acceptable standard.

Additionally, movement joints are required in the facade to tolerate and accommodate the movement of the structure (see 'Movement Joints'). These tolerances are nominated in the appropriate specification for the project.

The Hebel PowerPanel System for Facades is flexible and accommodating of the variations that occur during the construction of the support structure (building), such as variable slab to soffit heights and location of the slab edge.

The Hebel panels and lightweight structural steel framing can be fabricated to suit the on-site conditions.

The Hebel PowerPanel System for Facades with the panels beyond the slab edge accommodates the variability in slab position in the space behind the panel cladding. This system also eliminates the need for rendering a finished slab edge and the associated difficulties in coordinating labour and producing a quality finish slab edge (joint detailing and surface finish).

Importantly, the height of the panels is not affected by the slab to soffit heights, so that panels of similar lengths can be installed floor-to-floor, which gives a controlled, uniform set-out of horizontal jointing in the facade.

The construction process of the Hebel PowerPanel Systems for Facades provides a wall that can be accurately located. For concrete elements that are located beyond the finished surface plane, this will require rectification of the concrete.

Refer to Figs 2.7 & 2.8 (page 27) for recommended alignment. The same considerations should be made for columns.

CSR Hebel recommends that tolerances are specified in the project documents to ensure that in-situ concrete elements, such as columns and slab edges, are produced within the finished surface plane. This will minimise the area that requires rendering.

Movement Joints

During the life cycle of a building, the building and the materials that it is constructed from will move. These movements are due to many factors working together or individually, such as support structure movement (lateral sway or vertical deflection), thermal expansion and contraction and differential movements between materials. This movement, unless relieved or accommodated, will induce stress in the materials, which may be relieved in the form of cracking. To accommodate these movements and relieve any induced stresses, which could potentially crack the wall, movement joints need to be installed. There are two categories of joints:

- Articulation Joints (A.J.) are provided to relieve induced stresses due to support structure movement. The joints make the walls more flexible by breaking the wall into a series of small panels. Differential movement between the facade and adjacent structural elements need to be accommodated with articulation joints.
- Control Joints (C.J.), (one type is an expansion joint), are provided to relieve the induced stresses resulting from thermal expansion or contraction of the AAC, or differential movement between the AAC and another material or structure, such as abutting walls or columns of concrete or brickwork. Control joints can also delineate coating shrinkage breaks. A joint may perform the function of either an articulation joint or control joint or both.

IMPORTANT: *There are restrictions provided to the maximum length of Hebel Facade wall between control joints. Control joints must be provided at:*

- 6 metres maximum for continuous runs of walls.
- At all external and re-entrant corners. (unless otherwise approved by CSR Hebel)
- At control joints in the primary support structure.
- For windows/door openings $\leq 2400\text{mm}$ a control joint is to be provided to one side of the window/door opening
- For windows/door openings $> 2400\text{mm}$ control joints are to be provided either side of the opening

Hebel can offer a guide on locations of control joints if required.

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.

This Design Guide proposes minimum widths for the movement joints.

The project engineer shall determine if the joints are sufficient to accommodate the movement of

the specific project building. Typically, the vertical joint is a minimum 12mm wide and filled with an appropriate flexible sealant. A horizontal control joint is required beneath slabs or angles to accommodate any expected deflection. The magnitude of the deflection must be verified by the building designer. Typically, the horizontal joint is 15 - 20mm wide.

Sealants

All movement joints and gaps between the panels and infill framing or penetration framing must be filled with an appropriate flexible sealant. The sealant should be designed and installed in accordance with the sealant manufacturer's specifications. The specifications must provide information regarding priming the surface, geometry of sealant (width/depth ratio with width greater than depth), sealant surface profile (concave), substrate preparation, etc. Note: where different types of sealants come in contact, the designer must ensure the sealants are compatible.

Typically a backing rod is used to control the depth of sealant and ensure the sealant is bonded on two sides only. Note, the surface may require some preparation depending upon the type of sealant.

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 ABCB Condensation in Buildings Handbook /CSIRO/BRANZ/ASHRAE and must be consulted when building in areas where condensation is likely to occur.

In these cases, the appropriate use of a wall wrap as a vapour barrier or as thermal insulation, or both, can be effective in controlling condensation.

Panel Layout

Modular construction

Hebel Facade is essentially a flexible modular construction system. By adopting a few simple rules, significant savings can be gained in time and cost. This is achieved by the following:

- On-site width cuts – resulting in time loss, increased waste and treatment of cut reinforcement.
- Maintaining windows – ensuring 300mm multiples above and 600mm multiples wide for wall areas between windows and doors.

Planning the panel layout with special attention to the locations of openings and penetrations can significantly reduce the amount of on-site cutting.

At openings (windows and doors), it is recommended that

a 600mm width panel be installed adjacent to the opening. For large openings, it may be necessary to provide additional structural steel to support the loads shed from the opening.

'Good Practice' and 'Poor Practice' layouts for vertically installed panels with various penetrations are illustrated in Figure 1.2 and Figure 1.3.

Penetrations

Small service penetrations through the panel of the Hebel PowerPanel System for Facades must allow for differential movement between the panel and the service. All penetrations are a potential source for water ingress and should be sealed with an appropriate flexible sealant.

NOTE: The external sealant in the control joints adjacent to windows should be extended to the inside face of the wall, beyond the sealant line of the windows. No gap should exist between both sealants. This sealant configuration is recommended at similar detailing issues.

IMPORTANT: The detailing of penetrations through any facade is critical. An incorrect sealant detail could have a detrimental effect on the systems performance characteristics. For example, a penetration through the drained system with only the external surface being sealed would allow air to flow into the building, defeating the pressure equalisation behaviour.

Wet area wall construction

All wet area walls shall be lined and waterproofed in accordance with Australian Standards and to BCA requirements. Gyprock Aquachek™ or Cemintel™ Wallboard are suitable lining materials for wet area applications.

Cavity Baffles

Used vertically at the major corners of the building to limit the air flow within the cavity (typically 4 per level).

Pressure Equalisation Slots

PE Slots (Weepa) allow pressure equalisation to the wall cavity and permit drainage of any water from the cavity. Ideally located at control joints (CJ) and at no greater than 3 metre spacing.

Fig 1.4 Good Practice Panel/Penetration Layout

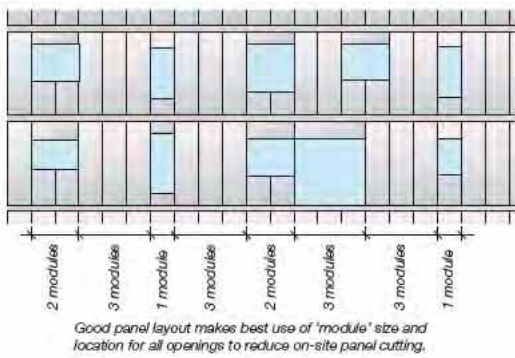


Fig 1.5 Poor Practice Panel/Penetration Layout

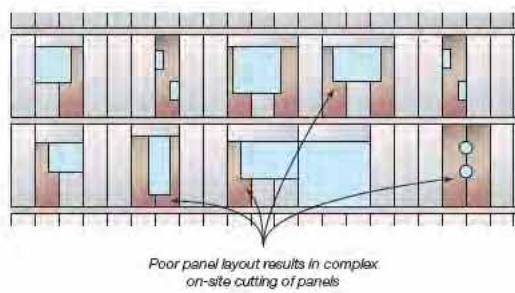


Fig 1.6 Typical Multi-Unit Floor Plan

The figure below is an example only and illustrates the typical placement of control joints, pressure equalisation slots and cavity baffles



- Control Joint
(no greater than 6m spacing)
- Pressure Equalisation Slots
(no greater than 3m spacing)
- Cavity Baffle

1.4 System components

Hebel PowerPanel

The core component of systems for facades is the 75mm thick Hebel PowerPanel. The panel is manufactured in a range of stock sizes as detailed in the following table.

Table 1.7 Hebel PowerPanel Stock Sizes

Panel Type	Panel Dimensions			Weight* (kg/m ²)	
	Length (mm)	Width (mm)			
		300	450	600	
Standard	1200			✓	49
	2400	✓		✓	49
	2550			✓	49
	2700	✓	✓	✓	49
	2850			✓	49
	3000	✓	✓	✓	49
	3300			✓	49
	3600			✓	53
	4200			✓	53
Custom	3000 max [†]			✓	49
	3300			✓	49
	Up to 4200 [^]			✓	53

Note: [†] Panel manufactured with a T&G profile to be used with the Slotted Angle track connection.

* Average panel weight calculated 30% moisture content

[^] Panels over 3300mm use caged mesh.

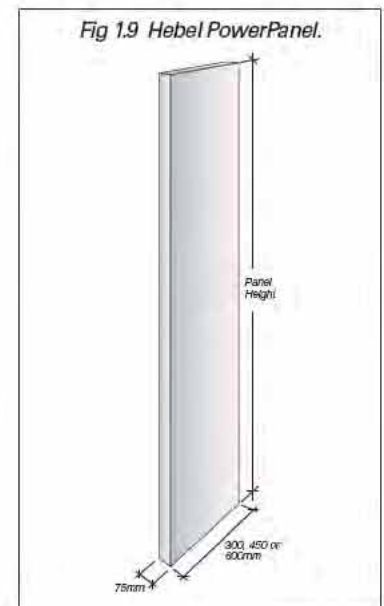


Table 1.8 Hebel Facade products and accessories

System Component	Hidden Slab Edge	Exposed Slab Edge	Supplied by CSR Hebel
FRAMING SYSTEM			
RONDO 92 x 50 x 1.15mm BMT deflection head track (or approved equivalent)	✓	✓	Rondo NOTE 1
RONDO 92 x 32 x 1.15mm BMT base track (or approved equivalent)	✓	✓	Rondo NOTE 1
RONDO 92 x 32 x 1.15mm BMT lipped studs (or approved equivalent)	✓	✓	Rondo NOTE 1
WALL SYSTEM			
Waterproof membrane	✓	✓	
Bradford Enviroseal ProctorWrap™ or DuPont™ Tyvek® HomeWrap®	✓	✓	
SLS ProctorWrap Plain Tape & SLS ProctorWrap Flexi Tape or 3M™ Gaffa Tape 1910C	✓	✓	
40 x 40 x 0.6 galvanised angle	✓	✓	✓
Hebel Facade Top Hat 50mm x 0.75mm BMT (also used as cavity baffle)	✓	✓	✓
10-16 x 16 hex head tek Top Hat fastener	✓	✓	✓
12-11 x 25 hex head type 17 Top Hat fastener	✓	✓	✓
125mm x 80mm x 5mm shelf angle	✓		✓
125mm x 110mm x 5mm shelf angle	✓		✓
M12 Hilti HVU galvanised chemical anchors at 900mm centres	✓		
M10 Hilti HVU galvanised chemical anchors at 450mm centres.	✓		
75 x 50 min. non-compressible packers	✓	✓	
Backing Rod	✓	✓	
Fire / Acoustic sealants	✓	✓	
Hebel Powerpanel	✓	✓	✓
Fentak anti-corrosion coating agent	✓	✓	✓
Hebel Adhesive	✓	✓	✓
14 -10 x 100 bugle head timber screw powerpanel fastener	✓	✓	✓
Pressure equalization slots	✓	✓	
Long screw 14-10x100 MP Bugle Head return panel fasteners	✓	✓	✓
Hebel patch	✓	✓	✓
Flashing / DPC - not supplied by CSR	✓	✓	
Gyprock plasterboard	✓	✓	
Bradford insulation	✓	✓	
COATING SYSTEM			
Dulux AcraTex AcraLite – Lightweight Repair & Levelling compound		✓	Dulux AcraTex
Dulux AcraTex AcraPatch High Build – Base Levelling and Reinforcing layer	✓	✓	Dulux AcraTex
Dulux AcraTex Green Render Sealer – FastTrack Primer	✓	✓	Dulux AcraTex
Dulux AcraTex AcraSkin – Elastomeric Texture and Weatherproofing membrane	✓	✓	Dulux AcraTex

1) RONDO steel stud framing (or approved equivalent) must be specified in accordance with the project wind loads as determined by the project design engineer. A design certificate prepared by the stud frame manufacturer or project engineer in regard to the stud framing specification must be provided to CSR Hebel.

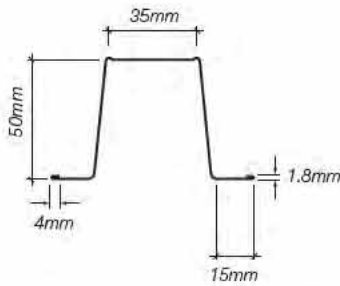
2) Steel stud framing must be installed in accordance with the manufacturer's or project engineer's specification.

3) The builder is to provide a letter of certification for stud installation following completion of stud framing provided to CSR Hebel.

4) CSR Hebel has engineered and tested the facade system to comply with the Building Code of Australia and relevant Australian Standards using accessories specified in Table 1.8

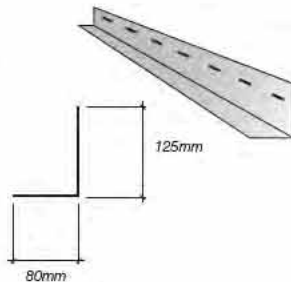
Hebel Facade Top Hat

The Top Hats are used to fix the Hebel PowerPanel to the structural support framing. CSR Hebel has specifically designed the Hebel Facade Top Hat to improve building setout and ensure any water entering the cavity is directed to the back face of the PowerPanel.



Hebel Shelf Angle

A shelf angle is used in the wall system with a hidden edge beam. It is the responsibility of the project engineer to confirm suitability of the angle, connection system and durability performance and additional protection requirements.



Available in two sizes:
125 x 110 x 5mm / 125 x 80 x 5mm



Hebel Adhesive

Hebel Adhesive (supplied in 20kg bag) is used for gluing the panels together at vertical and horizontal joints.



Hebel Patch

Minor Chips or damage to panels are to be repaired using Hebel Patch (supplied in 10kg bags).

Hebel Anti-Corrosion Protection Paint

Used to coat exposed reinforcement during cutting.



Steel Stud Framework

Zinc coated steel studs, noggings, head and base tracks are used to create separated stud framework, which in conjunction with the Hebel PowerPanel, provide cavity wall system assemblies.

The wall configurations outlined in this publication have been determined for cold-formed steel products manufactured by Rondo Building Services Pty Ltd. For alternative stud types, the stud manufacturer or project engineer will be responsible for approving the substitute product as adequate for performance requirements and providing certification of such systems to CSR Hebel. All steel stud framework components are to be designed in accordance with framing manufacturer's specifications, and AS/NZS4600.

Additional information can be obtained from Rondo Building Services Pty Ltd, telephone 1300 367 663 or the website: www.rondo.com.au

Bradford Insulation

Hebel PowerPanel System for Facades incorporate Bradford Insulation materials. Additional information on Bradford Insulation is available from the website:

www.bradford.com.au



Wall Wrap – Condensation Control Membrane

Hebel Power Panel Systems for Facades incorporate a vapour permeable wall wrap to control interstitial condensation, provide additional weatherproofing and improve thermal performance. The wall wrap is positioned between the top hats and steel stud support framing, and for optimum performance joints should be lapped and taped. Use 50x50x0.8 Rondo Steel angle on internal corners to prevent tearing.

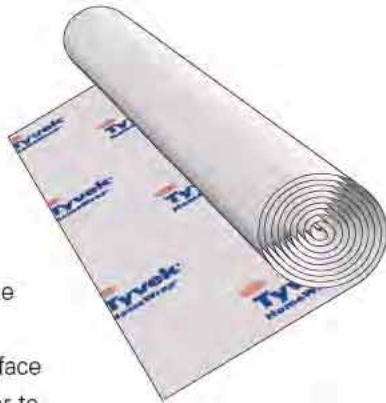
Hebel recommends:

- Enviroseal Proctor Wrap Residential Wall (RW) vapour permeable membrane with high water hold-out for *Region A applications*
- Bradford Enviroseal ProctorWrap™ Commercial Wall (CW) vapour permeable membrane with high water hold-out *Region B applications*



- SLS ProctorWrap Plain Tape for sealing lap joints and SLS ProctorWrap Flexi Tape for sealing around penetrations
Alternative Wall Wrap products:

- DuPont™ Tyvek® HomeWrap® use 50x50x0.8 Rondo Steel angle on internal corners to prevent tearing.



- 3M™ Gaffa Tape 1910C to tape off the Tyvek®.
Please note the surface may require a primer to ensure tape adhesion.

Gyprock® Plasterboard

Hebel PowerPanel System for Facades incorporate Gyprock plasterboard on the internal/steel stud sides. The type, thickness and densities of plasterboard will be as per Hebel PowerPanel System for Facades requirements which is typically 13mm Gyprock CD Plasterboard. Gyprock Fyrcheck to Gyprock Redbook™ specifications if internal fire rating required. Additional information on Gyprock Plasterboard is available from the website:

www.gyprock.com.au.

Fasteners & Fixings

Fixing of Hebel PowerPanel to Top Hat:

- #14-10 x 100mm bugle head timber screw.



Fixing of Top Hat to Steel Framing:

- #10-16 Hex head self drilling screw.

Steel Framing Fixings

Refer to Table 2.4 page 22 of this Design and Installation Guide

Plasterboard Fixings

Fix the plasterboard to the steel studs in accordance with Gyprock instructions.

DPC/Flashing

Plastic flashing minimum 100mm wide for wall junction and wider for base of facade wall when on exposed slab.

Sealants

All gaps in internal and external junctions and movement joints must be caulked with appropriate flexible sealants.

Sealants shall be installed in accordance with the sealant manufacturer's instructions.

IMPORTANT: Sealants and primers (as required) must be compatible with the substrate material, such as flashings, Hebel PowerPanel, window frame material and coatings.

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.

Waterproof Membrane

Waterproof membranes must be applied in accordance with manufacturers specifications and relevant codes - AS3740 and AS4654.

Cavity Baffles

Used vertically at the major corners of the building to limit the air flow within the cavity (typically 4 per level). The Hebel Facade Top Hat can be used as the cavity baffle.

Pressure Equalisation Slots

Proprietary slots (for example Weepa slots) can be used. Install in accordance with manufacturers instructions and include a spark proof grate where fire rating is required



Packers

Non-compressible PVC packers are used between the shelf angle and the slab edge and under panels in the visible slab edge Facade system. Use two 75 x 50mm packers to support the PowerPanel on the slab edge if required.

Performance and structure of the Hebel Facade wall system

2.1 Structural provisions

Hebel PowerPanel Systems for Facades

The Hebel PowerPanel System for Facades is a non-loadbearing facade which consist of the vertical Hebel PowerPanel cladding and a support structure of lightweight structural (cold-formed) steel products (horizontal Top Hats and vertical studs). This section provides tables to assist the designer in the selection of stud and Top Hat spacings that ensure the panel remains fit for purpose under the imposed actions.

A description of the wall components is outlined in Table 1.8.

The values in Table 2.2 & 2.3 are determined based on the following assumptions:

- The panel is not cracked when subjected to ultimate wind pressures; and
- The bending stresses induced into the panel considered the effect of a deflecting support framing and wind pressure acting on the surface of the panel.

Guidance is given in Table 2.2 & 2.3 for the selection of stud and Top Hat products manufactured by Rondo Building Services Pty Ltd for the Hebel PowerPanel System for Facades.

IMPORTANT: *The design and approval of the lightweight structural (cold-formed) steel framing is to be provided by Rondo Building Services (or similar) and/or project engineer including certification of stud framing installation. The builder is to provide a letter of certification of stud installation following completion of stud framing.*

Imposed Design Actions

The imposed design actions shall be determined from AS/NZS1170 series of codes and are to be provided by the designer.

For the wind load, the value must be the maximum after all effects, such as internal, external, and local pressure factors, etc. have been applied where applicable. This value is required as an ultimate strength design value.

Deflection Gaps

The width of deflection gaps at movement joints shall be nominated by the project engineer and sealant manufacturer, so that the sealant geometry can accommodate the magnitude of movement in the joint. 15mm between the top of the panel and shelf angle/concrete soffit, is typical for high-rise multi-residential buildings.

Air Barrier System

The facade designer shall verify that the selected plasterboard and wall wrap has adequate capacity for the particular project.

Hebel Facade Structural Design

Design Table Notes:

Design Parameters:-

Rondo 92 x 1.15mm BMT G2 Lipped Studs
Standard Rondo Wall Studs, Wall Tracks and Deflection Head tracks ONLY
Deflection Limit - SPAN / 360

Wind Loading Parameters:-

$VR = V1000 =$

$Cpe = 0.8, -0.65$

$Cpi = -0.3, 0.2$

KI in accordance with AS/NZS 1170.2:2002

Mz, cat assumed to vary with height

Notes:

Consult Rondo Building Services for applications outside these situations. Where the stud spacing is less than 300mm, using back to back studs at double spacing will require a custom deflection head track. Rondo should be consulted in this instance.

Key to Table

600 / 4

600 = Wall stud spacing (mm)

4 = Numbers of Top Hats

First and last Top Hats assumed to be 150mm from each end of stud Remaining Top Hats evenly distributed over height of wall 1/#10 tek screw per leg per stud typical - Top Hat to stud.

Table 2.1 Wall Configuration & Components

Wall Configuration	Description
Stud Configuration:	RONDO 92x32x1.15mm BMT lipped studs, G2 or similar 1 row of nogging mid wall height
Head Track:	RONDO 92x50x1.15mm BMT deflection head track , G2 or similar 1 row of nogging 100mm below head track
Base Track:	RONDO 92x32x1.15mm BMT track, G2 or similar 1 x #8 tek screw both sides per stud
Top Hat:	Hebel Facade Top Hat, 50mm x 0.75mm BMT, G2
Wall Linings:	Hebel 75mm PowerPanel + coating system (external)
	1x 13mm Gyprock plasterboard CD (internal)

Table 2.2 Hebel External Wall System Design - Region A, Terrain Category 3

Region A		Stud Frame Height (metres)					
Wind Ult (kPa)	Wind Serv (kPa)	3.0	2.9	2.8	2.7	2.6	2.5
0.96	0.62	600	600	600	600	600	600
1.08	0.70	450	600	600	600	600	600
1.20	0.78	450	450	600	600	600	600
1.31	0.85	450	450	450	600	600	600
1.34	0.86	400	450	450	600	600	600
1.42	0.92	400	450	450	450	600	600
1.47	0.95	400	400	450	450	600	600
1.63	1.05	300	400	450	450	450	600
1.68	1.09	300	300	400	450	450	600
1.77	1.14	300	300	400	450	450	450
1.94	1.26	300	300	300	400	450	450
1.98	1.28	225	300	300	400	450	450
2.17	1.41	225	300	300	300	400	450
2.25	1.46	225	225	300	300	400	450

Notes:

1 Stud Spacing in mm Provided

2 All above wall configurations require 4 Hebel 50mm Top Hats (minimum)

3 Wind Loads provided are the Upper Limits

4 Table 2.2 has been prepared by Rondo Building Services for Rondo Steel Stud Frame.

5 a) RONDO steel stud framing (or approved equivalent) must be specified in accordance with the project wind loads as determined by the project design engineer. A design certificate prepared by the stud frame manufacturer or project engineer in regard to the stud framing specification must be provided to CSR Hebel.

b) Steel stud framing must be installed in accordance with the manufacturer's or project engineer's specification.

c) The builder is to provide a letter of certification for stud installation following completion of stud framing provided to CSR Hebel.

d) CSR Hebel has engineered and tested the facade system to comply with the Building Code of Australia and relevant Australian Standards.

Table 2.3 Hebel External Wall System Design - Region B, Terrain Category 3

Region B		Stud Frame Height (metres)					
Wind Ult (kPa)	Wind Serv (kPa)	3.0	2.9	2.8	2.7	2.6	2.5
1.64	0.66	450	450	600	600	600	600
1.83	0.73	450	450	450	600	600	600
1.92	0.77	400	450	450	450	600	600
2.04	0.82	400	400	450	450	450	600
2.23	0.90	300	400	450	450	450	450
2.27	0.91	300	400	400	450	450	450
2.47	0.99	300	300	400	450	450	450
2.50	1.00	300	300	400	400	450	450
2.62	1.05	300	300	300	400	450	450
2.74	1.10	300	300	300	400	400	450
2.78	1.11	225	300	300	400	400	400
2.96	1.15	225	300	300	300	400	400
3.01	1.21	225/5	300	300	300	300	400
3.10	1.24	225/5	225/5	300	300	300	300
3.31	1.33	225/5	225/5	300/5	300/5	300	300
3.37	1.35	225/5	225/5	225/5	300/5	300	300
3.50	1.41	100/5	225/5	225/5	300/5	300	300
3.61	1.45	100/5	100/5	225/5	300/5	300/5	300
3.70	1.48	100/5	100/5	100/5	300/5	300/5	300
2.78	1.52	100/5	100/5	100/5	225/5	300/5	300/5
3.84	1.54	100/5	100/5	100/5	100/5	300/5	300/5

Notes:

- 1 Stud Spacing in mm Provided
- 2 Where /5 is shown adjacent to stud spacing - 5 Hebel 50mm Top Hats are required
- 3 All other configurations require 4 Hebel 50mm Top Hats (minimum)
- 4 Wind loads provided are the Upper Limits
- 5 Table 2.2 has been prepared by Rondo Building Services for Rondo Steel Stud Frame.
- 6 a) RONDO steel stud framing (or approved equivalent) must be specified in accordance with the project wind loads as determined by the project design engineer. A design certificate prepared by the stud frame manufacturer or project engineer in regard to the stud framing specification must be provided to CSR Hebel.
 - b) Steel stud framing must be installed in accordance with the manufacturer's or project engineer's specification.
 - c) The builder is to provide a letter of certification for stud installation following completion of stud framing provided to CSR Hebel.
 - d) CSR Hebel has engineered and tested the facade system to comply with the Building Code of Australia and relevant Australian Standards.

Steel Stud Frame

The steel stud frame shall be designed by Rondo or similar or appropriate project engineer.

Hebel PowerPanel is a masonry product and the support structure should be designed to provide sufficient stiffness. The steel stud frame shall be designed and constructed in accordance with AS3623 or AS/NZS4600 (BCA Performance Requirement) with performance requirements for the studs of:

■ Properties:

- Cold-formed steel studs
- Minimum yield strength 275MPa (\geq 250MPa Performance Requirement in the BCA).
- Minimum thickness 1.15mm BMT.
- Coating class Z275 (See Section 2.7 – Durability).

■ Lateral deflection limit:

- H/360 or 20mm maximum, under serviceability wind pressures in accordance with AS1170.2.
- The deflection behaviour of the steel stud under the serviceability and ultimate strength loading conditions is assumed to be linear. The deflection limit at ultimate loading is taken as H/170 ($H/400 \times (V_s/V_u)^2$) for Regions A, B and C in AS/NZS1170.2.

■ Vertical load:

- Steel stud framing support no vertical load (like Hebel PowerPanel or coatings) except in the fire limit state for the hidden slab edge arrangement.

■ Connections:

- Designer to specify fixings to accommodate vertical deflection and lateral sway of the supporting members (e.g. slab).
- Provide fixings specification (mechanical fasteners – spacings and type).

■ Stud layout:

- Around openings additional steel studs and end connections may be required to strengthen this area, for the loads that are shed from the openings (window or door).
- It is the responsibility of the stud frame manufacturer or project engineer to specify the configuration of the support structure.
- The builder is to provide a drawing of the stud framing plan and details produced by the stud frame manufacturer (or project engineer) prior to commencement of facade installation.

Air Barrier

A fully sealed air barrier is a compulsory requirement in the Hebel Pressure Equalised facade wall system.

The internal plasterboard linings (fixed to the steel stud frame) are considered the primary air barrier in this facade system. The Bradford Enviroseal ProctorWrap™ building wall wrap also functions as an air barrier under low external pressures.

As such, these internal linings and the Bradford Enviroseal ProctorWrap™ building wall wrap need to be completely sealed to the main building structure (around the periphery and at penetrations through the linings) to ensure proper function of the pressure equalised system and avoid a pressure differential (between the facade cavity and the internal parts of the building) that could otherwise draw water into the internal habitable areas of the building.

Steel Top Hat

The Hebel Facade Top Hat has been designed in accordance with AS/NZS4600:

■ Properties:

- Cold-formed steel Top Hats.
- Top Hat depth of 50mm.
- Thickness 0.75mm BMT.
- Minimum yield strength 275MPa ($>$ 250MPa Performance Requirement in the BCA).
- Coating class Z275 and Z450 coastal

(See Section 2.7 – Durability) under Steel Top Hat® Properties® Coating class Z275 and Z450

■ Lateral deflection limit:

- H/360 under serviceability wind pressures in accordance with AS1170.2.

■ Vertical load:

- Top Hats support no vertical load except in the fire limit state for the hidden slab edge arrangement.

■ Connections:

- Minimum screw coating class in accordance with AS3566: Class 3 and Class 4.
- Pullout and pullover capacities based on screws conforming to AS3566.

- **Top Hat spacings:**
 - Minimum number of Top Hats – 4.
 - Top Hats must be continuous over a minimum 2 spans, or for single spans, stud spacing must be < 2/3 of nominated maximum stud spacing.
 - The design tables nominate the number of Top Hats. The spacing is to be evenly distributed.
 - Maximum Top Hat spacing of 1,000mm.

Hebel PowerPanel

The strength design of the Hebel AAC panels has been carried out using the Transformed Section Theory, as detailed in the text book, 'Reinforced Concrete' by Warner, Rangan and Hall (Longman Cheshire).

The load carrying capacity of the Hebel PowerPanel is influenced by several factors, such as:

- Imposed action (wind).
- Lateral stiffness of the supporting structure (lightweight structural (cold-formed) steel framing).
 - Stud size and spacings.
 - Deflection limit.
- Height of the wall.
- Number and spacing of the Top Hats.
- Number of screw fixings considered effective.

Hebel panels have been designed as 'one-way' spanning structural members supported by the Top Hats. The specifications in Tables 2.2 & 2.3 are determined so that the Hebel panel is uncracked when subjected to ultimate wind pressures.

The steel Top Hat arrangement and stud spacing of the Hebel PowerPanel System for Facades can be determined from Tables 2.2 & 2.3.

The performance requirements of the Hebel PowerPanel cladding are:

- **Cut panels:**
 - All exposed reinforcement to be painted with a liberal coating of the protection paint – Fentak.
- **Finishes:**
 - Refer to Section 2.4 for performance requirements of the coating system.

- **Connections:**
 - No. 14 - 10 x 100mm Bugle Head Timber Screw.
 - Minimum screw coating class in accordance with AS3566: Class 3.
 - 3 screws per 600mm panel width for each Top Hat.
 - Minimum 2 screws per 400mm width (or less) for each Top Hat.

The design capacities of the Hebel PowerPanel cladding are in limit state format and intended for use with AS/NZS1170.2.

Fixings

Table 2.4 outlines the connection type and requirements for constructing Hebel PowerPanel Systems for Facades detailed in this Design Guide. The project engineer or framing manufacturer are responsible for specification of alternative details.

Shelf Angle minimum anchor details

Options.

- M12 Hiliti HVU galvanized chemical anchors are required at no more than 900mm centres (for embedment depth of 110mm).
- M12 Hiliti HVU galvanized chemical anchors are required at no more than 450mm centres (for embedment depth of 110mm).

Note: Minimum edge distance 70mm to the underside of slab.

Table 2.4 Fixings

Fixings For	Fixing Type	Number of Fixings and Spacing
Top/bottom Track to Structure	M8 Dynabolt + 25 x 3mm load sharing washer	600mm max. spacings. Project engineer or framing manufacturer to specify layout
Top Hat to Stud	#10 metal tek screws	2 fixings at each stud (one fastened through each Top Hat leg)
Panel to Top Hat	14 - 10 x 100mm bugle head timber screws	3 per 600mm width panel at each top hat

** Capacity calculated in accordance with AS4600*

2.2 Fire Resistance Performance

Fire Performance of Hebel Facade Systems

The Hebel PowerPanel System for Facades can be subjected to a fire loading as the result of either an external fire source, or an internal fire source. When the wall requires a fire resistance level (FRL) rating, Hebel provides the following guidance.

External Fire Source

For an external fire source, the excellent fire resistance qualities of the Hebel PowerPanel cladding protect the structural support framing, and provide a high fire resistance level or the Hebel PowerPanel System for Facades.

The Hebel PowerPanel System for Facades has an FRL of -/120/120 on the Hidden Slab Edge arrangement and -/180/180 on the Visible Slab Edge arrangement.

NOTE: The FRL rating of the wall can be affected by the penetrations and the method adopted to protect these penetrations. A fire collar with a -/120/120 FRL rating will govern the FRL of the wall, even if the wall configuration has a FRL rating of -/180/180.

Where required, the performance of the external coating when subjected to a fire loading must meet the appropriate performance requirements outlined in the BCA.

Internal Fire Source

If the Hebel PowerPanel System for Facades requires protection from an internal fire source, for example buildings of two storeys or less as described below, an internal lining system to protect the structural support framing, or an alternative fire protection system such as automatic external wall-wetting (sprinklers) is necessary.

The protective lining system can consist of CSR Gyprock Fyrchek™ plasterboard fixed to the support framing. Information can be found in CSR Gyprock Fire & Acoustic Design Guide, 'The Red Book™'.

The steel frame manufacturer or project engineer shall approve the connection arrangements for any fire rated lightweight steel support framing.

Fire Certificates & Reports

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

External Walls in Fire. BCA Deemed-to-Satisfy Provisions

Where necessary, the designer should ensure the structural support framing and its connections are adequate when subjected to fire conditions.

The Building Code of Australia Volume 1 outlines a Functional Statement (CP5) for external walls in fire for a building with two storeys or less:

Where an external concrete wall could collapse as a complete panel, it must be designed so that in the event of fire within the building, the likelihood of outward collapse is avoided.

Design Considerations

Pressure Equalisation Slots

Vents and pressure equalisation slots are to be protected by spark guards made from corrosion resistant steel, bronze or aluminium mesh with a max-aperture size of 1.8mm.

Fire Stop Penetrations

Penetrations through a Hebel PowerPanel System for Facades to accommodate pipework, electrical cabling or ductwork must 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.

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

NOTE: Stepped Slab Construction. Where the floor slab may change in level, the shelf angle must remain continuous around the building. This may require vertical sections of shelf angle to be installed to connect discontinuous sections of shelf angle (hidden slab edge arrangement only).

Shelf Angle

The shelf angle is required in situations where the Hebel PowerPanel is located in front of the slab (HEB2000). The base angle acts as a partial support and as a shelf to rest the panel on during the installation of the panel. The shelf angle must be installed in accordance with the project engineer's specifications and details. Shelf angle butt joints must be fully sealed with a suitable fire rated sealant.

2.3 Design for weather tightness

The primary goal in facade design is the provision of a building solution that manages the environmental conditions that the facade is subjected to during its design life. Of the various environmental conditions, the prevention of water ingress is critical.

The Hebel PowerPanel System for Facades is a high quality rain screen, and adopts the concept of pressure equalisation to provide a system that eliminates water being drawn through the rain screen due to a pressure differential.

When wind pressures act on the external surface of the facade, a pressure difference is generated between the external side and cavity space side of the Hebel PowerPanel cladding. The combination of a pressure differential;

a penetration in the external coating and sealing system; and water, can result in water being drawn through the penetration and into the cavity.

The principal of pressure equalisation is, where wind pressure acting on the external surface of the facade can gain access to the cavity side, thus allowing the pressures on both sides of the cladding to become similar.

The elimination of a pressure differential significantly reduces the process of water being drawn through a penetration in the external coating/sealing system and cladding.

Additionally, the slots provided for pressure equalisation allow for drainage of water from the cavity if ingress occurs.

A compulsory part of the Hebel PowerPanel System for Facades is the wall wrap, which is installed on the external side of the stud frame to seal the cavity space.

Fig 2.5 Hidden Slab Edge Detail (HEB2000)

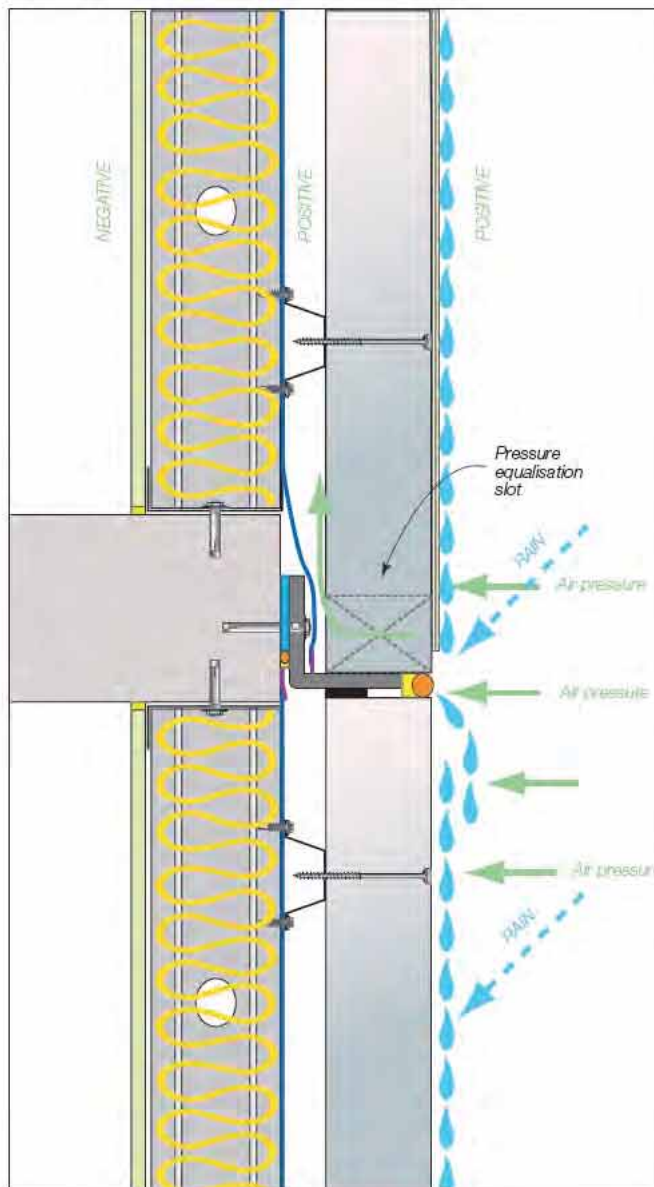
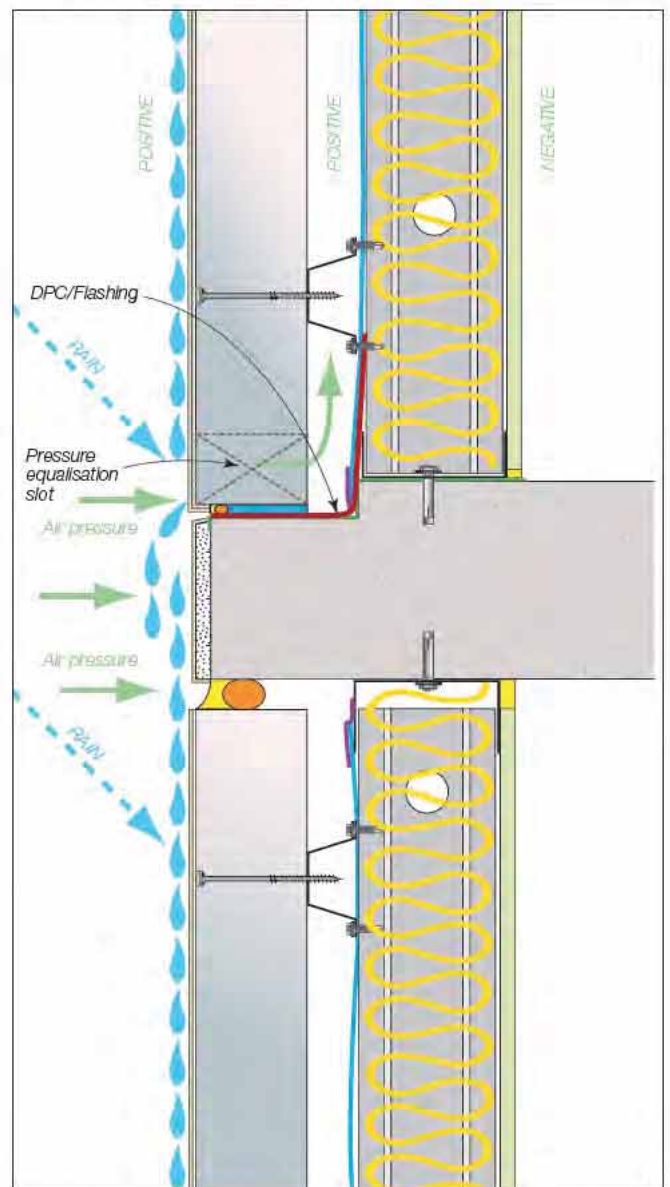


Fig 2.6 Exposed Slab Edge Detail (HEB2001)



CSR Hebel engaged the services of AECOM Australia Pty Ltd to undertake a test program to verify the structural and weatherproofing capability of the new framing system developed for the Hebel Facade system.

In particular, the test confirmed the ability of the system to meet the requirements of AS/NZ 4284: 2008 in demonstrating satisfactory performance under structural load, water penetration (under static and cyclic pressures), and Ultimate Proof Load.

The key performance achievements of the test were:

- Structural proof load up to -2.76kPa ; and
- Waterproofing performance up to 1.07 kPa (under cyclic pressure).

It should be noted that this performance was achieved without the benefit of any applied coating to the exterior surface of the test sample (i.e. the exterior of the Hebel panels).

The successful result confirms the robust performance of the system regardless of the quality (or omission) of any surface coatings.

CSR Hebel testing facility



2.4 Coatings

CSR Hebel has worked with Dulux® AcraTex® in development of coating systems for Hebel to meet the specific requirements of the Hebel substrate. *CSR Hebel Building Systems and Dulux AcraTex Coating Systems must be installed in full accordance with this design guide and relevant Product Data Sheets & Specifications.

DULUX ACRATEX COATINGS SYSTEMS GUIDE FOR HEBEL HI-RISE *		Dulux Product Code	Duspec Data Sheet	Usage
SLAB EDGE REPAIR AND LEVELLING – Hebel Visible Slab Edge Design Dulux AcraTex AcraLite		19385979-12L	AUDA 1614	
<p>AcraLite is a preblended LIGHTWEIGHT POLYMER & FIBRE reinforced levelling compound supplied in a dry powder form. Apply in layers of 4-12mm up to 25mm. Apply a slurry Key Coat (dash coat) followed by multiple Filling Layers as required.</p> <p>Key Coat Mix Ratio: Mix 5 parts Water to 1 part AcraBond and use as gauging liquid. Mix gauging liquid with AcraLite powder to make a slurry and apply a 70% "dash coat" Allow to firm before applying subsequent Filling layers</p> <p>Filling Layers: Mix 1 bag (10kg) AcraLite to 6.5L clean potable water. Allow to activate for 5 minutes. Adjust consistency with up to 0.5L water (once only) and apply up to 12mm thick layers. Allow to firm on the wall and screed level.</p>				Approx. 0.7 kg / sq m per mm filling depth
SKIMCOAT LEVELLING LAYER Dulux AcraTex AcraPatch High Build <i>mixed with RenderWall</i>		194 85841-15L	AUDA0440	
<p>AcraPatch High Build is a FLEXIBLE ACRYLIC levelling compound supplied in wet form to which RenderWall is added on site. Mix with RenderWall and apply in 3-5mm layers and float finish to a sand finish profile.</p> <p>AcraPatch HB / RenderWall Mix Ratio Pre-mix 20 kg (1 bag) RenderWall with 4L clean potable water to form a stiff RenderWall mix Mix and divide equally a 15L pail of AcraPatch High Build into 2 pails (ie 7.5L in each) Add half of the RenderWall wet mix to each 7.5L of AcraPatch High Build and mix.</p>				AcraPatch HB RenderWall mix 1L / sq m per mm cover
COATING SYSTEM Dulux AcraTex AcraSkin Low Profile Texture				sq m per lt
PRIMER :	Dulux AcraTex Green Render Sealer Apply by conventional nap roller to avoid efflorescence	19420802-15L	AUDA 1582	10
TEXTURE LAYER	Dulux AcraTex AcraSkin Apply by medium cell Texture Roller	19485675-15L	AUDA 1392	3
TOPCOAT :	Dulux AcraTex AcraSkin Apply by conventional med-long Nap Roller	19485675-15L	AUDA 1392	4
MOVEMENT JOINT TREATMENT				
<p>Expansion Joints must be in accordance with CSR Hebel Design Guide including the use of backing rod as specified. Dulux recommends filling of movement joints AFTER installation of the coating system Levelling Layer.</p> <ul style="list-style-type: none"> - Mastic filled joints should then be masked with 6mm tape prior to application of the Texture Layer – remove tape before Texture dries. - Application of the System Topcoat should be continuous over the entire area including mastic filled joint providing final colour uniformity. - Minor cracking of the topcoat over joint mastic may occur due to movement and is NOT considered a coatings defect. 				
Typical Process	Typical Movement Joint	Visible Slab Edge Design Pre-filling & Post Install of Dual Horizontal CJs		
Design	Vertical CJ or Horizontal Hidden Slab Edge Design	Specified where Hebel panel installation exposes the concrete Slab Edge which is typically recessed and not aligned to the Hebel Panel face		
Prep A		PreFill to Level the Slab Edge flush with the Hebel Panel surface with AcraLite - <i>as per Slab Edge Repair and levelling detail.</i>		
Typical CJ Process				
1	Skimcoat Levelling Layer System Installation - as per Coatings System detail. <i>- Care must be taken to ensure movement joints remain free of Levelling compound or mark accurately in planning to re-cut joints.</i>			
2	Accurately mark and recut Movement Joints and clean out in preparation for Sealant installation. <i>- Where Fire Proof Mastic is installed, recut joint only to the depth of the installed mastic.</i>			
3	Install backing rod as per Hebel specification and Joint Mastic manufacturer's recommendations.			
4	Install approved sealant (Fire Rated, as required) as per manufacturers recommendations. Sealant must be compatible with external coating system. <i>- Care must be taken to ensure mastic is not spread on panel face. - Best practice is masking of either side of joint prior to mastic install.</i>			
5	Mask cured mastic with 6mm tape prior to Installation of Texture Layer. Install Texture layer – as per Coating System detail			
6	Install the final Weatherproofing Topcoat layer over the entire area including the mastic joint providing colour uniformity across the joint.			

* Refer to Dulux AcraTex Product Data Sheets and Duspec Specification for full Project Specific Coating System and Warranty detail.

Concrete Edge Beam

Pre-filling will be required where misalignment between the in-situ concrete elements, such as slab edges and columns, and the finished wall plane. To exploit the accuracy of the installed wall system and minimise the amount of rendering, CSR Hebel recommend establishing concrete tolerances that result in the unrendered concrete edge beam being located behind the finished wall plane. This will eliminate the need for scabbling of the edge beam and/or building out the wall surface. (Refer to Section 2.4 'Coatings for pre-filling and coating detail of visible slab edge).

Fig 2.7 Alignment of Edge Beam – Recommended Practice

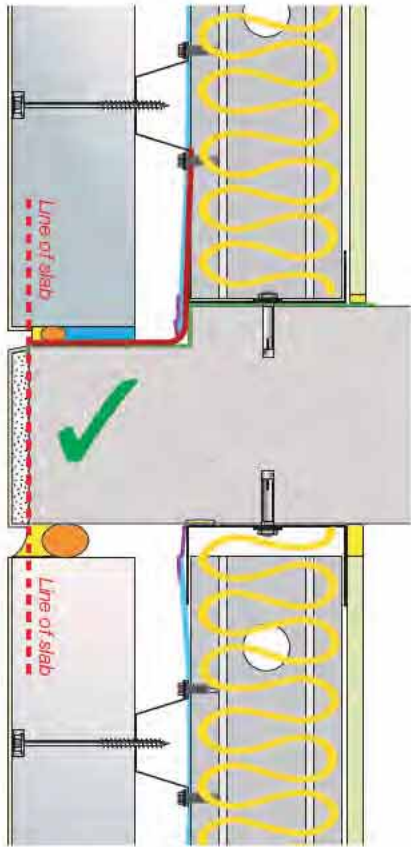
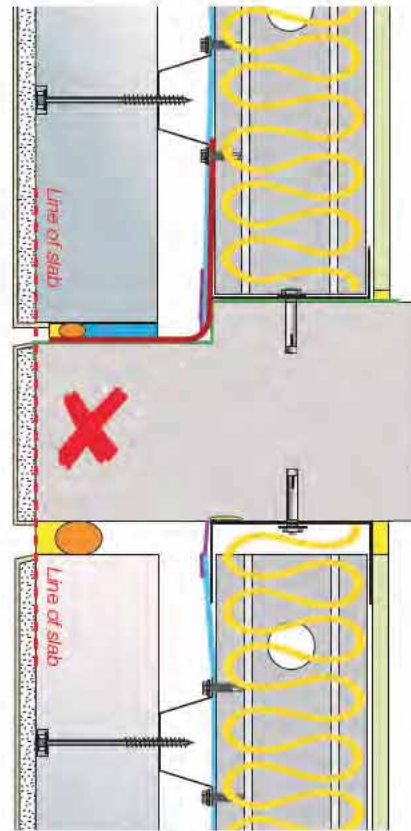


Fig 2.8 Alignment of Edge Beam – Not Recommended



Cladding Systems

Proprietary lightweight cladding systems such as Aluminium Composite Panels can be fixed to the Hebel PowerPanel. The Hebel PowerPanel System for Facades then acts as the structural backing for the proprietary cladding.

The designer should ensure the structural performance of the Hebel PowerPanel System for Facades is adequate. Contact CSR Hebel for more information.

Sealants

All movement joints and gaps between the panels and framing around windows must be caulked with an appropriate flexible sealant. Specifications must ensure sealant is compatible with the materials to be sealed and surfaces primed.

Wall Wrap

The Hebel PowerPanel System for Facades is designed as a high quality rain screen, if water ingress occurs, then the wall wrap between the Top Hats and the support framing will direct water to the drainage points (pressure equalisation slots).

2.5 Sound Transmission & Insulation

Overview

The Building Code of Australia (BCA) presents the Performance Requirements for sound insulation ratings. The sound insulation 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 BCA does not provide Performance Requirements for the airborne sound and impact generated sound insulation ratings for a building envelope. These requirements are set by the relevant local authority.

Design Recommendations

1. CSR Hebel recommends engaging a reputable acoustic consultant on a project-by-project basis to provide design advice and installation inspections.
2. When specifying the appropriate Hebel PowerPanel System for Facades, 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 PowerPanel

Systems for Facades, and any required modification of the installation details pertaining to the systems.

4. Using higher density or thicker insulation or plasterboard, will generally maintain or increase the acoustic performance of the Hebel PowerPanel System for Facades.
5. The acoustic performance values of the Hebel PowerPanel Systems for Facades shown in Table 2.9 are laboratory values. They do not constitute a field performance guarantee as factors such as, the presence of flanking paths, quality of installation, on-site detailing of wall junctions, room shapes and sizes, 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. To minimise the transfer of sound through the Hebel PowerPanel System for Facades 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.
- Site testing conditions.

Table 2.9 provides the results of laboratory testing at the Australian Hearing/National Acoustic Laboratories (NAL) in North Ryde, Sydney.

Table 2.9 Tested Acoustic Performance of Hebel PowerPanel Systems for Facades

NOTE: No external coating was applied to the test systems.

Description	$R_w + C_{tr}$	R_w	Construction
<ul style="list-style-type: none"> • 75mm Hebel PowerPanel fixed to steel Top Hats • 75x10mm pressure equalisation slots @ 3,000mm centres • Top Hats @ 785mm centres fixed to steel studs • 92x32x1.15mm BMT lipped studs @ 300mm centres • 75mm Bradford Glasswool insulation • 10mm Gyprock plasterboard CD <p>Test: ATF1460</p>	36	45	

2.6 Energy Efficiency

The BCA

The Building Code of Australia (BCA) is available in two volumes: Volume 1 – Class 2 to Class 9 Buildings; and Volume 2 – Class 1 & Class 10 Buildings – Housing Provisions. Each volume presents the Performance Requirements for the efficient use of energy for internal heating and cooling in buildings. Volume 1, Section J is the relevant section for the Hebel PowerPanel System for Facades.

The Performance Requirements for energy efficiency ratings are dependent upon the form of construction (i.e., walls or floors), Class of Building, and the type of areas being separated. The performance requirement is a value that is the Total R-Value, which is the cumulative total of the individual R-Values of the building system components.

Thermal Insulation

It is recommended that insulation materials be installed to enhance thermal insulation properties and occupant comfort. Insulation also improves the acoustic performance of the wall against outside noise.

The BCA provides Deemed-to-Satisfy Provisions for compliance and installation of the various types of insulation. The insulation should be installed in the Hebel PowerPanel System for Facades, such that it forms a continuous barrier to contribute to the thermal barrier. All insulation installed in a Hebel PowerPanel System for Facades must comply with: AS/NZS4859.1; or AS2464.3 for loose fill insulation.

Hebel PowerPanel Systems for Facades

One of the primary design objectives in planning a building is to provide a cost effective comfortable living/working environment for the building's inhabitants. Exploiting the inherent thermal mass and insulation qualities of Hebel AAC enables the designer to achieve this objective.

Several comparative studies have been conducted to investigate the benefits of incorporating AAC walls in place of conventional wall systems. A common trend was the lower heating and cooling energy consumption and smaller mechanical equipment required to maintain a comfortable living environment, especially with regards to regions of mainly cold weather. The excellent performance

was the result of the three characteristics – thermal mass, thermal insulation, and the air tightness of the construction.

The level of insulation provided in a wall is determined by the required Total R-value. The higher the required Total R-value the greater the insulation provided. The Hebel PowerPanel System for Facades provides the R-Value rating outlined in Table 2.10.

Air Tightness

Thermal performance can be influenced by many factors. Most of these are related to the design decisions and properties of the adopted materials.

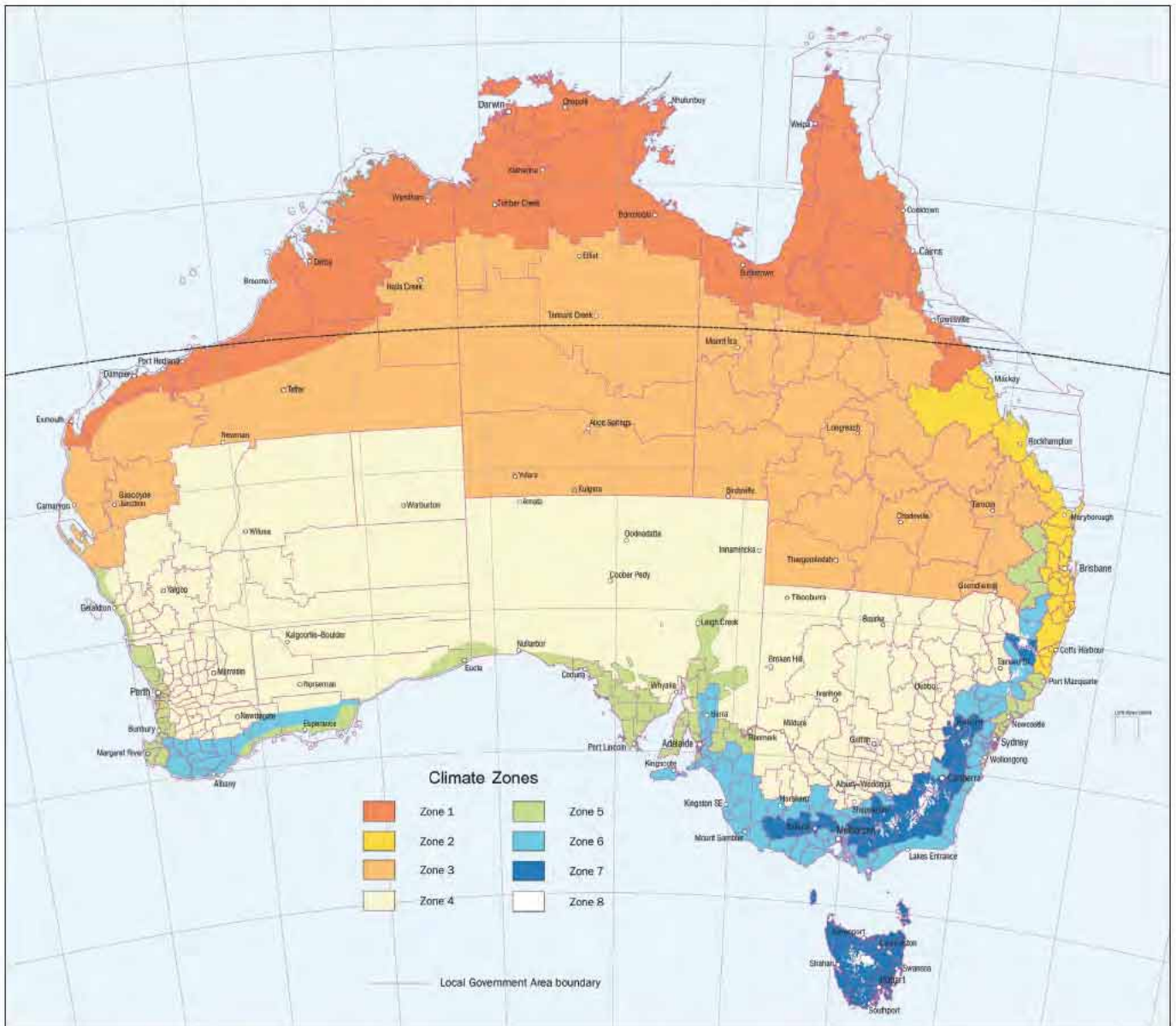
Construction practices can also significantly affect the performance, for example with poor sealing resulting in drafts. The tight construction tolerances of AAC provide a wall with low air infiltration rate. Testing at the CSIRO (Test Report DTM327) on Hebel blockwork with thin bed adhesive joints has determined an air infiltration rate of 0.3L/s (0.014% of internal volume). For panels having fewer thin bed adhesive joints, a rate less than this could be achieved. The air infiltration of the Hebel PowerPanel System for Facades is also dependant on the wall wrap and plasterboard linings.

Wall Wrap

As well as controlling condensation and acting as an air barrier, a wall wrap can be used to significantly improve the thermal insulation and energy efficiency performance of a building solution. Wall wrap layers can alter the performance of the cavity by providing a stagnant column of air.

Table 2.10 Energy Efficiency

The following tables show the performance levels required for walls and floors under the BCA and the thermal performance of the Hebel PowerPanel System for Facades.



STEP 1. Determine which climate zone your project is located in Australia from the map.

STEP 2. From the table, determine the design conditions ('Summer' heat flow in or 'Winter' heat flow out) according to the building class and climate zone for your project. Note: Building classes are defined by the BCA.

STEP 3. Refer to the roof, wall or floor system applicable to your construction type to determine Total R-Value.

Note. Some applications may achieve Total R-Values sufficient to comply with the minimum performance levels of the deemed to satisfy requirements contained in the Energy Efficiency Provision of the BCA

Climate Zone		1	2	3	4	5	6	7	8
			Below 300m	Above 300m					
Walls	Class 1-10,2,3,4&9c	Summer			Winter				
	Class 5,6,7,8,9a,9b	Summer						Winter	
Floors	Class 1-10	Summer			Winter				
	Class 2-8,9a,9b,9c	Summer				Winter			

Table 2.11 Low-Rise Multi-Residential: Options for each part of an external wall that is part of an envelope

Climate Zone	Options		
1, 2 and 3	(a)	(i)	Achieve a minimum <i>Total R-Value</i> of 3.3.
		(ii)	The minimum <i>Total R-Value</i> in (i) is reduced—
		(A)	for a wall with a surface density of not less than 220 kg/m ² , by 0.5; and
		(B)	for a wall that is—
		(aa)	facing the south orientation as described in Figure J2.3 from the BCA 2011, by 0.5; or
		(bb)	shaded with a projection shade angle in accordance with Figure J1.5 from the BCA 2011 of—
		(AA)	15 degrees to not more than 45 degrees, by 0.5; or
		(BB)	more than 45 degrees, by 1.0; and
		(C)	if the outer surface solar absorbance value is not more than 0.6, by 0.5.
		(b)	Where the only space for insulation is provided by a furring channel, Top Hat section, batten or the like—
		(i)	Achieve a minimum <i>Total R-Value</i> of 1.4; and
	(ii)	Satisfy <i>glazing</i> energy index Option B of Table J2.4a from the BCA 2011	
4, 5 and 6	(a)	(i)	Achieve a minimum <i>Total R-Value</i> of 2.8.
		(ii)	The minimum <i>Total R-Value</i> in (i) is reduced—
		(A)	for a wall with a surface density of not less than 220 kg/m ² , by 0.5; and
		(B)	for a wall that is—
		(aa)	facing the south orientation as described in Figure J2.3 from the BCA 2011, by 0.5; or
		(bb)	shaded with a projection shade angle in accordance with Figure J1.5 from the BCA 2011 of—
		(AA)	30 degrees to not more than 60 degrees, by 0.5; or
		(BB)	more than 60 degrees, by 1.0
		(b)	Where the only space for insulation is provided by a furring channel, Top Hat section, batten or the like—
		(i)	Achieve a minimum <i>Total R-Value</i> of 1.4; and
		(ii)	Satisfy <i>glazing</i> energy index Option B of Table J2.4a from the BCA 2011
7	(a)	Achieve a minimum <i>Total R-Value</i> of 2.8.	
	(b)	Where the only space for insulation is provided by a furring channel, Top Hat section, batten or the like—	
		(i)	Achieve a minimum <i>Total R-Value</i> of 1.4; and
	(ii)	Satisfy <i>glazing</i> energy index Option B of Table J2.4a from the BCA 2011	
8	(a)	Achieve a minimum <i>Total R-Value</i> of 3.8.	
	(b)	Where the wall is an earth retaining wall or earth-berm, achieve a minimum <i>Total R-Value</i> of 2.0.	

Table 2.12 Low-Rise Multi-Residential: An envelope wall other than an external wall – minimum total R-value

Location		Climate Zone								
		1	2	3	4	5	6	7	8	
(a)	With the non- conditioned space—		1.0	1.0	Nil	Nil	1.0	1.0	1.5	2.5
	(i)	enclosed, with mechanical ventilation of not more than 1.5 air changes per hour of outside air; and								
	(ii)	glazing not more than that required by Part J2.								
(b)	For other than (a)		2.3	2.3	2.3	1.8	1.8	1.8	2.8	3.8

Table 2.13 Hebel Facade Energy Efficiency

Hebel PowerPanel System for Facades	Description	Total R,m ² .K/W	
		Winter	Summer
HEB2000 HEB2001	Hebel PowerPanel 75mm, Outdoor air film, Coating system, Unventilated 50mm unreflective air space, Bradford Enviroseal ProctorWrap™, R2.0 Bradford Gold Wall Batts (90mm, 10kg/m ³), 13mm plasterboard, Indoor air film	R3.15	R2.94

Stated R values in Table 2.13 have been provided by James Fricker calculation 107.12 dated September 2008.

2.7 Durability

Introduction

The durability of the Hebel Facade Wall System can be enhanced by periodic inspection and maintenance. Inspections should include examination of the coatings, flashings and seals. Facade finishes and sealants must be maintained in accordance with the manufacturer's recommendations. Any cracked and damaged finish or sealants, which would allow water ingress, must be repaired immediately by recoating or resealing the effected area. Any damaged flashings or panels must be replaced as for new work.

The durability of the system can also be increased by using Class 4 fixings throughout, additional treatment of steelwork, and by painting all exposed sealants to the sealant manufacturer's recommendations.

Coastal Areas

The Hebel PowerPanel System for Facades can be used in coastal areas with additional precautions to ensure salt does not build up on the surface of the wall. For buildings which are 300m to 1000m from a shoreline or large expanse of salt water, such as Swan River (west of the Narrows Bridge), Sydney Harbour (east of the Harbour Bridge or Spit Bridge), one of the following is required:

- All walls must be sufficiently exposed from above so that rain can perform natural wash-down of the wall; or
- Walls which are protected by soffits above must be washed down twice per year, to remove salt and debris build-up, particularly at the joints.

In all cases, Class 4 or Z450 stainless steel screws must be used.

For buildings less than 300m from the shoreline as defined above, CSR Hebel does not recommend that Hebel Facade be used without project specific consultation.

Hebel PowerPanel

Hebel PowerPanel has many properties which make it a very durable product, including:

- Will not rot or burn, is not a food source for termites, and unaffected by sunlight.
- Not adversely affected over normal temperature ranges.

Lightweight (Cold Formed) Steel Support Framing

The Building Code of Australia (BCA) Volume 2, Part 3.4.2 presents 'Acceptable Construction Practice' Performance Requirements for the protection of the steel frame from corrosion. These requirements consist of minimum protective surface coatings with restrictions on the location of the building and exposure condition of the steel frame.

For the Hebel PowerPanel System for Facades, the steel framing is considered located within the building envelope, hence the requirements are as follows:

- Where the steel frame is within the building envelope, in locations –
 - more than 300m from breaking surf, or
 - not in a heavy industrial area; the steel frame must have a minimum coating class in accordance with AS1397 of Z275 (275 grams of zinc per square metre) or AZ150 (150 grams of aluminium/zinc per square metre).

The BCA describes the building envelope as the space in the building where the steel frame does not have direct contact with the external atmosphere, other than for normal ventilation purposes. An example of such locations, are frames in masonry veneer construction.

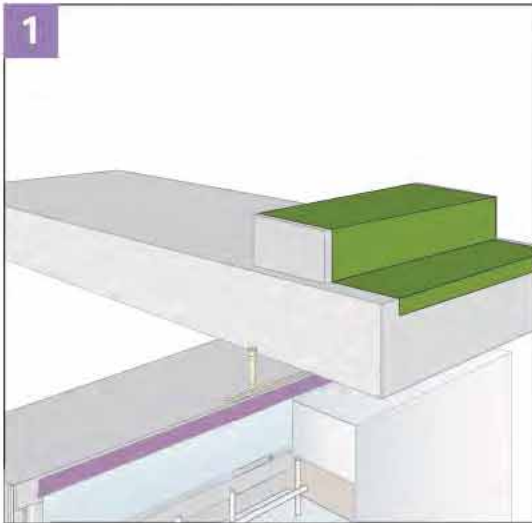
IMPORTANT: *The steel frame requirements outlined in the BCA should be considered in conjunction with steel frame design and construction advice from the steel frame manufacturer.*

NOTE: *The drainage openings (pressure equalisation slots) do not allow the external environment to circulate in the cavity space where the Top Hats are located. The cavity space is a stagnant column of air not subject to air circulation.*

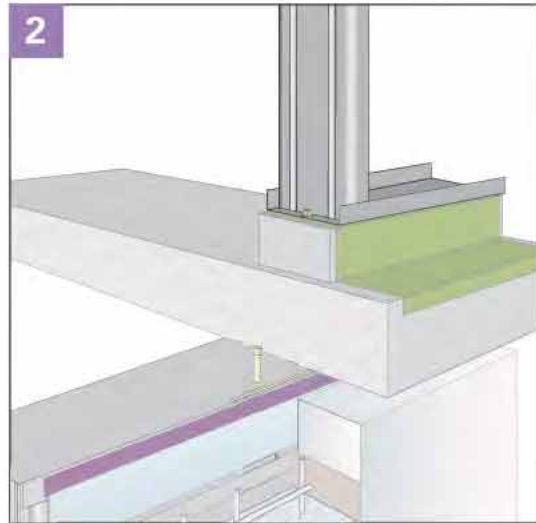
For regions classified as severe marine or heavy industrial, CSR Hebel recommends the designer ensures that the steelwork and AAC products have adequate protective systems to ensure durability is maintained. The designer can refer to Materials and Environments Report 08/078/2 and AS4312 for detailed information on corrosion.

3.1 System installation sequence

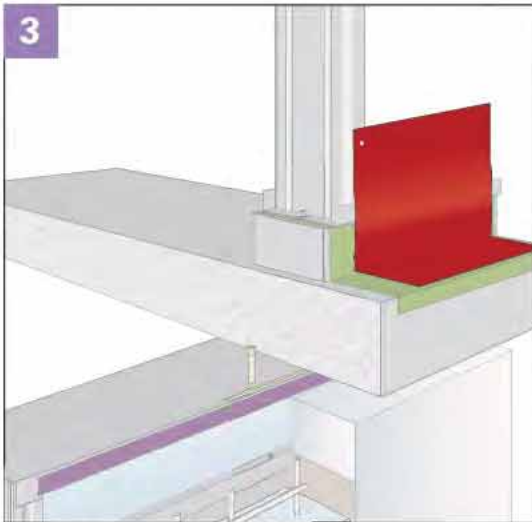
Fig 3.1 Construction of a Hebel PowerPanel System for Facades (Visible Slab Edge HEB2001)



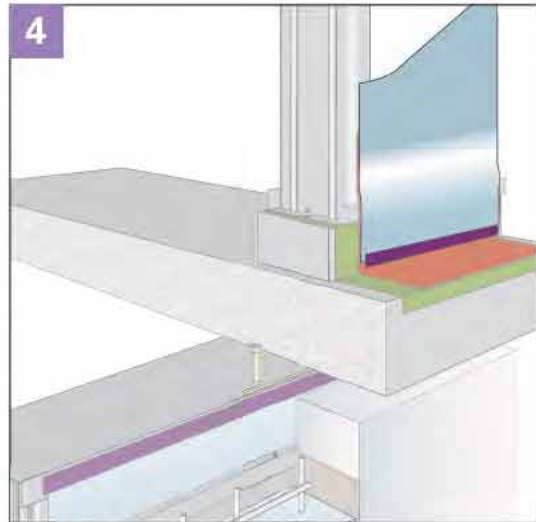
Apply waterproof membrane to hob and slab edge/rebate.



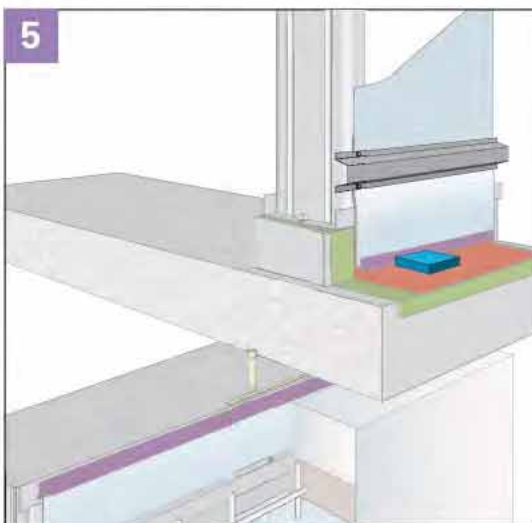
Install Rondo steel stud frame.



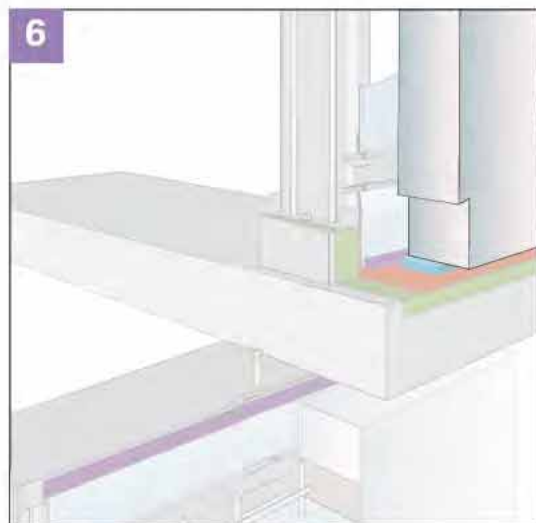
Add DPC/Flashing and fix to frame. Height of Flashing to be a minimum 100mm higher than bottom plate.



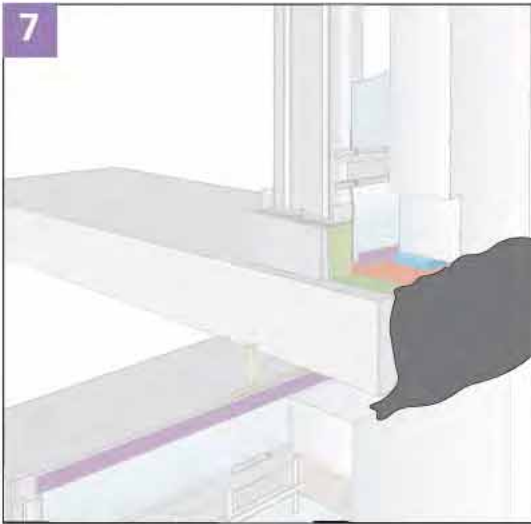
Install wall wrap, taping off to concrete elements.



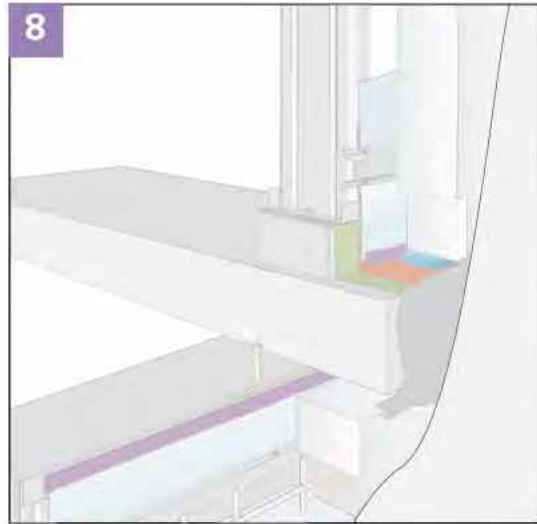
Step 1: Install Hebel Facade Top Hats and cavity baffles.
Step 2: Place Plastic Packer at each end of each PowerPanel i.e minimum 2 per panel.



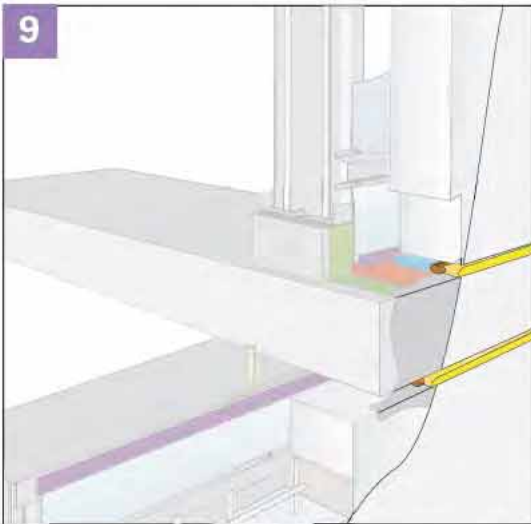
Install PowerPanel with pressure equalisation slots



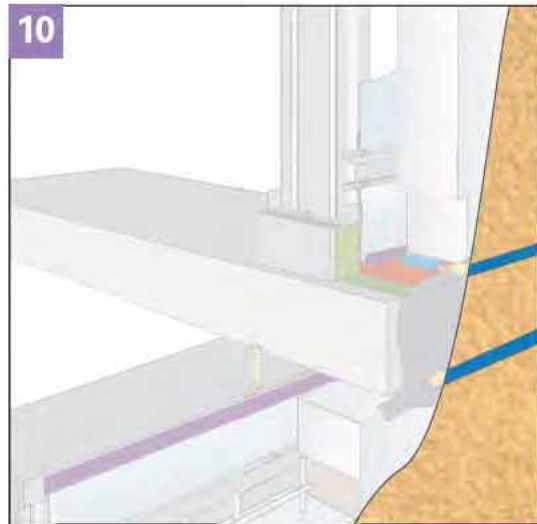
Install AcraLite to flush fill the Slab Edge recess level across panels.



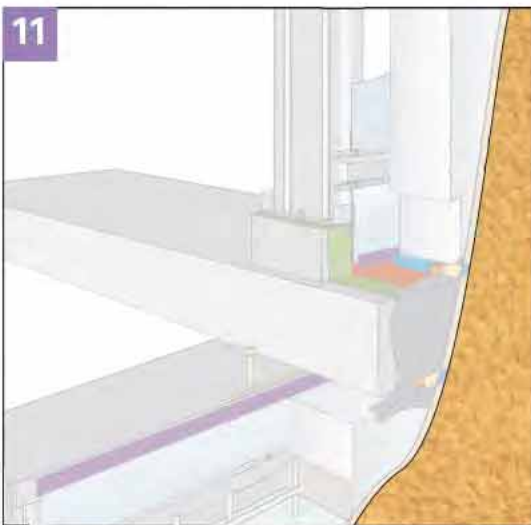
Apply Dulux AcraTex AcraPatch HighBuild levelling layer level across panel and joints.



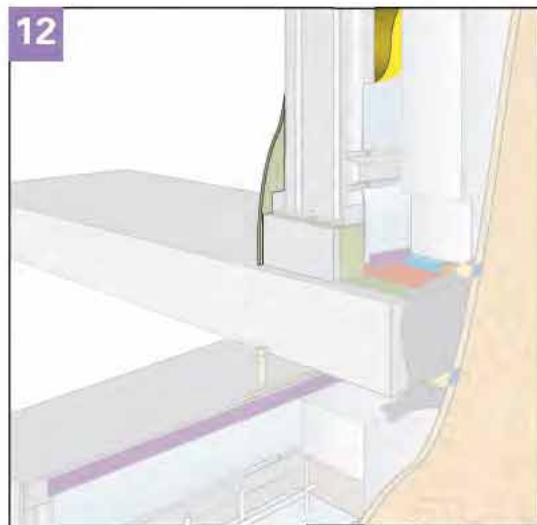
Accurately mark out and re-cut horizontal 10-15mm wide (Refer to Figure 3.10 and 3.11) Expansion Joints Top and Bottom of Slab Edges ensuring Slab & Panel are independent. Install approved Sealant including backing rod as per supplier instructions. Note: Backing Rod and Sealant (Fire Rated, as required) to adhere and be compatible with external coating system.



Mask cured Control Joint Sealant with 6mm masking tape. Apply Dulux AcraTex AcraSkin Texture Layer by medium texture roller. Remove masking before coating dries. Coating System texture layer must NOT bridge Control Joints.

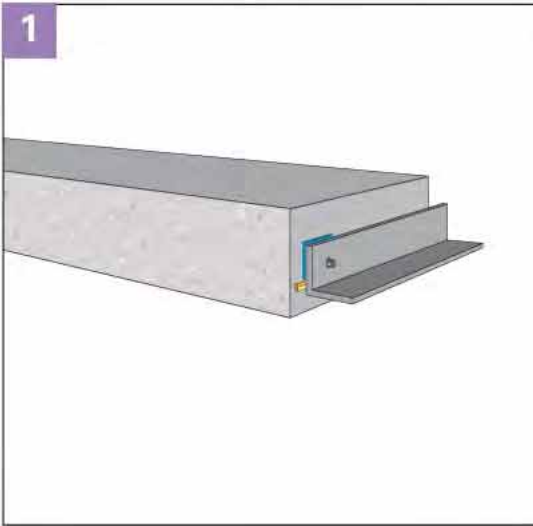


Apply final Weatherproofing Topcoat layer of AcraSkin by nap roller over the entire area including the Control Joints providing colour uniformity across the panel and joints.

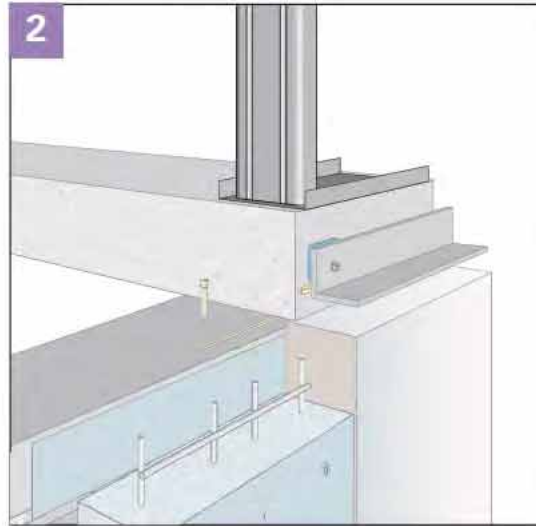


Install Bradford Insulation and Gyprock® Plasterboard.

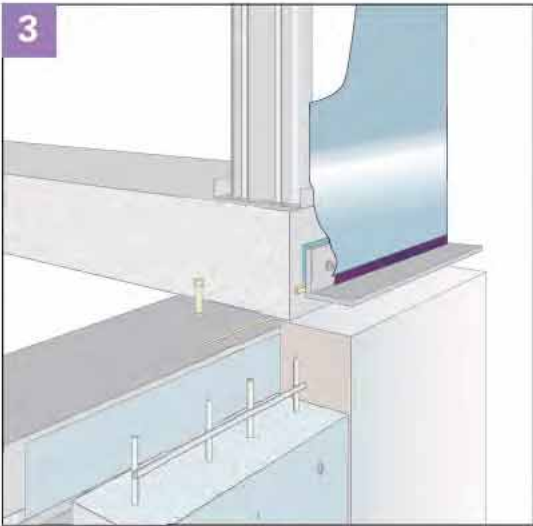
Fig 3.2 Construction of a Hebel Facade Wall System (Hidden Slab Edge HEB2000)



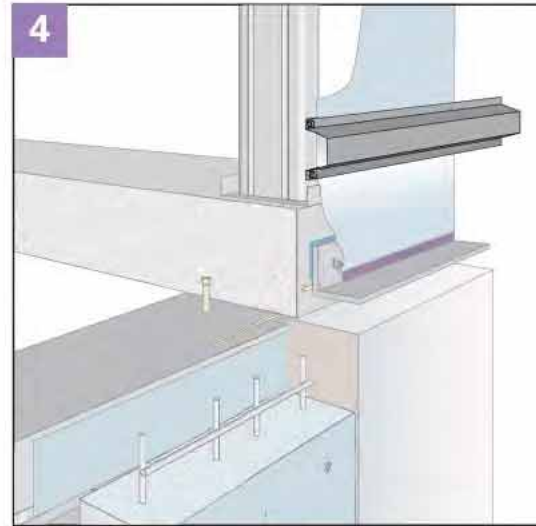
Install shelf angle. Install backing rod and sealant between the underside of shelf angle and slab.



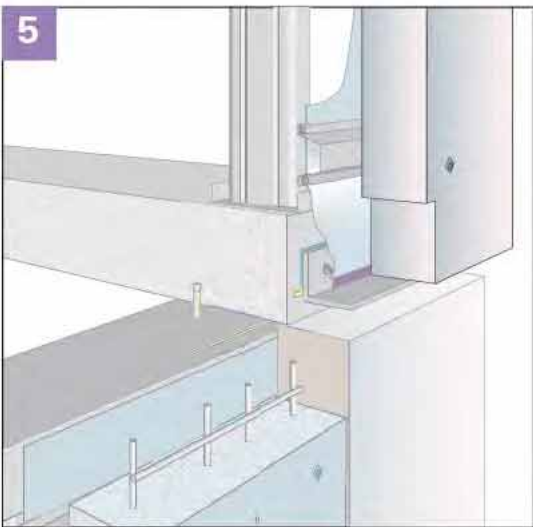
Install Rondo steel stud frame.



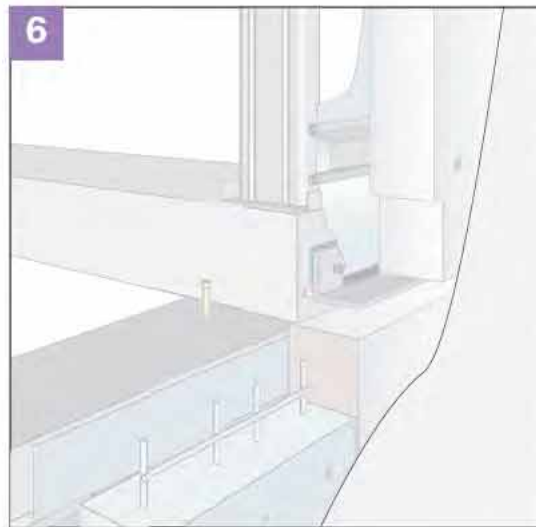
Tape Wall wrap to Hebel shelf angle.



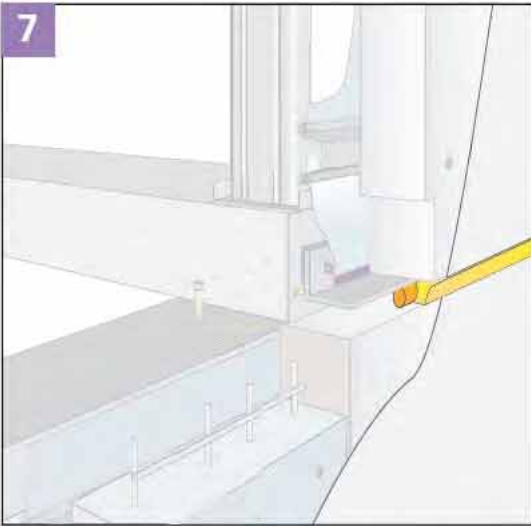
Install Hebel Facade Top Hats and cavity baffles.



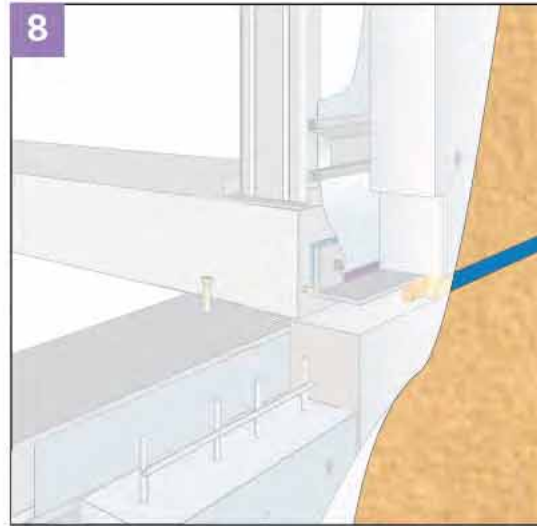
Install PowerPanel and pressure equalisation slots.



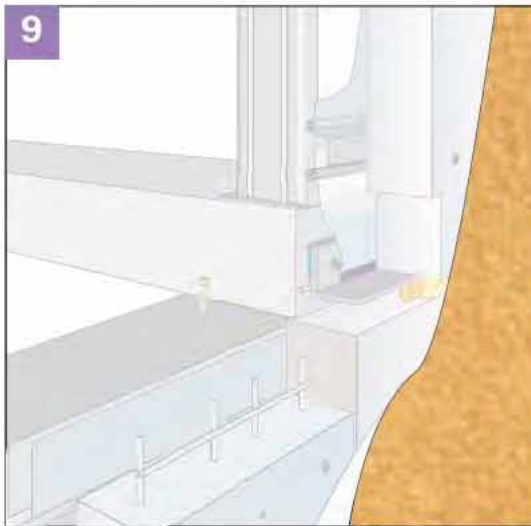
Apply Dulux AcraTex AcraPatch HighBuild levelling layer.



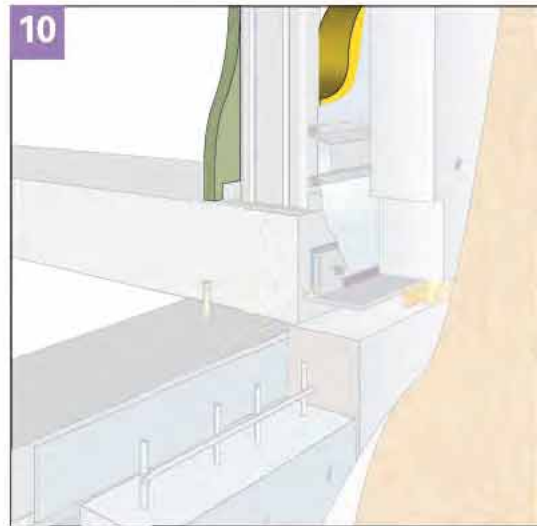
7
Recut movement joint and clean out. Install backing rod and sealant. Note: Backing Rod and Sealant (Fire Rated, as required) to adhere and be compatible with external coating system.



8
Mask cured Control Joint Sealant with 6mm masking tape. Apply Dulux AcraTex AcraSkin Texture Layer by medium texture roller. Remove masking before coating dries. Coating System texture layer must NOT bridge Control Joints.



9
Apply final Weatherproofing Topcoat layer of AcraSkin by nap roller over the entire area including the Control Joints providing colour uniformity across the panel and joints.



10
Install Bradford Insulation and Gyprock® Plasterboard.

3.2 Construction notes

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 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. Hebel accepts no responsibility for or in connection with the quality of installation of the Hebel High Rise Multi-Residential Facade system when installed.

Scaffolding

Should be fixed (where possible) to the structure at the slab edge. It is bad practice to pass thru the Hebel wall to concrete columns/ slabs as this will require patching afterwards and can show in final finish.

Setting Out & Positioning of Walls

Before commencing any installation work, ensure the work area is clean and tidy. Mark out the location of the walls, doors, windows, etc. When practical, ensure there are multiples of 300mm above the windows and doors and 600mm wide for wall areas. This will result in less cutting and waste. It is also good practice to have full 600mm wide panels on both side of windows and doors.

Waterproofing Membranes

Once the work area is cleaned and marked out, apply waterproof membrane coating to all set-downs and hobs. No waterproof membrane is applied to concrete slab edge if the Hebel PowerPanel is supported on a shelf angle in front of the slab. All waterproof coating membranes are to be applied in accordance to the coating membrane manufacturer's specifications and details.

Hebel Shelf Angle

The shelf angle is required in situations where the Hebel PowerPanel is located in front of the slab. The base angle acts as a partial support and as a shelf to rest the panel on during the installation of the panel. The shelf angle must be installed in accordance with the project engineer's specifications and details. Shelf angle butt joints must be fully sealed with a suitable fire rated sealant.

Shelf Angle minimum anchor details

Shelf Angle minimum anchor details

Options.

- M12 Hiliti HVU galvanized chemical anchors are required at no more than 900mm centres (for embedment depth of 110mm).
- M12 Hiliti HVU galvanized chemical anchors are required at no more than 450mm centres (for embedment depth of 110mm).

Note: Minimum edge distance 70mm to the underside of slab. Anchor type and minimum depth from slab edge and centres of fixings.

Steel Stud Framework

Rondo or approved equivalent steel stud framework must be installed in accordance with the manufacturer's or project engineer's specifications. Rondo Web Cleats are required on studs within 150mm of deflection track joints and on jamb studs. CSR Hebel are to be provided with letters of certification for:

- the stud framing design (prior to commencing installation of the facade system).
- the stud installation following completion of the stud framing provided by the stud frame manufacturer or project engineer.

For best results, we recommend to have the same contractor that installs the steel stud framing also install the Top Hats, sarking and panels to eliminate conflict from misalignment issues and warranty complications between different contractors.

Wall Wrap

The wall wrap shall be installed in accordance with the manufacturer's or project engineer's specifications. Each successive level should overlap the bottom level by a minimum of 150mm and should be fully sealed with appropriate tape. Joints between successive levels should be fully sealed with an appropriate sealant or tape as required. Wall wrap must be taped off to concrete elements. Provide reinforcement where wrap folds around sharp elements such as ends of Top Hats.

Cavity baffles

Cavity baffles must be installed vertically at every major external corner of the building to break up the cavity and pressure each elevation independently. Typically 4 per level.

Hebel facade Top Hat

Top Hats should be cut to size before securing them to steel studs. At control joints the Top Hats must be discontinuous. For number, location, spacing and fixing of Top Hats, refer to the project specifications.

Rondo Adjustable Top Hat Bracket Assembly

Rondo also supply an adjustable Top Hat bracket to allow fixing of Top Hat to concrete column. It also helps correct misalignment of the main concrete structure. Extra Top Hats may be required around penetrations (e.g. kitchen ducts) to support the Hebel panels.

Hebel PowerPanel

Hebel PowerPanel should be sized and prepared before installing the packer or mortar. The panels can be trimmed on-site using a circular saw equipped with diamond tipped cutting blade.

All loose AAC particles should be brushed off the panel with a rough broom. Steel reinforcement that is exposed on cut panels must be coated with a liberal application of Hebel Anti-Corrosion Protection Paint immediately following cutting of panel. Panels can be cut down to a minimum of 270mm wide which ensures two longitudinal bars of reinforcing within the panel. It is good practice for the cut side of the panels to be placed in adhesive joint, and not on end of the wall or adjacent to windows or doors.

Any minor damage and chips to the panels must be repaired using Hebel Patch. When the preparation of the panel is complete, locate the panel into its final position. Then secure the panel to the Top Hats with 3x #14-10x100mm bugle head screws per 600mm wide panel per Top Hat.

Outer screws should be located 50mm minimum and a 100mm maximum from the vertical edges of the panel.

Screwing of panels to Top Hats is always done from the outside. When the panel is secured in place apply Hebel

Adhesive to the panel edge abutting the next wall panel to be installed.

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 once the wall is installed. Adhesive is to be mixed to the proportions and consistency as per the instructions on the bag.

Pressure Equalisation Slots

Pressure Equalisation slots are required on all facades (except within 300m of breaking surf) to allow the pressure to be the same within the cavity as the outside and also allow drainage of any water in the cavity. Can be installed at control joints and no greater than 3m metres spacing by cutting the panel to the dimensions of the slot. Pressure Equalised Slots are to be installed at the base of the panels except in balconies of greater than 3m, where they are installed at the top. These must be installed prior to any coating. These slots are to be kept open and not rendered or painted over.

Windows

Sills to be cut on an angle of 15° minimum.

Waterproof sill and corners to the vertical reveal.

Sub-head, sub-sill and sub-jamb must bridge and seal the cavity preventing airflow to the cavity.

Caulking Movement Joints

All joint gaps which have been formed between panels, at the head and base, or at abutments with other building elements, shall be caulked with appropriate backing rod, primer and sealant.

Bradford® Insulation

Install Bradford insulation into the stud frame. The thickness of insulation provided should be such as to fully fill the cavity. If there is any gap in the insulation, the acoustic and thermal performance of the system may be adversely affected. Bradford handling and Design Guidelines should be followed.

Gyprock® 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 steel stud framing, with gaps at top and bottom for sealant.

Plasterboard is to be fixed and installed to steel stud framing in accordance with the Gyprock Steel Frame Wall Systems & Design Guide, N°GY544.

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

Handling and Design Guidelines and additional information on Gyprock Plasterboard is available from: www.gyprock.com.au.

Penetrations, Electrical, Plumbing and Other Services

Installation of services and penetrations into Hebel Facade walls should be carried out at an appropriate construction sequence. This will allow easy access to cavities, steel framed elements and Hebel panels, where services can be easily installed and neatly hidden.

CSR Hebel suggests the most appropriate time to carry out plumbing and cabling works is just before insulation and plasterboard are 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 is necessary to maintain the acoustic, thermal and fire integrity of the wall. Information regarding installation of services and penetrations is outlined in the various performance sections of this Hebel Facade Design Guide.

Where penetrations are required (e.g kitchen or bathroom exhaust), ensure that the distance from the top of the panel to the first top hat does not exceed 150mm. Additional top hat sections must be provided either side of penetration to support cut panel which can be installed vertically or horizontally depending on the space allowed.

Facade & Intertency wall junction

Install the facade wall system allowing for intertenancy panel to meet the back of the facade panel. A full length vertical Damp Proof Course is required with a fire & acoustic rated sealant between the facade panel and the Damp Proof Course and between the Damp Proof Course and the wall wrap.

3.3 Construction details and drawings – General

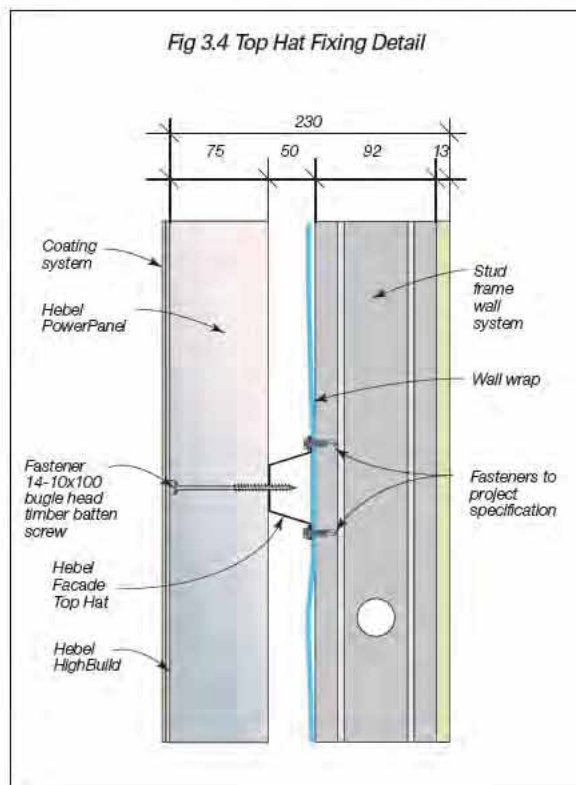
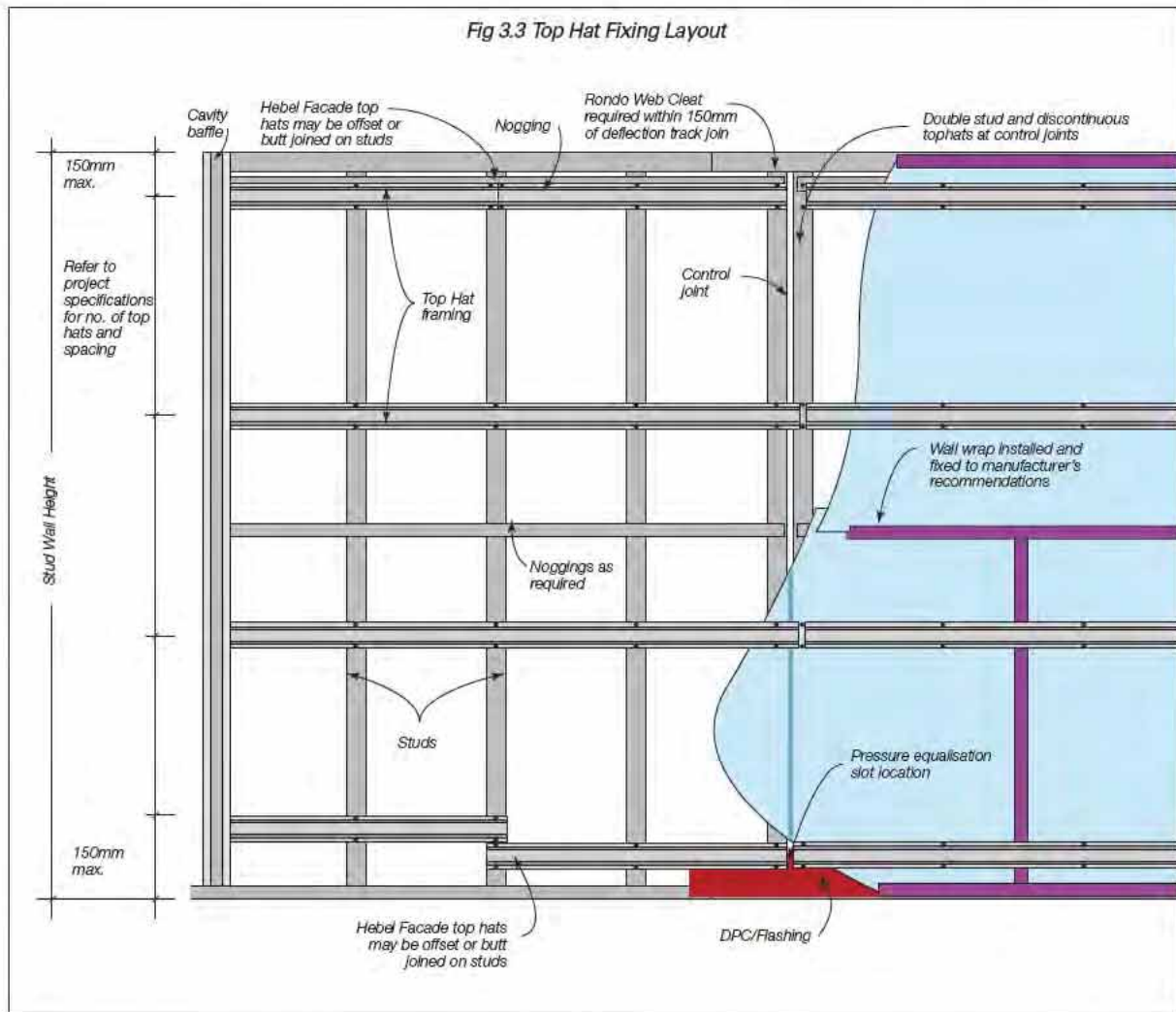


Fig 3.5 Hebel PowerPanel Fixing Detail (Visible Edge Beam shown)

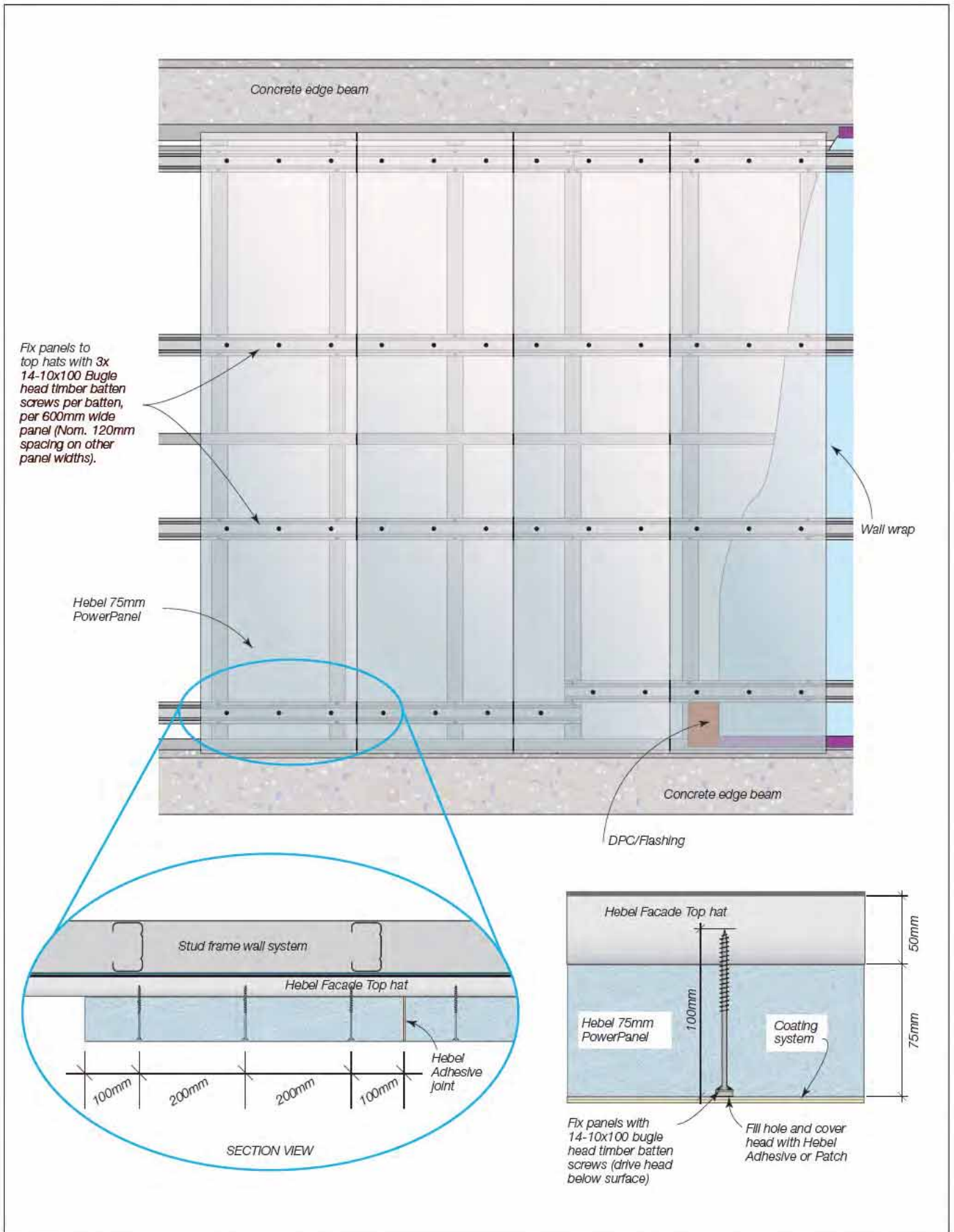


Fig 3.6 Window Opening Detail (Visible Edge Beam shown)

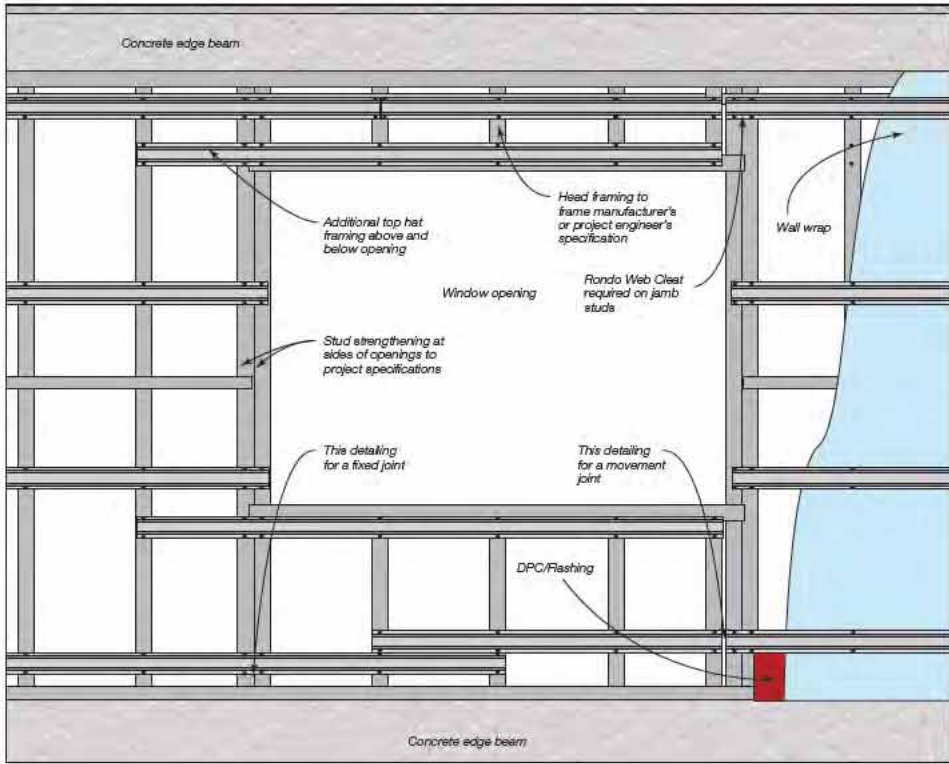
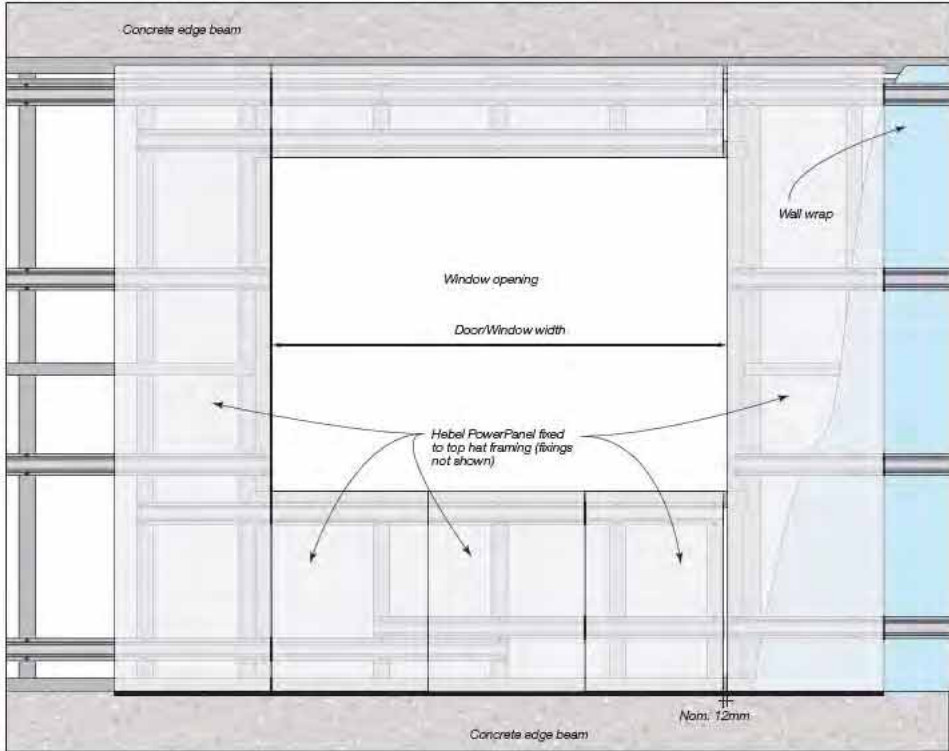


Fig 3.7 Window Opening Detail (Visible Edge Beam shown)



NOTE: For major openings in the Hebel PowerPanel System for Facades, CSR Hebel recommends locating movement joints adjacent to the opening.

Control joints at door/window openings:

- Door/windows width ≤ 2400mm – a control joint is to be provided to one side of the opening (minimum must be provided)
- Door/windows width > 2400mm – control joints to both sides of the opening must be provided

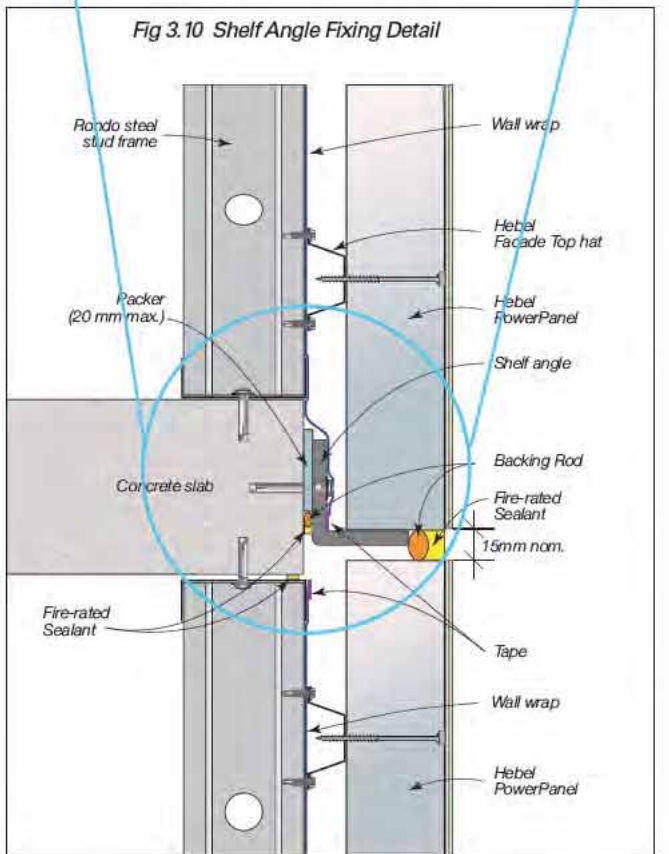
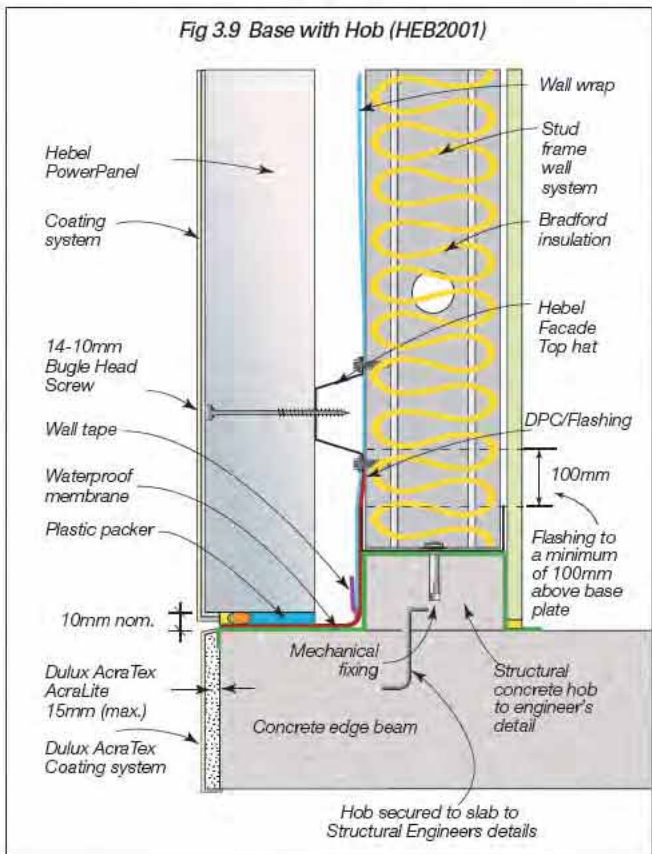
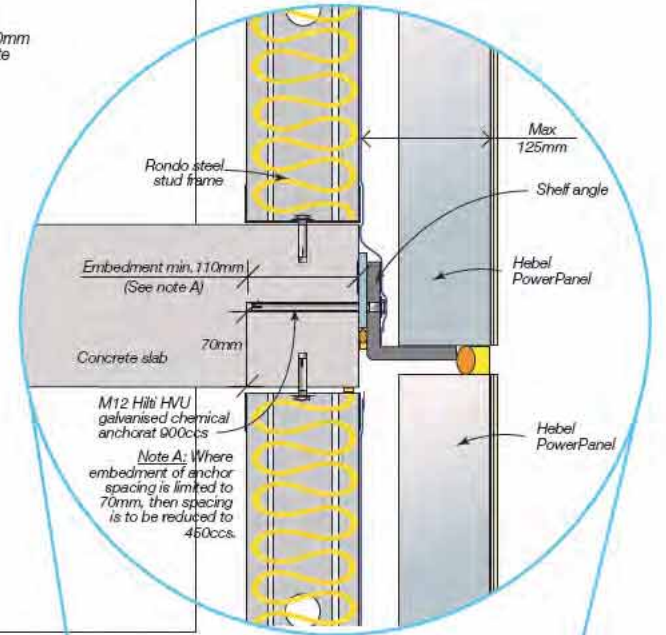
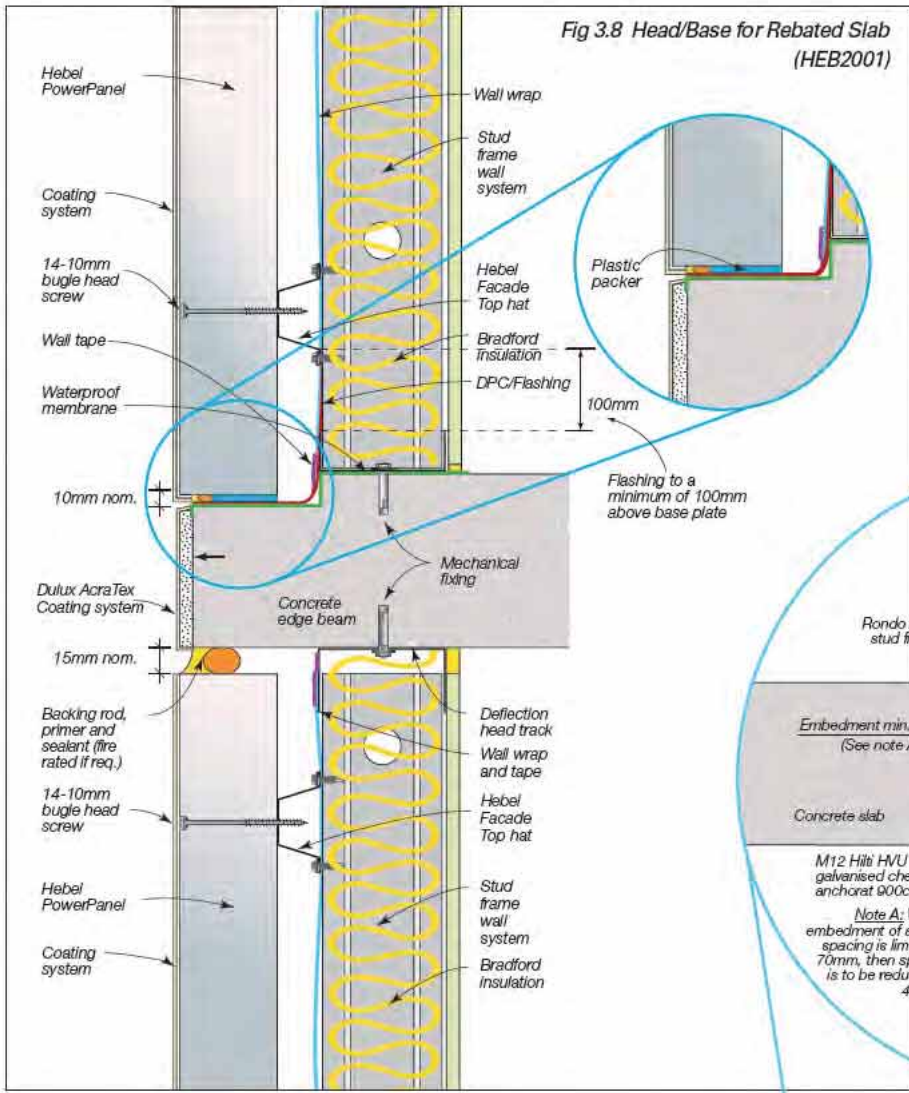


Fig 3.11 Control Joint

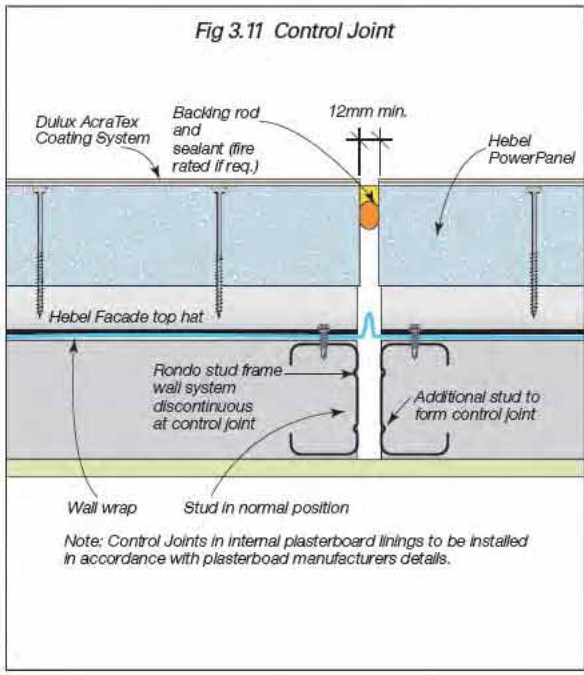


Fig 3.12 Junction with Concrete Column

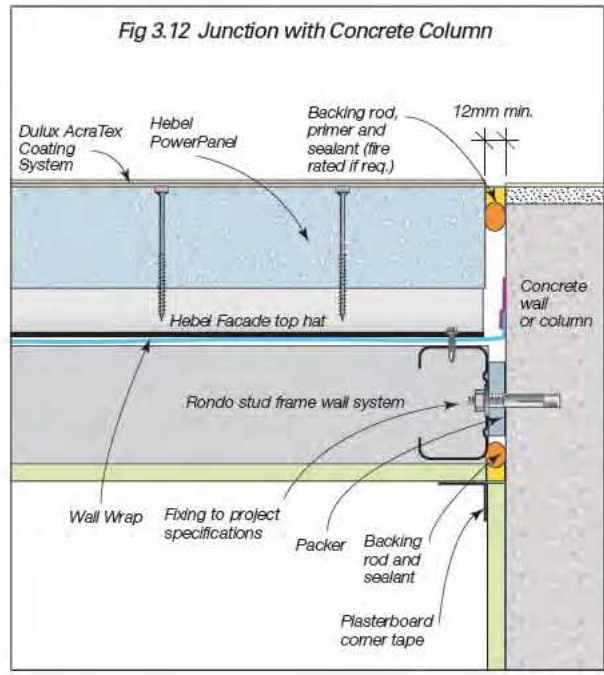


Fig 3.13 External Corner

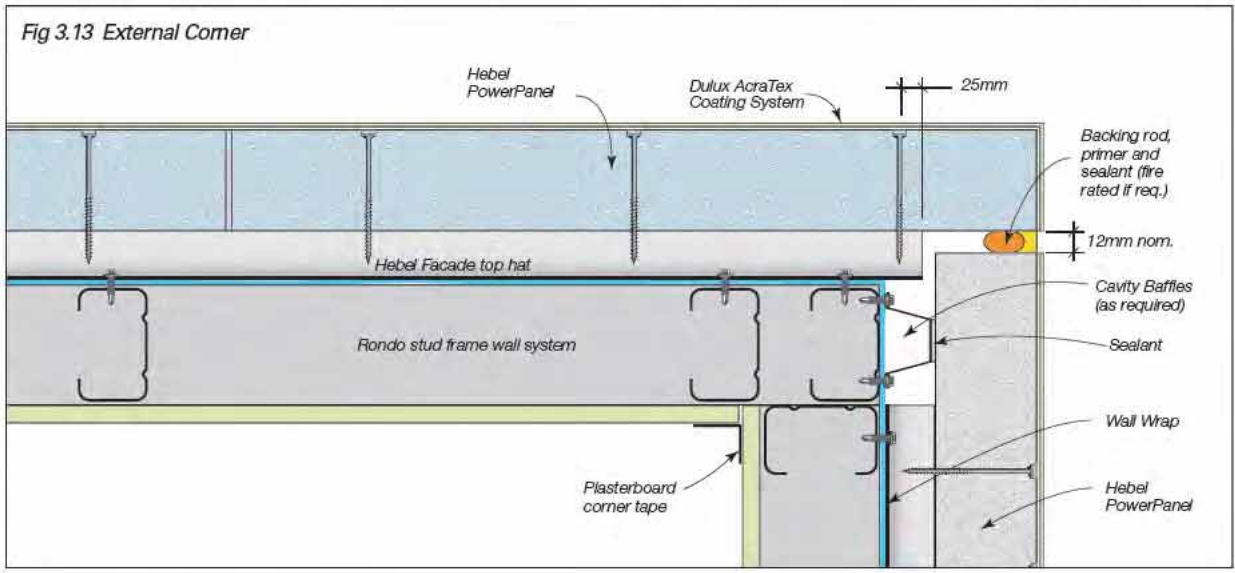
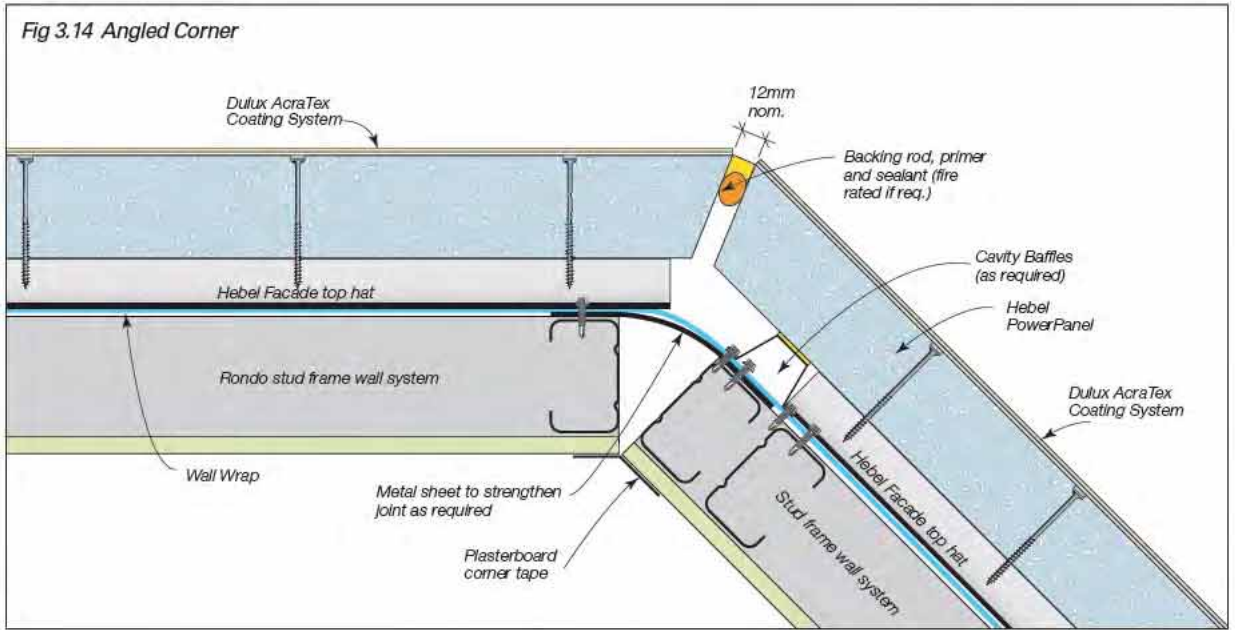


Fig 3.14 Angled Corner



IMPORTANT NOTES:

- Window/door frames are not to vent into the wall cavity. Provide air seal as required.
- Weather bar and brace flashing are integral to performance and must always be provided as described.
- Perimeter of openings to provide air-seal to plasterboard. Cover/seal holes in studs, seal all corner joints and wrap wall wrap and flashing tape around inside to face of frame.
- Window frame connections are to be in accordance with the window frame manufacturer's specifications.
- Windows are to be structurally supported by the stud frame wall system. No loads are to be transferred to the Hebel PowerPanel cladding.
- Provide support to studs/deflection tracks using Rondo Web Cleat P/N SWC3 as required and as per Rondo Technical Bulletin 30.
- Sealant type and configuration are to be in accordance with the window frame manufacturer's specifications and compatible with the substrates (waterproofing membranes or other sealants). Always prime surfaces to be sealed.

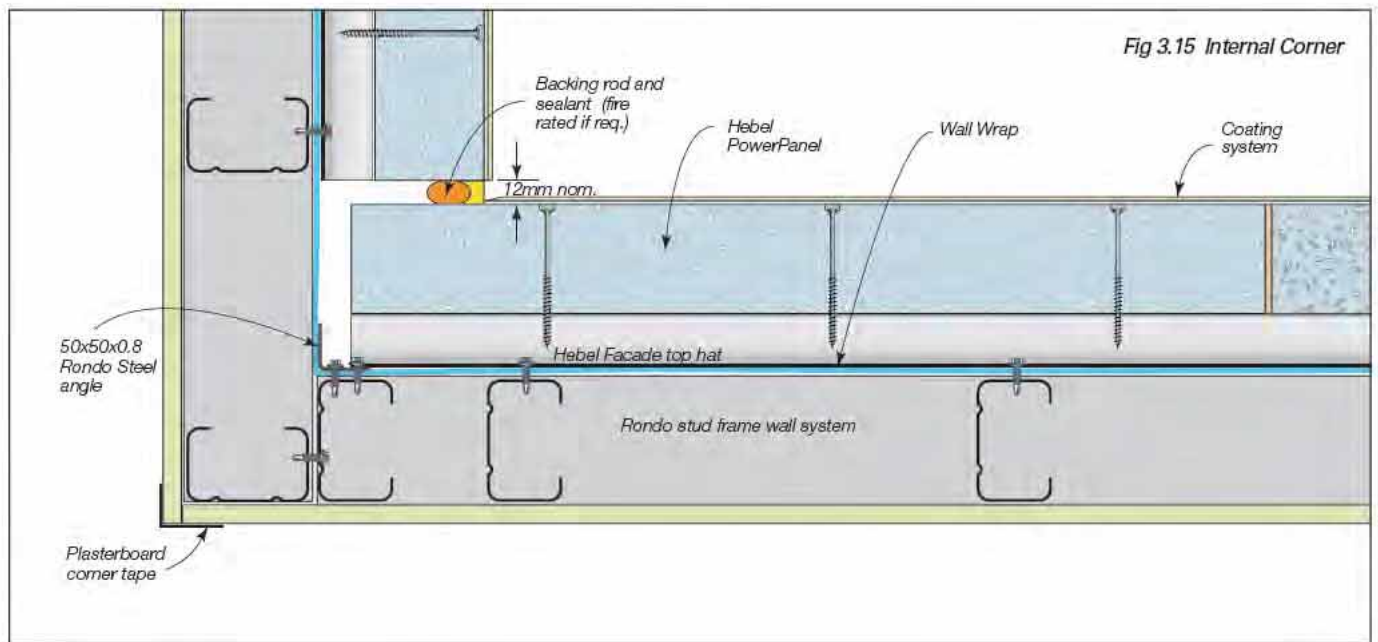


Fig 3.16 Window Head

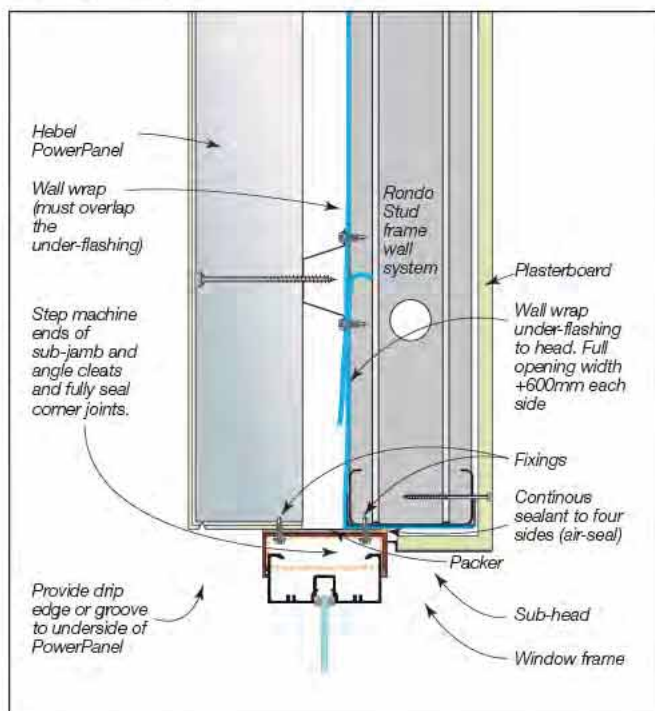
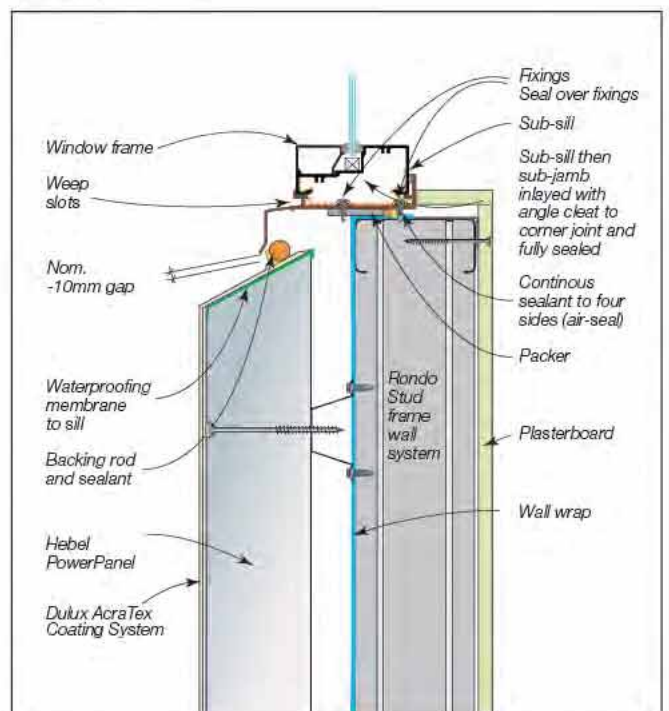


Fig 3.17 Window Sill



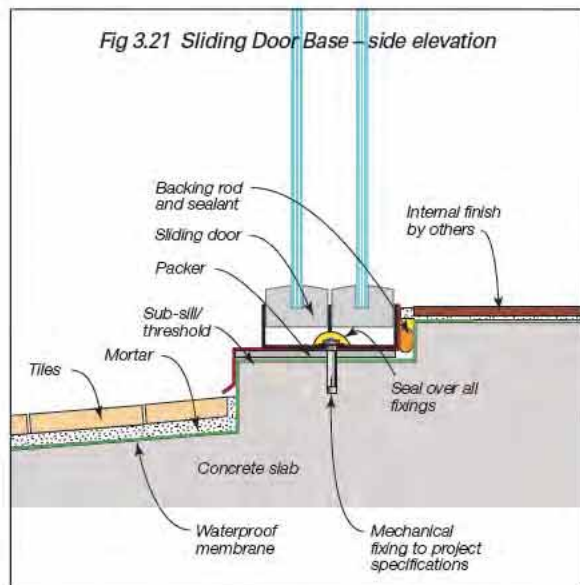
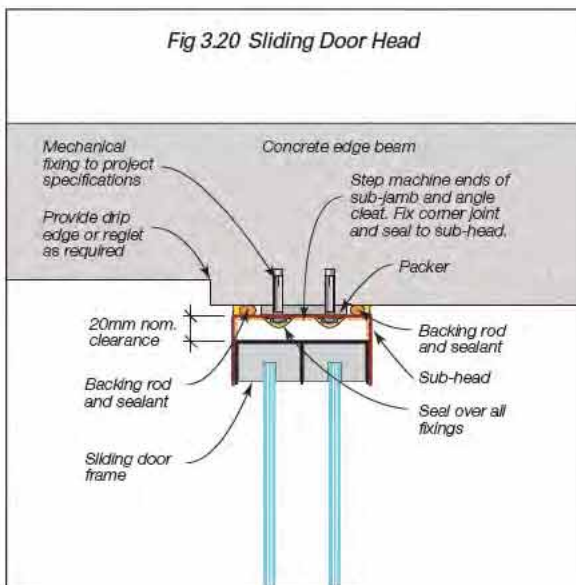
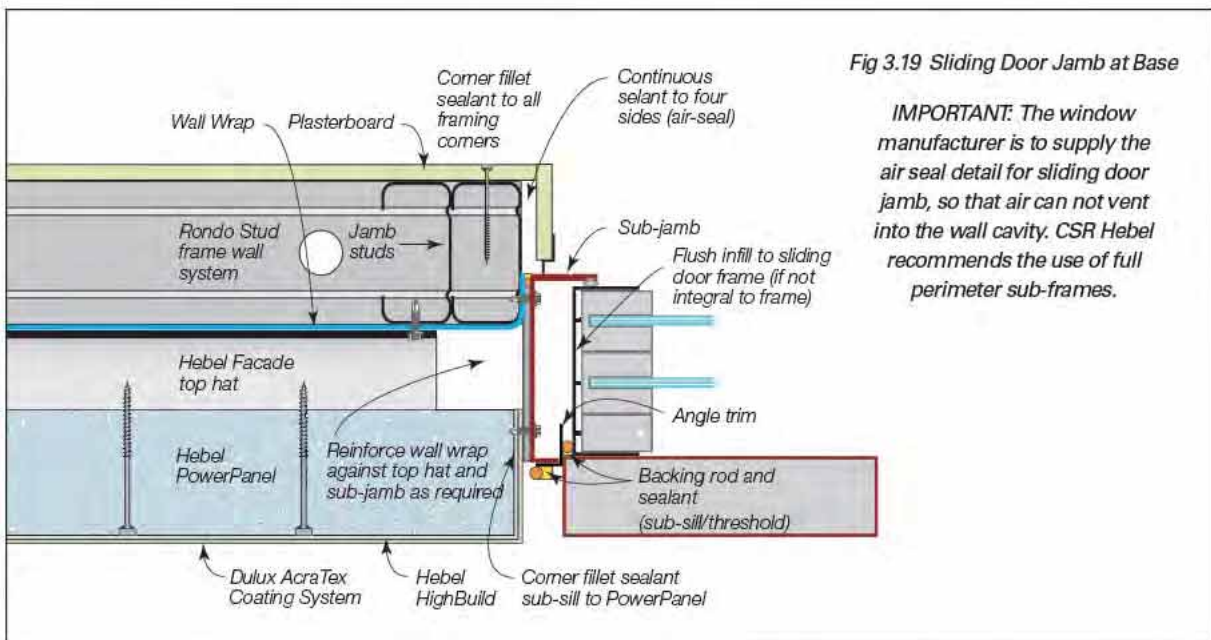
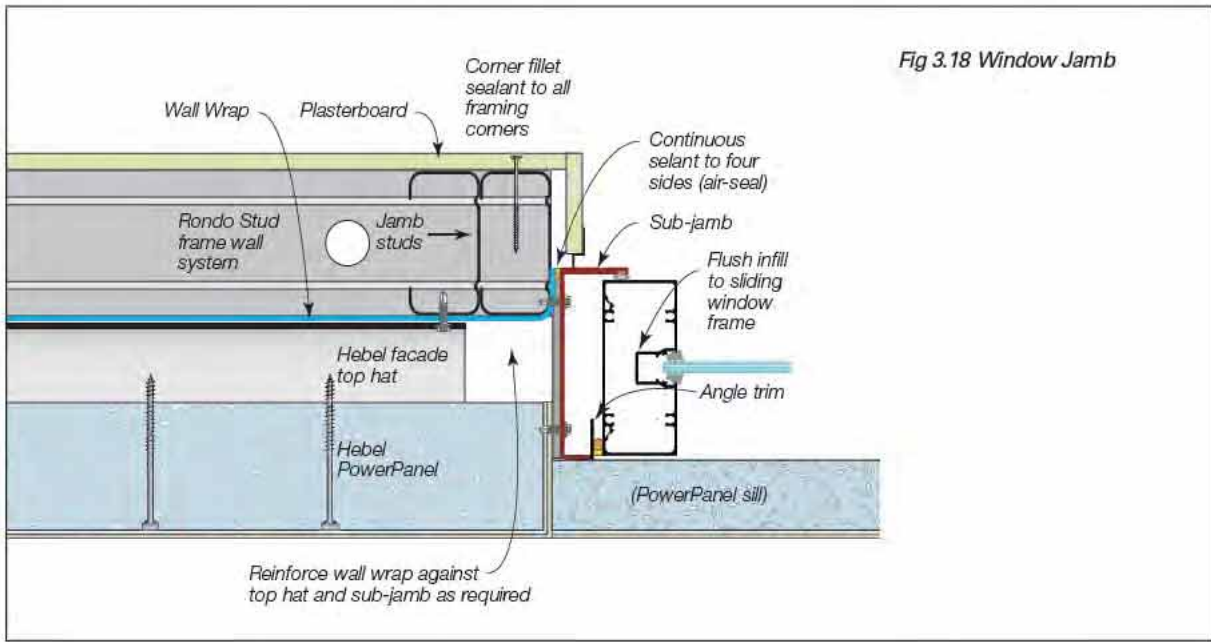
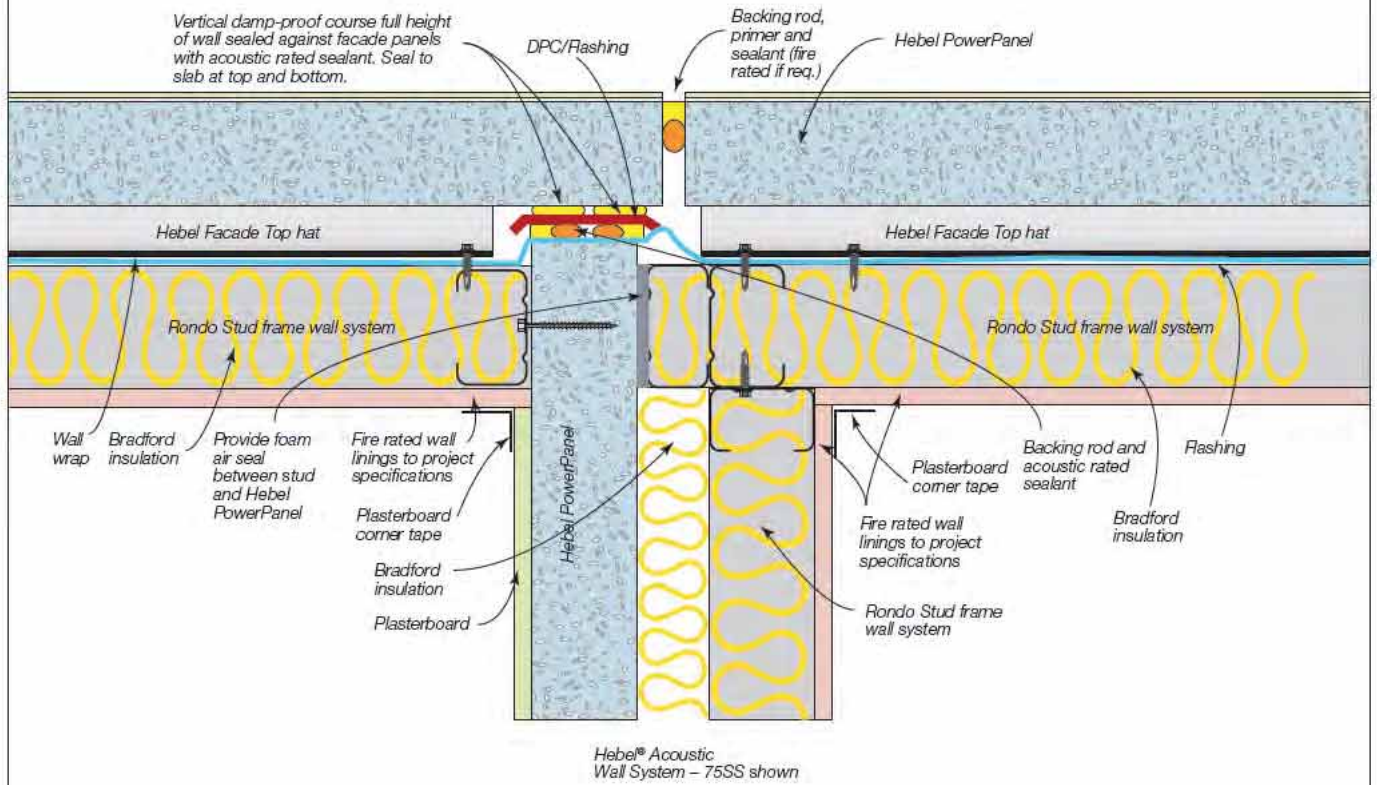
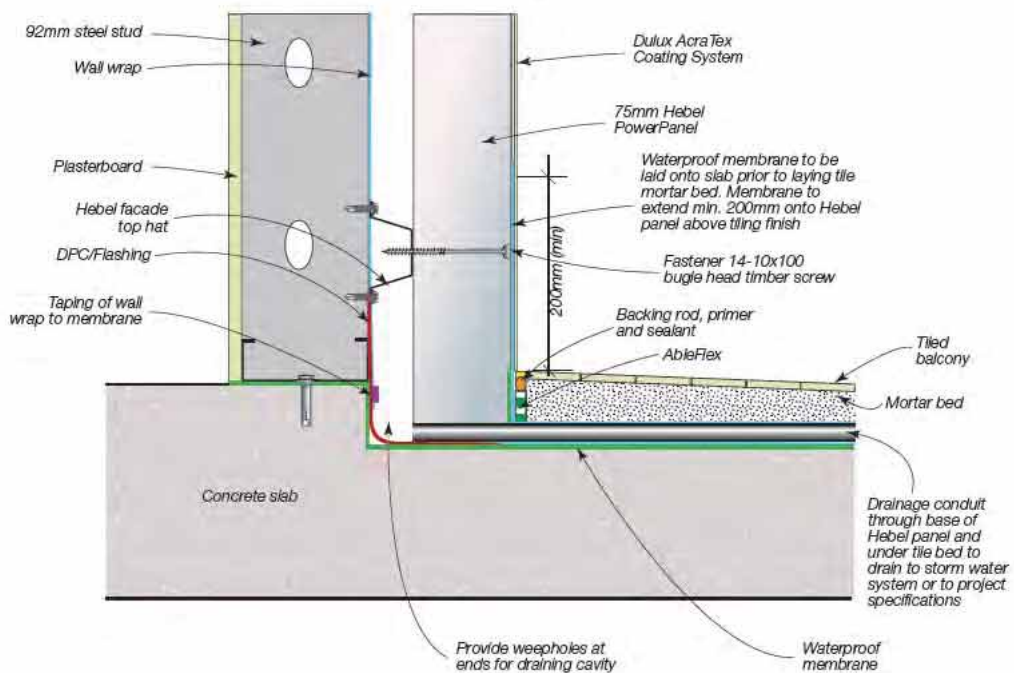


Fig 3.22 Party Wall Intersection



IMPORTANT: Treatment of party wall junctions requires specific project design and approval by structural, fire, acoustic and other project consultants.

Fig 3.23 Balcony Detail



NOTE: Pressure equalisation slots are to be installed at the tops of panels at a max. 3.0m CTRs over balconies greater than 3m in width.

Fig 3.24 Intertency Facade Junction Detail

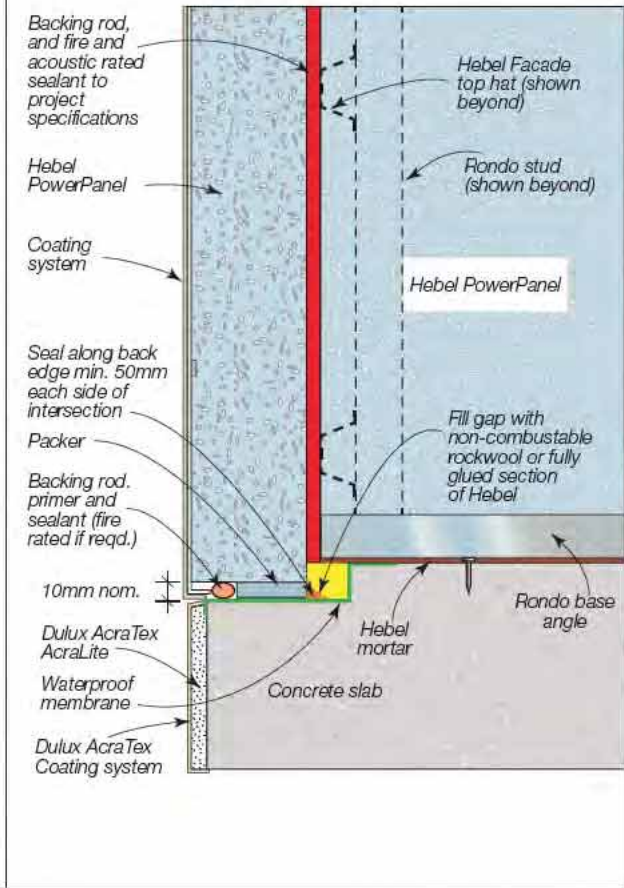


Fig 3.25 Handrail Attachment

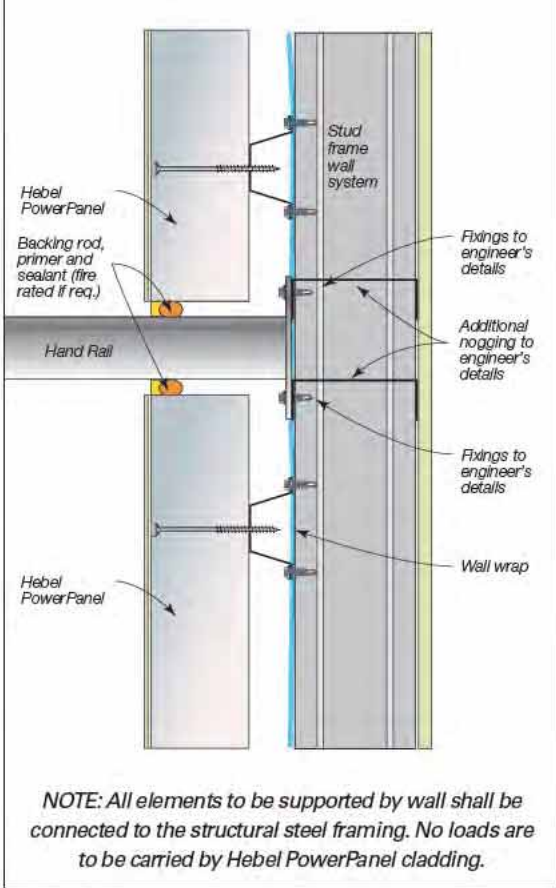


Fig 3.26 Parapet Capping

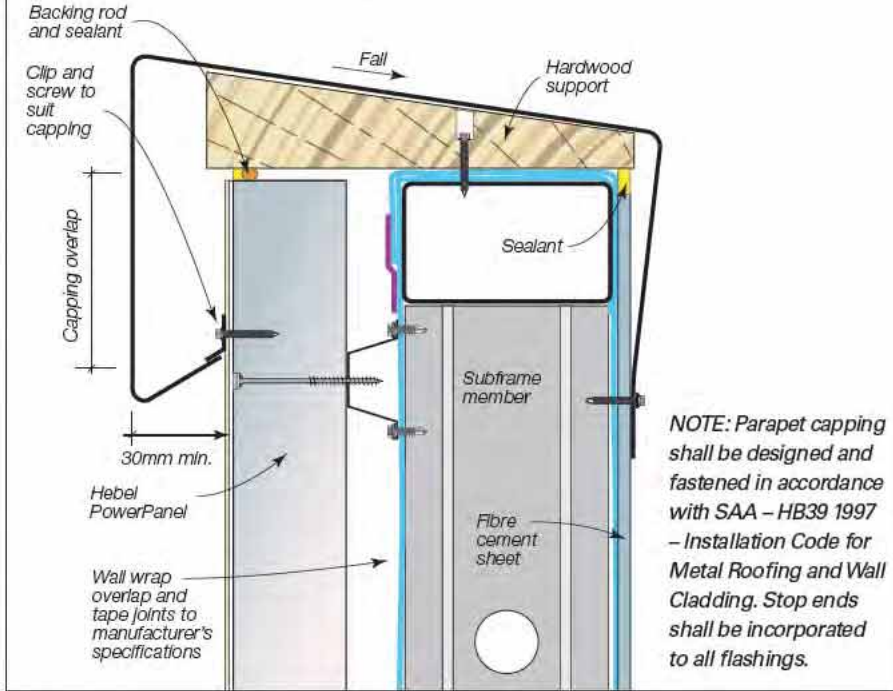


Table 3.27 Capping Overlap.

Ultimate Design Wind Pressure (kPa)	Capping Overlap Minimum (mm)
1.5	50
3.5	100
5.0	150
7.0	200

4.1 Delivery and storage

Unloading Panel Bundles

Panel bundles 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.

Note: Secondary handling increases the risk of PowerPanel damage. The repair of damage sustained during lifting and moving is the responsibility of the lifter. When damage is excessive, the PowerPanel 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.

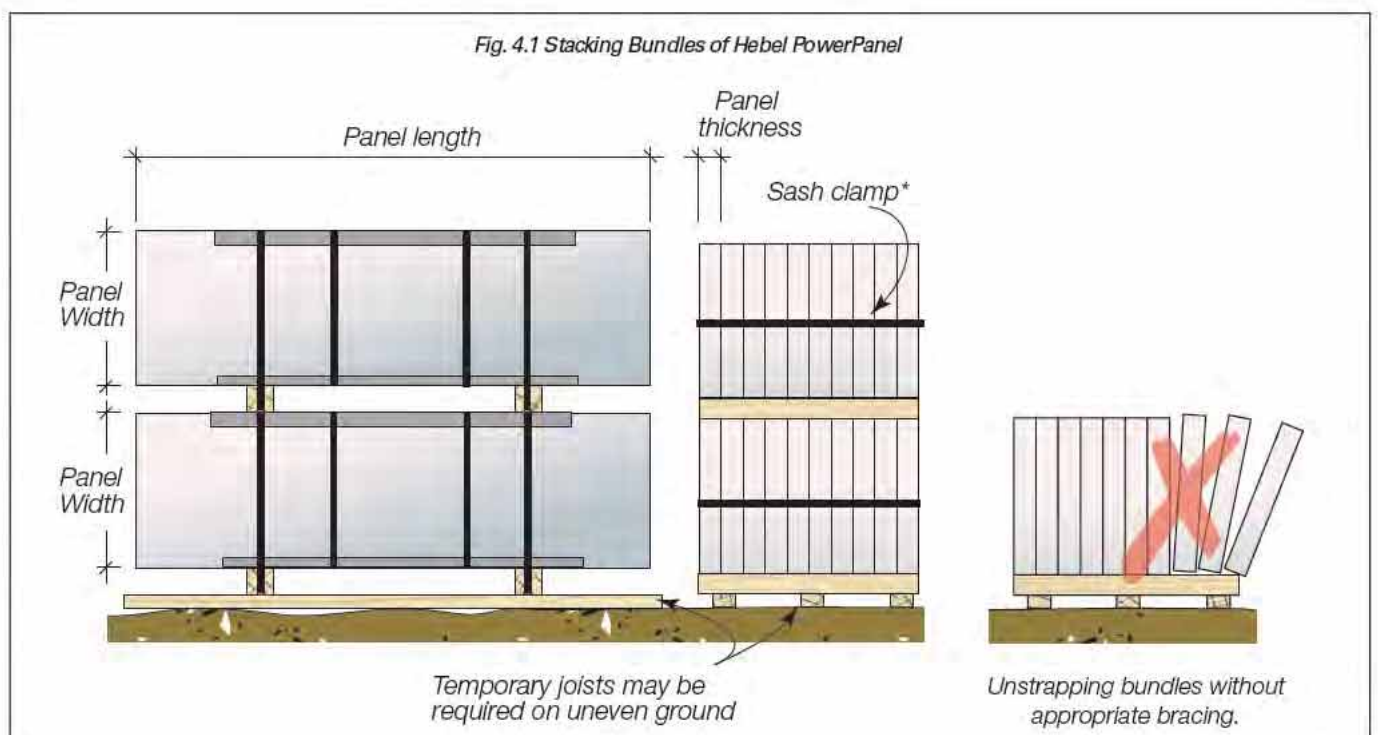
If outside, Hebel PowerPanel must be stored off the ground and protected from the weather. Only single bundles positioned on the ground can be opened. To provide a level surface, we recommend placing temporary joists beneath the supporting cleats.



Hebel PowerPanel Shipping Bundle

Unstrapping Bundles

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



4.2 Panel handling

Manual Handling

CSR 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, CSR Hebel suggests the following:

1. Use mechanical aids, such as trolleys, forklifts, cranes and levers, or team lifting to move panels.
2. Keep the work place clean to reduce the risk of slips, trips and falls, which can cause injury.
3. Plan the sequence of installation to minimise panel movements and avoid awkward lifts.
4. Train employees in good lifting techniques to minimise the risk of injury.

Mechanically Assisted Handling

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

Guidelines for handling Hebel PowerPanel using the PowerPanel Trolley or PowerPanel lifters are detailed in Technical Bulletin Hebel PowerPanel Handling & Design Guidelines, NoHTB791.

Hebel PowerPanel Trolley



Health, Safety & Personal Protective Equipment (PPE)

Hebel AAC 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 AAC and other concrete 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 appropriate Hebel Material Safety Data Sheet (MSDS). For further information, contact CSR Hebel or visit: www.hebelaustralia.com.au.

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 CSR Hebel or visit the website: www.hebelaustralia.com.au

Reinforcement exposed during cutting must be coated with a liberal application of Fentak Exposed Reinforcement Touch Up Paint.

Personal Protective Equipment



4.3 Design, Detailing & Performance Responsibilities

Overview

CSR 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 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 consultants.

Performance in projects is typically the responsibility of:

Project Consultants (Acoustic, Fire, Structural, Facade, etc.)

- 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, fire, structural, weather tightness, durability and any other required performance criteria 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 and floor junctions.
 - Penetrations.
 - Flanking issues.
 - Room/building geometry.
- Acoustic and water penetration field testing.

Project Certifier and/or Builder

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

CSR Hebel does not provide consulting services. CSR 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 Design & Installation Guide or supplied by CSR Hebel in the course of a project must satisfy themselves that it is true, current, accurate 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 & 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.

CSR Hebel accepts no responsibility for or in connection with the quality of the recommendations or their suitability for any purpose when installed.

CSR 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 Building Code of Australia.

Builder – Facade Framing System

The Rondo Steel Stud Framing System has been tested by CSR Hebel and is the approved wall framing to be used with the Facade System.

In the event that alternative Stud Framing Systems are selected by the builder, then a design certificate must be prepared by the Stud Frame Manufacturer or Project Engineer (in regard to the Stud Framing Specifications) confirming adequacy of the framing system to sustain the project wind loads. This letter of certification must be provided to CSR Hebel prior to commencement of the installation of the Facade System.

Installation of the stud frame must be such that eventual installation of Hebel panels are flush to ensure satisfactory application of coatings. Certification of the stud frame installation must be provided by the stud frame manufacturer or project engineer. Similarly, this letter of certification must be provided to CSR Hebel.

Facade Design, Specification and Pre-Installation Activities

The following matrix may be used as a guide in the design and specification of the Hebel Facade System in preparation for installation.

FACADE DESIGN, SPECIFICATION AND INSTALLATION PREPARATION	Activity	FACADE PRE-INSTALLATION ACTIVITY DESCRIPTION	Required involvement by		
			PROJECT CONSULTANT	ARCHITECT	BUILDER
1	Determine the project requirements such as acoustics, fire, structural, weather tightness and durability in accordance with the BCA and relevant statutory laws		X	X	
2	Consult the Hebel Facade system design and installation guide and check the Hebel system meets or exceeds the project requirements identified in Activity No. 1		X	X	
3	Create facade architectural specification which should include: <ul style="list-style-type: none"> • Building tolerances for in-situ concrete elements such as columns and slab edges • Stud framing specification including design certification from stud framing manufacturer or project engineer • Nominate control jointing location • Panel layout including penetration location for services 		X	X	
4	Nominate builder to begin construction. Consider likely Hebel installers and coating applicators				X

Facade Installation – Critical Stage Inspections (CSI)

The following matrix may be used as a guide in organising and scheduling Critical Stage Inspections of the Hebel Facade System.

FACADE INSTALLATION	CSI	CRITICAL STAGE INSPECTION (CSI) DESCRIPTION	Required attendee(s) at CSI			
			CSR HEBEL	COATING SUPPLIER	HEBEL INSTALLER	BUILDER
1	Scheduling of critical stage inspections, stud specification, control jointing & coating specification		X	X	X	X
2	Set-out and detailing of stud framing installation in accordance with the current Hebel Facade Design & Installation Guide. (Critical Stage Insp.1)		X		X	
3	Set-out and detailing of wall wrap and Top Hats. (Critical Stage Insp.2)		X		X	
4	Confirm panel installation to first wall length (i.e. Sample Wall). (Critical Stage Insp.3)		X	X	X	X
5	Confirm completed panel installation to entire level. (Critical Stage Insp.4)		X		X	X
6	Confirm the coating system and its installation process - identify any areas of concern and prepare appropriate actions to address.			X		X

Appendix A1 - Checklist Forms

FRAMING INSTALLER CHECKLIST

Project:			
Builder:			
Framing Contractor:			
Building:			
Floor Level:			
Grids or Area:			
	CONSTRUCTION STEP	SATISFACTORY	ACTION REQUIRED
1	Ensure CSR Hebel has been provided with a stud framing layout plan with framing installation details prior to proceeding to step 2		
2	Ensure that the waterproof membrane has been applied to all relevant slab areas.		
3	Install top plates - fix the top plate onto the soffit of the concrete slab with mechanical fixing (e.g. dynabolts) to frame manufacturers specs.		
4	Install bottom plates - fix the bottom plate onto the concrete slab with mechanical fixings (e.g. dynabolts) to frame manufacturers specs. Project specification must show where the control joints are to be located.		
5	Install studs at spacings relative to the wind loads given by the project engineer and in accordance with the framing manufacturers stud framing layout plan and details. Double studs will be required at every control joint with a 12mm gap between the two studs.		
6	Install framing plumb to ensure flush installation of panels.		
7	Install additional brackets if required to framing manufacturers recommendations at high stress areas (e.g. around windows, doors and near corners of buildings).		
8	Ensure that a letter of design certification of the facade stud framing has been prepared by the stud framing manufacturer or project engineer and provided to the CSR Hebel Business Development Manager.		
9	Ensure that inspection of the facade stud framing installation has been undertaken by the stud framing manufacturer or project engineer and letter of certification of framing installation has been provided to CSR Hebel Business Development Manager.		

HEBEL INSTALLER CHECKLIST

Project:			
Builder:			
Hebel Installer:			
Building:			
Floor Level:			
Grids or Area:			
	CONSTRUCTION STEP	SATISFACTORY	ACTION REQUIRED
1	Install shelf angles where required with fire rated sealant behind angle. Install flashing over and tape onto shelf angle.		
2	Ensure that the waterproof membrane has been installed where the panels are resting on the concrete slab.		
3	Install wall wrap to manufacturers recommendations which will include taping of all overlaps and to the structure.		
4	Install the required number of Top Hats to project specifications ensuring that the Top Hats are discontinuous over control joints.		
5	Install cavity baffles on one side of control joints to project consultants location requirements. These must be sealed against wall wrap and the Hebel panel.		
6	Install packers at slab edge (or onto shelf angle) in preparation for installation of Hebel panels		
7	Prepare Hebel panels in accordance with SWMS documentation. Any exposed reinforcement in the panels must be coated with Fentak Exposed Reinforcement Touch Up Paint immediately following cutting of panel. Fix panels to Top Hats from outside using the 3 screws per Top Hat and correct spacings.		
8	Hebel Adhesive is to applied to the vertical edges of the panels using a Hebel Notched Trowel. Joints are to be 2-3mm wide, completely filled with Hebel Adhesive. Remove any excess adhesive.		
9	Panels that are chipped or damaged are to be repaired using Hebel® Patch/ Hebel® Adhesive. This includes any patching of screw heads.		
10	Install pressure equalisation slots (at base of panels) in every face of wall at maximum 3m apart. Install pressure equalisation slots (at top of panels) at balconies in every elevation of wall at maximum 3m apart where balconies are greater than 3m in length (across the face of building)		
11	The panel joints are to be kept flush during installation. Any misalignment should be sanded back up to a max of 5mm using a sanding float to provide a flush joint. Remove any dags from joints for coating contractor.		
12	Prepare vertical movement joints at maximum 6m spacings to external walls and corners to locations outlined by the project consultants. Provide a 12mm gap between panels for appropriate backing rod, primer and sealant. These joints should also be provided where panels abut concrete columns or other materials as detailed in the project specifications.		
13	Prepare horizontal control joints at least 15mm from the top of the Hebel panel to the slab soffit above		

BUILDERS CHECKLIST

Project:			
Builder:			
Framing Contractor:			
Building:			
Floor Level:			
Grids or Area:			
	CONSTRUCTION STEP	SATISFACTORY	ACTION REQUIRED
1	Ensure that all information from consultants (e.g. wind loads) has been provided.		
2	Ensure that a letter of design certification of the facade stud framing has been prepared by the stud framing manufacturer or project engineer and provided to the CSR Hebel Business Development Manager.		
3	Ensure that waterproof membrane is installed on slabs where required.		
4	Ensure stud framing has been installed plumb to ensure flush installation of panels.		
5	Ensure that inspection of the facade stud framing installation has been undertaken by the stud framing manufacturer or project engineer and letter of certification of framing installation has been provided to CSR Hebel Business Development Manager.		
6	Ensure that waterproof membrane is applied to external base edge of panels and slab at balconies prior to laying tiling grout bed.		
7	Ensure that any reported non-conformances identified by CSR Hebel or coating manufacturer during any of the critical stage inspections during the installation of the facade system are rectified.		

WINDOW INSTALLER CHECKLIST

Project:			
Builder:			
Framing Contractor:			
Building:			
Floor Level:			
Grids Or Area:			
	CONSTRUCTION STEP	SATISFACTORY	ACTION REQUIRED
1	Install cavity flashing angle to head jambs and sill of windows as per the project specifications.		
2	Install the window to manufacturers recommendations fixing only to the framing. A nominal 10mm gap to the panels on all sides is required.		
3	Install primer and sealant in accordance with the window manufacturers details and project specifications.		

COATING CONTRACTOR CHECKLIST

Project:		
Builder:		
Framing Contractor:		
Building:		
Floor Level		
Grids or Area:		
CONSTRUCTION STEP	SATISFACTORY	ACTION REQUIRED
A	Ensure all surfaces are clean and free of all contaminants. De-dust Hebel Surfaces prior to coating. DO NOT coat when temperatures are below 10°C or if rain is expected - Protected from Rain or Frosts for 24 hours. If a record of Coating Conditions is required refer Checklist AS 3894.14 – Inspection Report – Daily Painting	
Pre-fill of Visible Slab Edge (Designs where coating system is to hide slab edge)		
1	Remove all form oils with AcraTex Tiltwash & HPW	
2	Apply slurry-dashcoat of AcraTex AcraLite with AcraBond	
3	PreFill to level the Slab Edge, flush with the Hebel Panel surface using AcraTex AcraLite.	
4	Accurately mark and re-cut horizontal 10mm wide Expansion Joints Top and Bottom of Slab Edges ENSURE SLAB & PANEL ARE INDEPENDENT.	
5	Where specified, Install CSR Hebel approved Fire Proof Mastic to supplier recommendations.	
Pre-fill of Major Hebel Panel Damage and Misalignment		
1	PreFill broken edges and damages to Hebel Panel surface using AcraTex AcraLite.	
2	Identify & Sand flush or Prefill misaligned joints using AcraTex AcraLite	
Levelling Coat Installation & Prep for Control Joint Installation		
1	Install System Levelling Layer of Dulux AcraTex AcraPatch High Build	
2	Accurately mark and recut Movement Joints and clean out. WHERE FIRE PROOF MASTIC IS INSTALLED, RECUT JOINT ONLY TO THE DEPTH OF INSTALLED MASTIC.	
Control Joint Installation		
1	Install backing rod as per Hebel specification and Joint Mastic manufacturer's recommendations.	
2	Confirm Control Joint Mastic is internally plasticised polyurethane type - suitable for acrylic paint overcoating. Prime and Install in accordance with supplier recommendations.	
3.	Mask cured mastic with 6mm tape prior to Installation of Texture Layer.	
Coating System Installation – relevant to Project Aesthetic Requirement, alternate Dulux AcraTex approved Texture Coat may be specified.		
1	<i>Primer coat:</i> AcraTex Green Render Sealer - Nap Roller Application	
2	<i>Texture coat: colour as per Project Specification</i> AcraTex AcraSkin - Low Profile Texture Roller Application Remove masking over CJ's before Texture Coat dries	
3	<i>Weatherproofing Topcoat: colour as per Project Specification</i> AcraTex AcraSkin - Nap Roller Application Final Weatherproofing Topcoat layer to be applied over the entire area including the CJ mastic providing uniformity of colour across the joint & panel.	
<p align="center">THIS CHECKLIST IS A GUIDE TO TYPICAL INSPECTION REQUIREMENTS AND DOES NOT CONSTITUTE A SPECIFICATION. FOR DETAIL REFER TO SECTION 2.4 COATINGS AND DULUX ACRATEX PRODUCT DATA SHEETS AND PROJECT DUSPEC SPECIFICATION FOR FULL DETAIL</p>		

Appendix A2 – Hebel PowerPanel Material Properties

Manufacturing Tolerances

Length	± 5mm
Width	± 1.5mm
Thickness	± 1.5mm
Diagonals (max.)	5mm
Edge straightness deviation (max.)	1.5mm

PowerPanel Physical Properties

- 1) Hebel PowerPanel profile and nominal dimensions are shown in Table 1.7 on page 14.
- 2) Panel reinforcement is a single layer of steel mesh with 4 longitudinal wires of 4mm diameter.
- 3) Nominal dry density = 510 kg/m³.
- 4) Average working density = 663 kg/m³ at 30% moisture content.
- 5) Average service life density = 561 kg/m³ at 10% moisture content.

PowerPanel Strength Properties

- 1) Characteristic Compressive Strength or AAC, f'_m = 2.8 MPa.
- 2) Average Compressive Strength of AAC = 4.0 MPa.

- 3) Characteristic Modulus of Rupture, f'_{ut} = 0.60 MPa.

PowerPanel Acoustic Properties

- 1) Panel only with no plasterboard or other lining R_w = 36dB,
 $R_w + C_{tr}$ = 33dB (refer to acoustic test ATF-676).

PowerPanel Thermal Properties

- 1) R-Value of PowerPanel with no plasterboard or other lining = 0.51 m²K/W (4% moisture content).

Fire Hazard Indices

Hebel AAC 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 Developed Index	0
Smoke Developed Index	0-1

Fire Resistance Level (FRL) Ratings

For fire performance characteristics of the Hebel Facade Wall System, refer to Section 2.2 page 22 of this publication.

Appendix A3 – 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.

This information can be downloaded from the Hebel website: www.hebelaustralia.com.au

Scope

The contractor shall furnish all material and equipment required to satisfactorily complete the installation and jointing of the Hebel PowerPanel System for Facades where indicated in the contract specification and/or on the layout drawings.

Materials

All AAC material shall be Hebel PowerPanel as manufactured by CSR Hebel. Screws for fixing Hebel PowerPanel shall be supplied, manufactured or approved by CSR Hebel.

Steel frame components shall be those manufactured by Rondo Building Services Pty Ltd. (or approved equivalent)

All lining materials, fixings and finishing products shall be those manufactured and/or supplied by CSR Gyprock. Plasterboard shall be manufactured to meet the dimensional requirements of AS/NZS2588 'Gypsum Plasterboard'.

All infill material shall be those manufactured and/or supplied by CSR Bradford.

Non-Fire Rated Hebel PowerPanel System for Facades

The contractor shall supply and install the non-loadbearing Hebel PowerPanel System for Facades *....., as detailed in the project drawings and or specifications, in accordance with Hebel Facade Design Guides, HEBEL1269 High Rise Multi-Residential Facades.

The Hebel PowerPanel System for Facades, framing, fixing and joints, shall be designed and installed to comply with the requirements for an Ultimate Design Wind Pressure of *.....kPa maximum/minimum.

Installation shall be carried out to the level specified for a field acoustic performance of R_w *..... using cavity infill of Bradford *..... (or products of equivalent or better performance).

All movement joints shall be caulked with *..... backing rod and *..... sealant installed in accordance with the sealant manufacturer's recommendations.

OR

Fire Rated Hebel PowerPanel System for Facades

The contractor shall supply and install the non-loadbearing Hebel PowerPanel System for Facades *....., as detailed in the project drawings and or specifications, in accordance with Hebel Facade Design Guides, HEBEL1269 High Rise Multi-Residential Facades.

The Hebel PowerPanel System for Facades framing, fixing and joints shall be designed and installed to comply with the requirements for an Ultimate Design Wind Pressure of *.....kPa maximum/minimum.

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.

Installation shall be carried out to the level specified for a field acoustic performance of R_w *..... using cavity infill of Bradford*.....

All movement joints shall be caulked with *..... backing rod and *..... sealant installed in accordance with the sealant manufacturer's recommendations.

Lightweight Steel Framing

Wall framing shall consist of Rondo lipped steel studs *.....x..... xmm BMT installed at *.....mm maximum centres into deflection head tack (top) *.....x.....x.....mm BMT and bottom track *.....x.....x.....mm BMT.

Top Hat framing shall consist of Hebel Facade 50 x 35 x 0.75mm BMT Top Hats installed at *.....mm maximum centres.

Fixings

Screws to fix the Hebel PowerPanel to the Top Hat shall be *..... and Class*.....

Screws to fix the Top Hats to the stud framing shall be *..... and Class *.....

Screws to assemble the stud framing shall be *..... and Class *.....

Wall Wrap

The wall wrap shall be Bradford Enviroseal ProctorWrap™ or DuPont™ Tyvek® HomeWrap®. Fixing, jointing and sealing shall be designed and installed in accordance with the manufacturer's instructions, to comply with the requirements for an Ultimate Design Wind Pressure of *.....kPa maximum/minimum.

Internal Plasterboard Lining

For non fire rated wall systems, the framing shall be lined on the internal side with one layer of *.....mm Gyprock® *..... plasterboard,

OR

For fire rated wall systems, the framing shall be lined on the internal side with one layer of *.....mm Gyprock® *..... plasterboard, followed by a second layer of *.....mm Gyprock® *..... plasterboard.

All layers shall be fixed and caulked as specified for the relevant system in the Gyprock® Steel Frame Wall System Installation Guide, N°GYP544, other relevant CSR Gyprock Technical Literature, and Rondo Building Services literature.

Levels of Finish – Internal

All framing, plasterboard lining, jointing and finishing shall be carried out to Level *..... Level of Finish, in accordance with Gyprock® Residential Installation Guide, N°GYP547 and/or AS/NZS2589.1 'Gypsum Linings in Residential and Light Commercial Construction - Application and Finishing'.

Hebel Facade Finishing

All screw heads in the Hebel PowerPanel shall be covered with Hebel Adhesive/Hebel Patch, and shall be sanded flush with the panel surface.

Hebel PowerPanel System for Facades shall be externally coated with *..... coating system, which shall be applied to the manufacturer's recommendations.

Apply primers and prepare surfaces in accordance with the manufacturers specifications prior to application of coatings and sealants. Confirm compatibility before specifying.



The better way to build

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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 hebelaustralia.com.au > Resources > MSDS. 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: HEB1269 July 2013 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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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:
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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HEBEL1269 July 2013

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