Hebel® PowerBlock™ Design and Installation Guide

It is the responsibility of the architectural designer and engineering parties to ensure that the details in the Hebel® PowerBlock™ 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. Hebel® accepts no responsibility for or in connection with the quality of the recommendations or their suitability for any purpose when installed.
1.0 Introduction

CSR Panel Systems is a division of CSR Building Products Limited, one of Australia’s leading building products companies. CSR Panel Systems manufactures Hebel® Autoclaved Aerated Concrete (AAC). The AAC in Hebel® products is manufactured from sand, lime and cement to which a gas-forming agent is added. The liberated gas expands the mixture, forming extremely small, finely dispersed air pockets, resulting in lightweight aerated concrete.

CSR Panel Systems has manufactured Hebel® products that have won wide acceptance as innovative and environmentally preferable building materials. This is due to their lightweight nature, excellent thermal, fire and acoustic properties and design versatility. These inherent properties of Hebel® products help achieve quick and cost efficient construction practices as well as providing for comfortable operating environments inside the buildings all year round.

Build a premium home with Hebel® PowerBlock™

Hebel® PowerBlocks are large AAC Blocks with a standard face dimension of 600mm x 200mm, laid in much the same way as bricks but using Hebel® Adhesive to form a monolithic structure. Typically, external walls use a single skin of 250mm thick blocks while internal, non-loadbearing walls use 100mm thick blocks. Hebel’s tight manufacturing tolerances deliver beautifully flat, true surfaces that are easily rendered and painted.

Walls built with Hebel® PowerBlock™ are strong and durable, providing the security of solid masonry coupled with exceptional thermal and acoustic insulation properties. With over three times the thermal resistance of double brick, Hebel® PowerBlocks exceed the Building Code of Australia (BCA) for energy efficiency regulations for zones 1, 2, 3 and 5 without the need for additional bulk insulation.

Hebel® PowerBlocks are non combustible and can achieve an Fire Resistance Level (FRL) of up to 240/240/240.

For detached houses, this is well above the requirements for building right up to the boundary line and making Hebel® an ideal choice for bushfire prone areas.

Compared to traditional double brick construction, Hebel® PowerBlock™ walls can be laid much faster, saving building time and costs. Building with Hebel® Blocks may create more internal floor area for the same building dimensions. Hebel® Lintels can be used over windows, doors and garage door openings. Hebel® also supplies sill blocks for under windows to complement the overall look of your home.
2.0 Benefits

The many benefits of using Hebel PowerBlocks include:

**Solid and strong:** Being a high-quality masonry product, Hebel PowerBlocks provide the solid feel, security and peace-of-mind associated with traditional bricks. In fact, independent tests show that a rendered Hebel wall has similar impact resistance to brick.

**Fire resistant:** Hebel is renowned for its fire resistant properties. A non-combustible material, Hebel PowerBlocks can achieve Fire Resistance Levels (FRLs) of up to 240/240/240 minutes (tested at CSIRO) and meet or exceed the requirements for all six Bushfire Attack Level (BAL) categories. When building with Hebel, you’re building with peace-of-mind that your home is safe and secure.

**Comfortable living environment:** Hebel PowerBlocks have superior insulation qualities compared to other masonry products. With better thermal resistance and thermal mass, Hebel is a smart choice for meeting Australia’s stringent building regulations. And, for homeowners, it means there is less reliance on heaters or air conditioners – helping to save money and being kinder to the environment, too.

**Sustainability for a better world:** Environmentally friendly, Hebel products and systems are the sustainable choice.

Independent testing shows that overall Hebel has a 30% lower environmental impact than concrete or brick veneer. Using over 60% less embodied energy, and producing at least 55% less greenhouse emissions than concrete or brick veneer, Hebel is the cleaner, greener choice.

**Fast to construct & cost effective:** Hebel is a strong and robust building material that’s extremely cost effective. Compared to traditional double brick construction, Hebel PowerBlock walls can be laid much faster. The result is lower labour costs and significant savings for the homeowner.

**Better acoustics:** Hebel gives you more peace and quiet. When compared to polystyrene and fibre cement external walls, Hebel significantly reduces sound transmission between rooms and also reduces noise from external sources such as traffic.

**Proven and backed by CSR:** Hebel products and systems are designed, developed and warranted in Australia by CSR.

**Energy Efficiency**

The unique combination of thermal resistance and thermal mass make building with Hebel® a smart choice for meeting Australia’s stringent building regulations.

The thermal performance of a building depends on a number of factors such as orientation and size and aspect of windows. The R-Value of walls and doors can significantly affect the energy-rating outcome of dwellings. A 250mm Hebel® PowerBlock™ has 3 times the R-Value of a cavity brick wall (BCA Vol. 2 Figure 3.12.1.3). The use of Hebel® in walls and doors will provide increased thermal performance that can allow more flexibility with other design aspects of a building.

The thermal efficiency of Hebel® systems will also reduce the reliance on heating and cooling appliances. The combined effects of running a heater less in winter and fans or air conditioning less in summer can have a big impact on energy costs and the environment.

**Single Skin Construction**

The AAC masonry constructed from Hebel® PowerBlock™ products is called “Plain Masonry” and the blocks are masonry units referred to as a “Solid Unit”. The type of solid unit is “Autoclaved aerated concrete masonry unit” complying with AS/NZS 4455 – Masonry Units and Segment Pavers

The larger face dimension and being a single skin, Hebel® PowerBlock™ walls are erected quickly when compared to double brick construction.
3.0 Energy Efficiency

Table 3.1 identifies the minimum deemed to satisfy the R-Value requirements in accordance with BCA for Climate Zones 1 to 8. Table 3.2 lists the R-Values for various Hebel blockwall systems. For more information on Hebel® and energy efficiency refer to Section 3 and Appendix C and D of the Hebel® Technical Manual.

Table 3.1: Low-Rise Multi Residential Buildings

<table>
<thead>
<tr>
<th>Climate Zone</th>
<th>Options</th>
<th>Overall Thickness</th>
<th>R-Value</th>
<th>R_w</th>
<th>R_w + C_V</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,2,3,4 and 5</td>
<td>(a) Achieve a minimum Total R-Value of 2.8.</td>
<td>268 mm</td>
<td>1.8</td>
<td>48</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>(b) Achieve a minimum Total R-Value of 2.4; and Shade the external wall of the storey with a verandah, balcony, eaves, carport or the like, which projects at a minimum angle of 15 degrees in accordance with Figure 3.12.1.2. of the BCA.</td>
<td>296 mm</td>
<td>2.0</td>
<td>51</td>
<td>43</td>
</tr>
<tr>
<td>6 and 7</td>
<td>Achieve a minimum Total R-Value of 2.8.</td>
<td>296 mm</td>
<td>2.0</td>
<td>51</td>
<td>43</td>
</tr>
<tr>
<td>8</td>
<td>Achieve a minimum Total R-Value of 3.8.</td>
<td>268 mm</td>
<td>1.8</td>
<td>48</td>
<td>43</td>
</tr>
</tbody>
</table>

Table 3.2: Wall Element R-Value

<table>
<thead>
<tr>
<th>System Number</th>
<th>Construction</th>
<th>Overall Thickness</th>
<th>R-Value</th>
<th>R_w</th>
<th>R_w + C_V</th>
</tr>
</thead>
<tbody>
<tr>
<td>401</td>
<td>8mm Render in Texture Coat and Paint 250mm Hebel PowerBlock 10mm Gyprock</td>
<td>268 mm</td>
<td>1.8</td>
<td>48</td>
<td>43</td>
</tr>
<tr>
<td>402</td>
<td>8mm Render in Texture Coat and Paint 250mm Hebel PowerBlock 28mm furring channels @600mm centres 10mm Gyprock</td>
<td>296 mm</td>
<td>2.0</td>
<td>51</td>
<td>43</td>
</tr>
<tr>
<td>403</td>
<td>8mm Render in Texture Coat and Paint 250mm Hebel PowerBlock 28mm furring channels @600mm centres Non reflective (normal sarking) 10mm Gyprock</td>
<td>296 mm</td>
<td>2.0</td>
<td>51</td>
<td>43</td>
</tr>
<tr>
<td>404</td>
<td>8mm Render in Texture Coat and Paint 250mm Hebel PowerBlock 28mm furring channels @600mm centres Reflective foil 10mm Gyprock</td>
<td>296 mm</td>
<td>2.6</td>
<td>51</td>
<td>43</td>
</tr>
<tr>
<td>405</td>
<td>8mm Render in Texture Coat and Paint 250mm Hebel PowerBlock 28mm furring channels @600mm centres with 50mm 11kg - Bradford Glasswool Non reflective (sarking) 10mm Gyprock</td>
<td>296 mm</td>
<td>3.0</td>
<td>53</td>
<td>44</td>
</tr>
<tr>
<td>406</td>
<td>8mm Render in Texture Coat and Paint 250mm Hebel PowerBlock 8mm Render in Texture Coat and Paint</td>
<td>216 mm</td>
<td>1.8</td>
<td>48</td>
<td>43</td>
</tr>
</tbody>
</table>

4.0 Fire

Hebel® AAC has a BCA Group Number 1. Hebel® PowerBlock™ walls satisfy BCA2008 Vol.2 Clause 3.7.1.5 (a) (iii) masonry construction and therefore suitable for boundary wall construction on a Class 1 building.

5.0 Acoustic

Table 5.1 provides acoustic performance levels for PowerBlock™ walls. For alternatives and composite wall construction, Table 3.2 are acoustic performance for PowerBlock™ systems.

Table 5.1: Acoustic Performance

<table>
<thead>
<tr>
<th>PowerBlock™ Thickness</th>
<th>R_w</th>
<th>R_w + C_V</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>38</td>
<td>35</td>
</tr>
<tr>
<td>150</td>
<td>43</td>
<td>40</td>
</tr>
<tr>
<td>250</td>
<td>45</td>
<td>42</td>
</tr>
</tbody>
</table>

Values for PowerBlock™ only, no linings.
6.0 Design Approach

There are 2 methods of construction – typical and tie-down. Typical is the most common method of building whilst the tie-down method is required for cyclonic or high wind areas (as determined by an engineer). This guide provides information for both building methods.

**Important Note**

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**Scope**

The Hebel® PowerBlocks Design and Installation Guide has been created to provide information for detached residential buildings. The design information in this guide has been condensed from the Hebel® Technical Manual and AS3700 Masonry structures. The design basis is AS3700 Masonry structures, Section 12 Simplified design of masonry for small buildings. The footing and slab design is based on AS2870 Residential slabs and footings – Construction. Refer to Table 6.1 for Building Geometry Limitations.

**Design Parameters**

The structural design information in this guide is based on the data and assumptions in Table 6.2, 6.3 and 6.4.

**Design Sequence**

Fig. 6.1 details Hebel® recommendations for how to design a Hebel® PowerBlock™ home.

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**Table 6.1: Buiding Geometry Limitations**

<table>
<thead>
<tr>
<th>2 storeys max</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. height to underside of eaves</td>
<td>6.0m</td>
</tr>
<tr>
<td>Max. height to top of roof ridge</td>
<td>8.5m</td>
</tr>
<tr>
<td>Max. building width incl. verandah but not eaves</td>
<td>16.0m</td>
</tr>
<tr>
<td>Max. building length</td>
<td>5x width</td>
</tr>
<tr>
<td>Max. lower storey wall height</td>
<td>3.0m</td>
</tr>
<tr>
<td>Max. upper storey wall height</td>
<td>2.7m</td>
</tr>
<tr>
<td>Max. floor load width on external wall</td>
<td>3.0m (6.0m single span floor)</td>
</tr>
<tr>
<td>Max. roof load width on external wall</td>
<td>3.0m (6.0m rafter/truss span)</td>
</tr>
<tr>
<td>Max. floor load width on internal wall</td>
<td>6.0m</td>
</tr>
</tbody>
</table>

Where the building geometry is outside the above limitations, the designer must refer to the Hebel® Technical Manual and AS3700 Sections 1-11.

**Table 6.2: Design Parameters**

<table>
<thead>
<tr>
<th>Hebel® PowerBlock™ material properties:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Dry Density</td>
<td>525 kg/m²</td>
</tr>
<tr>
<td>Working Density (30% M.C of ACC)</td>
<td>682 kg/m²</td>
</tr>
<tr>
<td>Characteristic Compressive Strength, f' m</td>
<td>2.25 MPa</td>
</tr>
<tr>
<td>Characteristic Flexural Tensile Strength, f' m</td>
<td>0.20 MPa</td>
</tr>
<tr>
<td>Characteristic Shear Strength, f' m</td>
<td>0.30 MPa</td>
</tr>
<tr>
<td>Characteristic Modulus of Elasticity, E ST</td>
<td>1125 MPa</td>
</tr>
<tr>
<td>Characteristic Modulus of Elasticity, E LT</td>
<td>562 MPa</td>
</tr>
</tbody>
</table>
Table 6.3 Design Parameters - Permanent and Imposed Actions

<table>
<thead>
<tr>
<th>Permanent Actions (Dead Loads):</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Floor - Superimposed</td>
<td>1.00 kPa</td>
</tr>
<tr>
<td>Roof - Tile</td>
<td>0.90 kPa</td>
</tr>
<tr>
<td>Roof - Sheet</td>
<td>0.40 kPa</td>
</tr>
<tr>
<td>Framed Floor/Deck - Timber</td>
<td>0.50 kPa</td>
</tr>
<tr>
<td>Framed Deck - Tile</td>
<td>0.50 kPa</td>
</tr>
<tr>
<td>Pergola Roof - Tile</td>
<td>0.80 kPa</td>
</tr>
<tr>
<td>Pergola Roof - Sheet</td>
<td>0.32 kPa</td>
</tr>
<tr>
<td>Hebel® PowerFloor™ System</td>
<td>0.80 kPa</td>
</tr>
<tr>
<td>Hebel® Floor Panel System - 250mm</td>
<td>1.90 kPa</td>
</tr>
<tr>
<td>Hebel® PowerBlock™ Wall - 250mm, 2700mm (H)</td>
<td>4.60 kN/m</td>
</tr>
<tr>
<td>Hebel® PowerBlock™ Wall - 150mm, 2700mm (H)</td>
<td>2.76 kN/m</td>
</tr>
</tbody>
</table>

Imposed Actions (Live Loads):
In accordance with AS 1170.1:2002

| Floor - general                                     | 1.50 kPa       |
| Deck                                                | 2.00 kPa       |

Table 6.4 Design Parameters - Wind Actions (General wall areas)

<table>
<thead>
<tr>
<th>Wind Classification (AS4055)</th>
<th>Wind Pressure (kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Serviceability, $W_s$</td>
</tr>
<tr>
<td>N1</td>
<td>0.41</td>
</tr>
<tr>
<td>N2</td>
<td>0.41</td>
</tr>
<tr>
<td>N3</td>
<td>0.61</td>
</tr>
<tr>
<td>N4</td>
<td>0.91</td>
</tr>
<tr>
<td>N5</td>
<td>1.33</td>
</tr>
<tr>
<td>N6</td>
<td>1.82</td>
</tr>
<tr>
<td>C1</td>
<td>0.61</td>
</tr>
<tr>
<td>C2</td>
<td>0.91</td>
</tr>
<tr>
<td>C3</td>
<td>1.33</td>
</tr>
<tr>
<td>C4</td>
<td>1.82</td>
</tr>
</tbody>
</table>
Site Classification

Site Classifications are generally carried out for new housing developments, be they part of a subdivision or an individual allotment. The purpose of the site classification is to assess the subsurface conditions and therefore enable determination of the most appropriate foundations/floor slabs (i.e. the classification will generally determine the appropriate dimensions for house footings and / or floor slabs).

Site Classification is carried out in accordance with the Australian Standard AS2870-1996: “Residential Slabs and Footings”.

The available Classes include S (slightly reactive), M (moderately reactive), H (highly reactive), E (extremely reactive), or P (problem site). Classes S, M, H, and E refer generally to sites in which clayey soils will form the founding strata. The classification indicates how reactive the clay subsoil is to changes in moisture content. The reactivity (shrinking and swelling) of the clay can have a significant impact on the footings/slabs of a building slab, which need to be designed to counteract the movements of the clay soils.

Sites classified as Class P generally present difficulties for the proposed construction. The P classification more often than not suggests deep and/or uncontrolled fill, which cannot provide suitable bearing for the house. In these situations, the house is either founded on the stable materials beneath the fill (i.e. deep footings/piers), or the fill is removed and replaced with compacted, controlled fill.

Slab Design

All Hebel® PowerBlock™ homes must have footings and slabs designed to AS 2870 “Full Masonry”. Local engineering advice should always be sought.
Table 7.1.1 Slab on Ground

<table>
<thead>
<tr>
<th>SITE CLASS</th>
<th>TYPE OF CONSTRUCTION</th>
<th>DEPTH (d) mm</th>
<th>BOTTOM REINFORCEMENT</th>
<th>MAX. SPACING CENTRE TO CENTRE (m)</th>
<th>SETDOWN (s) mm</th>
<th>WIDTH (b) mm</th>
<th>SLAB MESH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLASS 'A'</td>
<td>Hebel® Masonry Wall</td>
<td>500</td>
<td>3-L8TM</td>
<td>-</td>
<td>50</td>
<td>350</td>
<td>SL72</td>
</tr>
<tr>
<td></td>
<td></td>
<td>500</td>
<td>3-L8TM</td>
<td>-</td>
<td>100</td>
<td>350</td>
<td>SL72</td>
</tr>
<tr>
<td></td>
<td></td>
<td>500</td>
<td>3-L8TM</td>
<td>-</td>
<td>150</td>
<td>400</td>
<td>SL72</td>
</tr>
<tr>
<td></td>
<td></td>
<td>500</td>
<td>2x3-L8TM</td>
<td>-</td>
<td>&gt;200</td>
<td>450</td>
<td>SL72</td>
</tr>
<tr>
<td>CLASS 'S'</td>
<td>Hebel® Masonry Wall</td>
<td>700</td>
<td>2x3-L11TM</td>
<td>5.0 (Note 1)</td>
<td>50</td>
<td>350</td>
<td>SL72</td>
</tr>
<tr>
<td></td>
<td></td>
<td>700</td>
<td>2x3-L11TM</td>
<td>5.0 (Note 1)</td>
<td>100</td>
<td>350</td>
<td>SL72</td>
</tr>
<tr>
<td></td>
<td></td>
<td>700</td>
<td>2x3-L11TM</td>
<td>5.0 (Note 1)</td>
<td>150</td>
<td>400</td>
<td>SL72</td>
</tr>
<tr>
<td></td>
<td></td>
<td>700</td>
<td>2x3-L11TM</td>
<td>5.0 (Note 1)</td>
<td>&gt;200</td>
<td>450</td>
<td>SL72</td>
</tr>
<tr>
<td>CLASS 'M'</td>
<td>Hebel® Masonry Wall</td>
<td>950</td>
<td>2x3-L12TM</td>
<td>4.0</td>
<td>50</td>
<td>350</td>
<td>SL82</td>
</tr>
<tr>
<td></td>
<td></td>
<td>950</td>
<td>2x3-L12TM</td>
<td>4.0</td>
<td>100</td>
<td>350</td>
<td>SL82</td>
</tr>
<tr>
<td></td>
<td></td>
<td>950</td>
<td>2x3-L12TM</td>
<td>4.0</td>
<td>150</td>
<td>400</td>
<td>SL82</td>
</tr>
<tr>
<td></td>
<td></td>
<td>950</td>
<td>2x3-L12TM</td>
<td>4.0</td>
<td>&gt;200</td>
<td>450</td>
<td>SL82</td>
</tr>
<tr>
<td>CLASS 'M-D'</td>
<td>Hebel® Masonry Wall</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLASS 'H'</td>
<td>Hebel® Masonry Wall</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLASS 'H-D'</td>
<td>Hebel® Masonry Wall</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLASS 'P'</td>
<td>Hebel® Masonry Wall</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

GENERAL NOTE: This table is to be read in conjunction with the requirements of AS2870 2011 and AS3600.

NOTES:
1. A 10% increase in the spacing is permitted where the spacing in the other direction is 20% less than specified.
2. Where the number of beams in a particular direction satisfies the requirements of the maximum spacing given above, the spacing between individual beams can be varied provided that the spacing between any two beams does not exceed the spacing given in the above figure by 25%. These allowances for increased beam spacings do not override the maximum spacings between edge beams and first internal beams as required by clause 5.3.9.
3. For two storey timber framed floor or Hebel® floor panel construction, the width of the edge beams must be increased by 100mm and the bottom reinforcement must be increased by one bar of the same diameter.
Sub-Floors On Elevated Sites

Hebel® PowerBlock™ must not be used at or below ground level. When building a Hebel® PowerBlock™ structure on a sloping site that is not suitable for a concrete slab, a solid core-filled concrete block or brick substructure may be erected on a strip footing to raise the building and floor system to a level that is clear of the ground resulting in a level building platform that allows sufficient airflow under the floor.

The first course of Hebel® PowerBlocks must be laid on a DPC to stop rising damp and to act as a bond breaker between the different building elements.

Termite Protection

Hebel® PowerBlocks are not a food source for termites. Solid wall construction still requires termite protection. There are many methods to protect your home against a termite invasion and a qualified professional pest control should be consulted to determine the most suitable method for your design.

The Building Code of Australia recognises an exposed slab edge to a depth of 75mm above finished ground level as adequate termite prevention.

For masonry sub-floor construction a continuous ant cap installed between the brick/ concrete block work and the Hebel® PowerBlock™ also satisfies the Building Code of Australia termite protection requirements.

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### Table 7.1.2 - Strip Footing

<table>
<thead>
<tr>
<th>Site Class</th>
<th>Type of Construction</th>
<th>Depth (d) mm</th>
<th>Width (b) mm</th>
<th>Reinforcement</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLASS ‘A’</td>
<td>Hebel® Masonry Wall</td>
<td>300</td>
<td>450</td>
<td>4-L8TM</td>
</tr>
<tr>
<td>CLASS ‘S’</td>
<td>Hebel® Masonry Wall</td>
<td>500</td>
<td>450</td>
<td>4-L11TM</td>
</tr>
<tr>
<td>CLASS ‘M’</td>
<td>Hebel® Masonry Wall</td>
<td>900</td>
<td>450</td>
<td>4-L12TM</td>
</tr>
<tr>
<td>CLASS ‘M-D’</td>
<td>Hebel® Masonry Wall</td>
<td></td>
<td></td>
<td>Site Specific Engineering Required</td>
</tr>
<tr>
<td>CLASS ‘H’</td>
<td>Hebel® Masonry Wall</td>
<td></td>
<td></td>
<td>Site Specific Engineering Required</td>
</tr>
<tr>
<td>CLASS ‘P’</td>
<td>Hebel® Masonry Wall</td>
<td></td>
<td></td>
<td>Site Specific Engineering Required</td>
</tr>
</tbody>
</table>

GENERAL NOTE: This table is to be read in conjunction with the requirements of AS2870 2011 and AS3600

NOTES:
1. For all beams 700mm or deeper, as specified in the table above, internal footings shall be provided at no more than 6m centres, and at re-entrant corners to continue the footings to the opposite external footing.
2. Internal strip footings shall be of the same proportions as the external footing and run from external footing to external footing ‘side slip joints’ consisting of a double layer of polyethylene shall be provided at the sides of the footing only.
3. Provide ventilation to the sub-floor in accordance with the BCA.
7.2 Hebel® PowerBlock™ Walls

Generally, the minimum recommended wall thickness is:
- 250mm for external walls
- 150mm for internal load-bearing walls.
- 100mm for internal non-load bearing walls.

Hebel® suggests considering a wall as having top and bottom lateral restraints only (one-way vertical span) and designing the appropriate wall thickness, so that retrofitting or changing the location of the movement joints will not be detrimental to the lateral load capacity of the wall. In determining the appropriate wall thickness, the designer shall consider a range of factors relating to relevant codes and project specific considerations, these factors may include:

- Movement joint location
- Bracing considerations
- Vertical (compression) loading
- Out of plane wind/earthquake (lateral) loading
- Required fire rating level (FRL).

The particular project loading configurations could result in walls that exceed the above minimum requirements.

Ring Beam (for standard trussed roofs)

A ring beam must be provided at the base and top of perimeter Hebel® walls. The ring beam is 60mm x 60mm with 1N12 bar centrally located. Shear connection ties are to be placed at the location of control joints at 600mm spacings (vertically). See Fig 7.2.1 for ring beam details.

Bond Beam (for vaulted roofs)

A bond beam is a continuous beam around the perimeter of a building for the purpose of providing lateral stability and bracing to the walls for vaulted cathedral roofs, to minimise cracking at openings. As a minimum, bond beams are to be located at the top of the walls for each floor level, or at a maximum vertical spacing of 3m. Bond beams are constructed of reinforced concrete which is poured in situ between two Hebel® PowerBlocks. The minimum dimension of the bond beam must be 100mm wide and 200mm high. Bond beam reinforcement should be not less than 2 rows of 12mm deformed bars placed top and bottom in the centre of the beam (overlapped at least 400mm where it joins).

Where bond beams intersect a control joint, it is important to continue the control joint through the beam. The reinforcing bars must pass through the control joint and terminate 400mm past the joint. Where the reinforcing bars are bridging the control joint, the bars that extend for the 400mm should be fitted into conduit sleeves to allow the wall to expand and contract without causing excessive stress on the wall.

Bond beams must be continuous around a built-in corner.

The ring beam at the base is still required. See Fig. 7.2.1.

Compression

The assessment of Hebel® PowerBlock™ wall compression capacity in this Design and Installation Guide is based on the scope of this design guide (see Section 6.0 and Table 6.1). Three top support conditions are applicable:

1) Supporting concrete slab above (see Section 14 and Fig. 14.26)
2) Supporting floor other than concrete slab above (see Section 14 and Fig. 14.28)
3) Face supported framed floor (See Section 14 and Fig. 14.27)
No vertical support of the wall is considered as worst case in the compression capacity assessment. Under that constraint and for wall heights up to 3000mm:

- 250mm load-bearing external PowerBlock™ walls have adequate compression capacity for all top support conditions.
- 150mm load-bearing internal PowerBlock™ walls to 3000mm height have adequate compression capacity for the first two top support conditions, but is not suitable for face loaded framed floors. If face loaded timber framed floors are designed both sides of the wall, their spans are within 20% and loading is the same, this can be considered top support condition 2. Otherwise 250mm Hebel® PowerBlock™ wall is required.

Roof loading on top of the wall through the top plate is considered top support condition 2.

**Bending**

250mm Hebel® PowerBlock™ walls up to 3000mm height have adequate bending capacity without edge support in wind classifications N1 to N3.

Table 7.2.1 provides maximum wall lengths between edge restraints for wind classifications N4 to N6 and C1 to C4. Both ends of these walls must have edge support.

Edge support must be an engaged perpendicular wall (bracing wall) or a built-in 89x89x5 SHS column. The designer must detail the plate connections at the base and top of the SHS column and specify adequate ties to the Hebel® PowerBlock™ work.

**Shear**

Horizontal forces, such as wind and earthquake loading, applied to a building are to be resisted by bracing walls. Bracing walls are located generally at right angles to the walls subjected to these forces. All bracing components in the building shall be interconnected to adequately transfer the imposed loads to the footings.

Refer to Appendix K in AS3700 for total ultimate racking forces for houses in wind classifications up to N4/C2. Those tables are based on wall height up to 2700mm. For wall height greater than 2700mm up to 3000mm, factor up the loads by 15%. Earthquake categories H1 and H2 are covered by N3/C1 tables and earthquake category H3 is covered by N4/C2 tables.

Table 7.2.2 provides ultimate racking capacities of unreinforced 150mm and 250mm Hebel® PowerBlock™ walls. This table does not include sliding which the designer must also check depending on compression loads on wall in all wind cases and dowel action at base of wall through hold-down rods.

**Lintels General**

The minimum bearing lengths at the end of all Hebel® lintels is 150mm or L/8, whichever is greatest. The bearing PowerBlock™ must extend past the end of the lintel by min. 100mm.

**Hebel® Lintels**

Hebel® lintels are reinforced sections similar to panels. The lintels are used as supports over doorways, windows and other opening.

Lintels shall be installed so that the surface marked “THIS SIDE UP” is uppermost, as the section reinforcement may not be symmetrical. Hebel® lintels are not to be cut on-site.

Table 7.2.4 presents the range of standard Hebel® lintels and the associated capabilities.

For larger spans, use structural steel lintels as designed by the project structural engineer.

**Steel Lintels**

Can be used to support PowerBlock™ work above openings. refer to Tables 7.2.5 and 7.2.6.

**Control 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 foundation movement (shrinkage and swelling), thermal expansion and contraction, differential movements between materials, climate and soil condition. This movement, unless relieved or accommodated for, will induce stress in the materials, which may be relieved in the form of cracking. To accommodate these movements and relieve any induced stresses, control joints (vertical gaps) shall be installed to minimise cracking in Hebel® masonry walls.

**Location of Control Joints**

Where control joints are required they are best positioned:

- At no more than 6m spacing unless more stringent requirements are specified in accordance with AS 2870.1996.
- At intersecting walls and columns.
- At changes of wall height or thickness, or where chases occur.
- To coincide with movement joints in adjacent elements of structure (floor or roof)
At junctions of dissimilar materials
Where architectural or structural features create a ‘weak’ section
Movement joints are not normally required below DPC level.

Construction of Control Joints
Straight, unbonded vertical joints are the most common type of control joint. Typically, the vertical joint is 10mm wide and filled with an appropriate backing rod and flexible sealant.
Where stability of the design requires continuity across the joint, Hebel® control joint ties should be set in every second bed joint.

Movement joints must be continuous through the entire block wall and all surface finishes. When the control joint is aligned with a window or door opening, the joint must be continuous and may need to be offset to deal with the lintel spanning the opening. In such a case a slip joint must be provided under that end of the lintel. Control joints must also be continuous through any bond beams which have been installed in the wall. This can be achieved by breaking the bond beam at this joint during its construction. To maintain lateral strength and continuity of the bond beam, the reinforcing rods should bridge the joint with one side of the beam having conduits cast in for the rods to slide while still keeping the wall in plane.

The control joints should be installed as the wall is being constructed as the joint ties must be installed in the centre of the block ensuring the tie is fully bonded with Hebel® adhesive.

Service Penetration
To penetrate services through Hebel® walls, core out an appropriate sized hole (typically 10mm larger diameter than the service) and run the service through. A flexible sealant should be used to seal the gap around the service, this will also prevent any cracking/movement issues that may occur with the stress imposed on the blocks if the services were placed hard against the Hebel® PowerBlock™.

For penetrations through fire rated walls, an appropriate fire collar must be used with fire rated sealants. To affix the services to the Hebel® walls please refer to the fixing guide in this manual.

Chasing Services Into Hebel®
Services should be run through cavities where possible to avoid unnecessary chasing into Hebel®.
Where chasing is necessary some basic guidelines need to be followed:
- All Hebel® products 100mm or less must not be chased
- All chases must comply with the BCA
- The depth of the chase must not exceed 25mm
- The width of the chase must not exceed 25mm
- The maximum number of chases allowed is 2 chases per 1 metre length of wall.
- All chases must be backfilled with a material that will adhere to the wall (Hebel® Patch or a sand/cement patching mix).
- Chasing can be done with a Hebel® Hand Router or a power router fitted with dust extraction

### Table 7.2.2 Unreinforced Wall

<table>
<thead>
<tr>
<th>Wall Length (mm)</th>
<th>Ultimate Racking Capacity (kN)</th>
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### Table 7.2.3 Top-Plate & Hold-Down Selection Table

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<th>Wind Classification</th>
<th>Top Plate &amp; Hold-Down</th>
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**Legend**
- A 90x45 F7 timber top plate / 700mm deep strap @ 1200mm ctrs.
- B 90x45 F17 timber top plate / 1700mm deep strap @ 2400mm ctrs.
- C 90x45 F17 timber top plate / Ø12mm rod @ 2400mm ctrs.
- D 90x45 F17 timber top plate / Ø12mm rod @ 1200mm ctrs.
- E 90x45 F17 timber top plate / Ø12mm rod @ 900mm ctrs.
- F 100x50x3.0 RHS top plate / Ø12mm rod @ 2400mm ctrs.
- G 100x50x3.0 RHS top plate / Ø12mm rod @ 1200mm ctrs.
### Table 7.2.4: Lintel Selection – Hebel® Lintel

<table>
<thead>
<tr>
<th>Opening Width (mm)</th>
<th>Single Storey or Upper Level of Double Storey</th>
<th>Lower Level of Double Storey</th>
<th>Sheet Roof</th>
<th>PowerFloor</th>
<th>Floor Panel</th>
<th>PowerFloor</th>
<th>Floor Panel</th>
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**Legend (Hebel® product code)**

- A: 22046 + 22047
- B: 22038 + 22039
- C: 22041 + 22042
- D: 22043 + 22044
- E: 82066 + 82067

**Legend (Hebel® lintel for 250mm external wall)**

- A: 22046 + 22047
- B: 22038 + 22039
- C: 22041 + 22042
- D: 22043 + 22044
- E: 82066 + 82067

**NOTE:** Hebel® lintel for 250mm external wall comprises 100mm lintel on outside face and corresponding 150mm lintel on inside face. Top plate to bear across both lintels, min. 25mm bearing on 100mm lintel.

### Table 7.2.5: Lintel Selection – Equal Angles

<table>
<thead>
<tr>
<th>Opening Width (mm)</th>
<th>Single Storey or Upper Level of Double Storey</th>
<th>Lower Level of Double Storey</th>
<th>Sheet Roof</th>
<th>PowerFloor</th>
<th>Floor Panel</th>
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**Legend**

- A: 2/100x100x7 EA
- B: 2/100x100x9 EA
- C: 2/100x100x10 EA
- D: 2/100x100x12 EA
- E: 2/150x100x10 EA
- F: 2/150x100x12 EA

**NOTE:** For unequal angles, the long leg is vertical.

### Table 7.2.6: Lintel Selection – Galintel

<table>
<thead>
<tr>
<th>Opening Width (mm)</th>
<th>Single Storey or Upper Level of Double Storey</th>
<th>Lower Level of Double Storey</th>
<th>Sheet Roof</th>
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**Legend**

- A: Multi-Rib T-Bar - 200x200x7
- B: Multi-Rib T-Bar - 200x200x9
- C: Traditional T-Bar - 200x10/200x10
- D: Traditional T-Bar - 250x10/200x10
- E: Traditional T-Bar - 250x12/200x10

**NOTE:** Hebel® lintel for 250mm external wall comprises 100mm lintel on outside face and corresponding 150mm lintel on inside face. Top plate to bear across both lintels, min. 25mm bearing on 100mm lintel.
7.3 Floor Panel Systems

Hebel® Floor Panels are reinforced AAC panels designed as loadbearing components in commercial, industrial and residential construction applications.

A preliminary thickness of the floor panel can be determined from Table 7.3.1 in this guide. Contact your local distributor to confirm the selected floor panel thickness is adequate for the design parameters of span, load, deflection, limit and fire resistance level rating.

After the panels are laid, reinforcing bars are placed between the panels in the recess and around the perimeter of the floor to form the ring anchor system in accordance with Hebel® specifications.

The joints and ring anchor sections should be lightly pre-wetted, filled with minimum 15 MPa concrete grout, and rodded to ensure complete and level filling of the notch and groove. A mix of C35:3A2 (5mm maximum coarse aggregate) with 150mm slump is usually suitable. The grout should completely cover the reinforcing.

The hardness of Hebel® Floor Panels is greater than the PowerBlocks. When ring anchors are placed accurately and mortar is poured carefully and screeeded properly, the surface is level and smooth.

When Hebel® panels are used in external floor areas such as patios or balconies, it is important to use an approved waterproofing membrane.

Hebel® Floor Panels provide an excellent, solid, stable base for tile, slate, marble and other hard surface flooring, including bathroom, laundry and other wet area applications.

The smooth flat surface is also perfectly suited to carpet, vinyl, timber boards, parquetry and decorative plywood flooring.

Panels in General

Panels should not be cut on site unless they are ordered as cuttable. It is preferred they are ordered from the factory at the desired length. Where panels have been cut the exposed reinforcing should be with coated with Hebel® corrosion protection compound or an approved equivalent.

Hebel® panels are supplied ready for use. They can be simply and easily laid into position with only the joints needing to be mortared. Installation is therefore largely dry and generally no formwork or bracing is necessary. The reinforcing in the panels is custom designed for each project.

Panels installed on Hebel® PowerBlock™ work or steel beams can offer a flooring system that can be laid down exceptionally fast. As well as providing the benefits of rapid construction, differential movement between floors and walls is minimised.

Framed Floors

Hebel® PowerBlock™ construction can incorporate floor construction using joists. Typically the joists are installed onto bearing plates which distribute the floor loads evenly into the supporting blocks. Hebel® PowerBlocks are easily shaped to infill between the joists. The infill blocks will provide support for the blocks above the floor framing.
### Table 7.3.1: Hebel® Structural Floor Panels

#### With Flexible Coverings / No Walls Above (L/250 deflection)

<table>
<thead>
<tr>
<th>Panel Thickness (mm)</th>
<th>Maximum Panel Length (metres)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Live Load (kPa)</td>
</tr>
<tr>
<td></td>
<td>Superimposed Dead load (kPa)</td>
</tr>
<tr>
<td>150 (4.00)</td>
<td>1.5</td>
</tr>
<tr>
<td>175 (4.50)</td>
<td>2.0</td>
</tr>
<tr>
<td>200 (5.00)</td>
<td>3.0</td>
</tr>
<tr>
<td>225 (5.50)</td>
<td>4.5</td>
</tr>
<tr>
<td>250 (6.00)</td>
<td>6.0</td>
</tr>
</tbody>
</table>

#### With Rigid Coverings / Walls Above (L/600 deflection)

<table>
<thead>
<tr>
<th>Panel Thickness (mm)</th>
<th>Maximum Panel Length (metres)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Live Load (kPa)</td>
</tr>
<tr>
<td></td>
<td>Superimposed Dead load (kPa)</td>
</tr>
<tr>
<td>150 (4.00)</td>
<td>1.5</td>
</tr>
<tr>
<td>175 (4.50)</td>
<td>2.0</td>
</tr>
<tr>
<td>200 (5.00)</td>
<td>3.0</td>
</tr>
<tr>
<td>225 (5.50)</td>
<td>4.5</td>
</tr>
<tr>
<td>250 (6.00)</td>
<td>6.0</td>
</tr>
</tbody>
</table>

**NOTES TO FLOOR PANEL TABLES:**
- Length is calculated based on the minimum bearing.
- Minimum bearing is panel length /80 but not less than 60mm.
- Maximum clear span is panel length less than 2x minimum bearing.
- (Length) is maximum standard panel length in metres.

---

Image 7.3.2: Installed Floor Panels

Image 7.3.3: Installing Floor Panels
7.4 Decks, Verandahs and Pergolas

When attaching a deck, verandah roof or pergola to your Hebel® PowerBlock™ Wall, the building designer / project engineer must calculate and determine the loads that will be imposed on the Hebel® PowerBlocks. For conditions equal to or less than those outlined in table 7.4.2, a timber or steel waling plate may be attached to the block wall as shown in Section 14 details 14.34 and 14.35. This must be affixed using the appropriate number and type of fixings as outlined in Tables 7.4.1 and 7.4.2. The fixings must be either Fischer Injection Mortar 10mm x 80mm long or Ramset Injection Mortar 12mm x 160mm long.

Where the loads that will be imposed on the waling plate exceed the table or the structure is to be detached from the Hebel® PowerBlock™ Walls, a detached post and beam structure may be erected adjacent to the Hebel® wall which will ultimately transfer the load directly into the foundation. This type of construction must be designed and certified by the project engineer.

### Table 7.4.1 Deck/Verandah Floor Walling Plate Connection

<table>
<thead>
<tr>
<th>Deck Flooring Type</th>
<th>Maximum Anchor Spacing (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Joist Span = 1.2m</td>
</tr>
<tr>
<td>Timber</td>
<td>800</td>
</tr>
<tr>
<td>Tile</td>
<td>600</td>
</tr>
</tbody>
</table>

### Table 7.4.2 Roof Walling Plate Connection

<table>
<thead>
<tr>
<th>Wind Classification</th>
<th>Maximum Anchor Spacing (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rafter Span = 2.4m</td>
</tr>
<tr>
<td></td>
<td>Sheet Roof</td>
</tr>
<tr>
<td>N1</td>
<td>1500</td>
</tr>
<tr>
<td>N2</td>
<td>1300</td>
</tr>
<tr>
<td>N3/C1</td>
<td>1000</td>
</tr>
<tr>
<td>N4/C2</td>
<td>700</td>
</tr>
<tr>
<td>N5/C3</td>
<td>450</td>
</tr>
</tbody>
</table>

Note: Walling plate span capacity to be checked by building designer / project engineer.
# 8.0 System Components

## Products

Hebel® stocks many of the products and materials required to construct your Hebel® home.

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
<th>Product</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hebel® Thermoblocks</td>
<td>50mm - 300mm (25mm increments)</td>
<td>Hebel® Adhesive</td>
<td>20 kg bag</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Used for gluing the blocks together at vertical and horizontal joints</td>
</tr>
<tr>
<td>Sill blocks</td>
<td>600x200x50mm thick or 100mm thick, 30° slope</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PowerFloor™ Panels</td>
<td>1800mm x 600mm x 75mm</td>
<td>Hebel® Mortar</td>
<td>20 kg bag</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Used as thick bed mortar base to provide a level base for the first course</td>
</tr>
<tr>
<td>Custom PowerFloor™ Panels</td>
<td>150mm - 250mm x 600mm by up to 6m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hebel® Lintels</td>
<td>To suit openings up to 5m</td>
<td>Hebel® HighBuild™ render</td>
<td>20kg bag</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Used as a preparation coat to level surface providing an even true surface</td>
</tr>
<tr>
<td>Stair treads</td>
<td>300mm x 175mm x 1m or 1.2m</td>
<td>Hebel® Patch</td>
<td>10kg bag</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Used to prepare minor chips or damage to blocks</td>
</tr>
<tr>
<td>Control joint tie</td>
<td>Used at every third course in control joints</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sliding joint tie</td>
<td>Fixed to RHS/SHS column every second course</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrosion Protection Paint</td>
<td></td>
<td></td>
<td>To coat exposed reinforcement during cutting</td>
</tr>
</tbody>
</table>
9.0 Construction Notes

**General Notes**

1. These notes and details are to be read in conjunction with the project’s contract documentation.
2. All materials and workmanship shall be in accordance with this Installation Guide, the current edition of the Hebel® Technical Manual and other Hebel® documentation.
3. Refer to architectural drawings for all setting out dimensions.
4. Do not scale drawings, use written dimensions.
5. Should any omission, penetration, cutting of panels, discrepancy or fault exist, contact the designer immediately for a decision before proceeding with work.
6. All load-bearing walls, bearing on Hebel® floor panels, shall be supported separately in accordance with the project engineer’s design.
7. Hebel® accepts no responsibility for the design or selection of supporting walls, lintels, beams, columns or other structural members.
8. Corrosion protection of all structural steelworks shall be specified by the project engineer or architect.
9. The temporary restraint of walls is the responsibility of the builder or installer.
10. Supporting structure to be designed to full masonry standards

**IMPORTANT**

11. PowerBlocks on site should be protected against rain and water saturation. This can best be achieved by leaving the shrink-wrap cap on the top of pallets and covering the top of blockwork if rain threatens. PowerBlocks should not be laid in the rain.

12. Ensure engineering tie-down rods are present and located in accordance with the engineer’s documentation.
13. Ensure control joint locations are marked out in accordance with the engineering documentation.

---

**Fig 9.1: Wall Construction Diagram**

- Control joint ties to be placed at every third course maximum
- Block overlap to be minimum 100mm using Hebel® Adhesive
- Joint thickness to be 2-3mm
- Horizontal joints to be completely filled
- Block damage to be repaired
- Perpends to be completely filled
- Supporting structure to be designed to full masonry standards
- Excess adhesive to be removed
- All fixings to be of an approved type
- Depth of chasing not to be greater than 25mm
- Control joints built in at 6m maximum centres or otherwise noted
- Hebel® Mortar
- DPC slip joint membrane to all walls on a support
Coatings

Table 9.1 details Hebel® recommendations for Coating System options for Low Rise and Detached Residential construction to deliver a durable, monolithic appearance.

Hebel® and Dulux® Acratex® have developed coating systems designed specifically for the Hebel® AAC substrate and warrant these systems for 7 years. Performance requirements for alternate system options are provided. In such circumstances, the project specifier must satisfy themselves that systems are engineered and suitable for relevant project requirements.

General purpose, site or pre-bagged sand and cement renders must not be used on Hebel® PowerBlock™ walls, owing to potential variability and unsuitability of formulation for Autoclaved Aerated Concrete (AAC).

Conventional exterior low build paint systems must not be used, as their ability to accommodate normal expansion and contraction in order to maintain a crack free protective layer is not assured.

Refer to “High Performance Coating Systems” brochure on the website, for more information.

Reinforcing Mesh Installation

Fully meshing all rendered Hebel® surfaces using alkali-resistant glassfibre mesh is recommended to assist in maintaining render integrity and minimising consequential cracking. The minimum requirement is to mesh at corners of wall openings (doors and windows) to minimise corner cracking. The mesh should be embedded into the wet first pass of Hebel® HighBuild™.

Linings

Plasterboard can be direct fixed to internal Hebel® PowerBlock™ walls. It is recommended that battens be used behind plasterboard linings on the inside surface of external walls. Fibre Cement sheet linings must be installed on battens.

<table>
<thead>
<tr>
<th>Table 9.1 Coating systems for Hebel® PowerBlock™</th>
</tr>
</thead>
<tbody>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Power-Block™</td>
</tr>
<tr>
<td>Uniform Sand</td>
</tr>
<tr>
<td>Uniform Sand</td>
</tr>
<tr>
<td>Uniform Sand</td>
</tr>
</tbody>
</table>

OPTION 1: 1-2mm Acrylic Texture Trowel applied Type: AS4548.4 Polymer content (dry): 9% min.

OPTION 2: Dependant on specifier approval.

Sponge finishing of Hebel® HighBuild™ to a project approved standard, plus Elastomeric Membrane finishing system.

Hebel® recommends the installation of 1-2mm Acrylic Texture Coat over the render base coat providing improved consistency of finish, system flexibility and durability.
PowerBlock™
Laying Procedure

1. First Course
   a. Mix Hebel® Mortar according to the directions on the bag.
   b. Mix Hebel® Adhesive according to the directions on the bag.
   c. Lay a DPC (damp proof course) slip joint membrane at the base of all external and internal walls to allow for differential movement between the blocks and the slab/footing. Cut the DPC around tie rods as required. The DPC must be installed on the slab/footing prior to the application of Hebel® Mortar.
   d. Lay Hebel® Mortar to get first course level and plumb. Accurately position a block and tap into place with a rubber mallet. Ensure that the block is level in all places.
   e. All loose particles and dust must be brushed from the base and vertical end surfaces of all first course blocks before bedding in Hebel® Mortar and applying Hebel® Adhesive.
   f. Lay Hebel® Mortar to get first course level and plumb. Accurately position a block and tap into place with a rubber mallet. Ensure that the block is level in all places.
   g. Position the next block vertically adjacent the first block. Place the block down into position and tap the block end horizontally with a rubber mallet to fully close the vertical joint. Joints must be 2-3mm thick.
   h. Tap the block vertically into the base mortar and level with the first block.
   i. Repeat until the first course is complete.
   j. Bore holes in blocks for tie-down rods using a 40-50mm auger bit and place over rods where required. Rod must be central in hole.

2. Second and Subsequent Courses
   a. All loose particles and dust must be brushed from the top of the first course before applying Hebel® Adhesive.
   b. Apply Hebel® Adhesive to the horizontal surface using a Hebel® notched trowel that matches the block thickness.
   c. Overlap the block joints a minimum of 100mm over joints in the previous course. Normal practice is to overlap by thickness of the intersecting wall.
   d. Install wall ties where required, locating centrally across block thickness and bed into the Hebel® Adhesive.
   e. Position the first block in the second course and gently tap accurately into place with a rubber mallet. Joints must be 2-3mm thick.
   f. Apply Hebel® Adhesive to the perpend of the first block. Position the next block vertically adjacent the first block. Place the block down into position and tap the end with the rubber mallet to fully close the perpend joint. Joints must be 2-3mm thick.
   g. Tap the top of the block until level with the previous blocks laid.
   h. Repeat for subsequent blocks.
   i. Excess adhesive should be cleaned off the block face at the end of each course within 1-2 hours.
   j. Large holes can be patched using Hebel® Patch in accordance with the directions on the bag.
   k. Bore holes in blocks for tie-down rods using a 40-50mm auger bit, and place over rods where required. Rod must be central in hole.
   l. Where required construct a bond beam in the top course of loadbearing walls. Minimum dimension is 100mm wide x 200mm high. Use minimum 50mm thick blocks each side to form up bond beam. Reinforcement to be minimum 2x N12 deformed bars. Refer to Floor Panel Note 2 for grout specification.
   m. Where required construct a ring beam in the top course of the non-loadbearing walls. Cut/rout 60mm x 60mm recess and place 1x N12 deformed bar centrally. Refer to Floor Panel Note 2 for grout specification.

3. Finishing
   a. Ensure that all perpends are completely filled with Hebel® Adhesive.
   b. Ensure holes and chips are completely filled with Hebel® Patch. Sand back level.
   c. Clean off any remaining Hebel® Adhesive runs.
   d. The blocks can be sanded when dry to ensure a good surface is presented for surface coatings.

4. Base Rendering and Sealants
   a. Mix up Hebel® HighBuild™ render in accordance with the instructions on the bag.
   b. Apply alkali-resistant glass fibresmesh at corners of wall openings (doors and windows) to minimize corner cracking. The mesh should be embedded into the wet first pass of Hebel® HighBuild™.
   c. Hebel® HighBuild™ should be applied with a hark and trowel with minimal thickness of 6mm. General purpose, site or pre-bagged sand and cement renders must not be used on Hebel® Autoclaved Aerated Concrete.
   d. Render must be stopped at control joints to allow the joint to open/close and function correctly.
e. All control joints and gaps between blockwork and framing around windows must be caulked with an appropriate flexible sealant.

f. Install backing rods approx 10mm from surface.

g. Apply primer to the surfaces.

h. Installed sealants to manufacturer’s specifications.

5. Coatings for External Walls
   a. Coatings must comprise a high build acrylic texture coat and finish elastomeric paint membrane.
   b. Conventional exterior low build paint must not be used.
   c. Allow Hebel® HighBuild™ to fully cure (approx 24 hours depending on weather conditions).
   d. Apply primer to the Hebel® HighBuild™
   e. Apply texture body coat such as Dulux® AcraTex®. Ensure texture coat stops at control joints.
   f. Apply finishing sealants in control joints.
   g. Apply first finishing paint elastomeric paint membrane.
   h. Apply second coat of elastomeric paint membrane.
   i. Refer to manufacturer’s guideline for coating on AAC PowerBlock™ work and Hebel® Highbuild™

6. Internal Linings
   a. Plasterboard can be direct fixed to internal Hebel® PowerBlock™ walls.
   b. It is recommended that battens be used behind plasterboard linings on the inside surface of external Hebel® PowerBlock™ walls.
   c. Fibre cement sheet linings cannot be direct fixed to Hebel® PowerBlocks. Installed fibre cement sheet linings on battens.
   d. Hebel® HighBuild™ render may be directly applied to internal block walls as per pervious instructions.

Floor Panel Notes
1. The ring anchor reinforcement shall be a minimum of N12 grade in accordance with AS1302, unless noted otherwise by the project engineer.
2. Hebel® Mortar should be used as grout for the ring anchor system. A nominal composition of 1 Cement: 4 Sand (5mm maximum coarse aggregate) can also be used. Minimum compression strength of f’cg= 15MPa at 28 days.
3. Additives to reduce the grout shrinkage shall only be used in accordance with the manufacturer’s instructions.
4. The installer shall support (chair) reinforcement to enable grout to fully surround the reinforcement. Reinforcement shall not be in contact with the panel when grout is placed.
5. Grout shall be rodded to ensure complete filling of notch and groove.
6. The installer shall provide notch and groove at panel joints as per Hebel® standard detail 5.3.5 on page 7.60 in the Hebel® Technical Manual.
7. Ensure notch is cleared of all loose material and reinforcement cleaned of all foreign material.
8. Lightly pre-wet notch prior to pouring the grout.
9. Panels shall only be cut on-site as indicated on the engineer’s drawings, otherwise contact your distributor or sales representative.
10. Propping of panels may be required to accommodate minor misalignments until 3 days after ring anchor grout is poured.
11. All propping shall be removed from Hebel® Floor Panels before any walls are erected over.
12. Traffic on floor panels is to be avoided for a period of 3 days after the ring anchor grout is poured.
13. All panel dimensions are the responsibility of Hebel’s client and are subject to approval by the client before commencing manufacture of panels.
10.0 Tools & Equipment for Construction

Hebel® PowerBlocks can be laid using construction tools/equipment.

**String Line** – A string line is required to accurately set out and lay Hebel® PowerBlock™ Walls.

**Brick/Blocklaying Profiles** – used to gauge the block course are being laid level.

**Mixing Bucket** – a minimum 20 litre bucket is required for mixing Hebel® Mortar, Hebel® Adhesive and Hebel® HighBuild™ render.

**Electric Drill** – an electric drill is required to mix the Hebel® Mortar, Hebel® Adhesive and Hebel® HighBuild™ render. It is also used to drill clearance holes in the blocks so they can be placed over the tied down rods where required.

**Stirrer** – fitted to the electric drill, the stirrer is used to mix the Hebel® Mortar, Hebel® Adhesive and Hebel® HighBuild™ render inside the mixing bucket.

**Notched Trowel** – the notched trowel is used to apply the Hebel® Adhesive to the Hebel® surfaces. The width of the trowel must match the block thickness to ensure the adhesive is applied with full and even coverage.

**Rubber Mallet** – a rubber mallet is required to ‘tap’ the Hebel® PowerBlocks onto the adhesive and into place.

**Spirit Level** – required to install the blocks level and plumb.

**Hand Saw** – a Hebel® handsaw can be used to cut Hebel® PowerBlocks to length and height.

**Powered Bandsaw** – a bandsaw is ideal for cutting Hebel® PowerBlocks. (perfect when there are many site cuts to be performed).

**Hebel® Square** – a purpose built square is available for use when marking and cutting Hebel® PowerBlocks.

**Steel, Plastic and Timber Trowels** – these trowels may be required for the installation of the Highbuild render and texture coatings.

**Sanding Float** – used to even out inconsistencies in the Hebel® PowerBlock™ Wall in preparation for render/texture coats.

**Hebel® Hand Router** – may be used to chase services into solid Hebel® walls.

**Circular Saw** – (fitted with a diamond blade) may be used to chase services into solid Hebel® walls.

**Electric Router** – may be used to chase services into solid Hebel® walls.

**Crane** – may be required to lift large Hebel® Lintels and Hebel® custom floor panels.

**Lifting Grabs** – required for use in conjunction with crane for lifting Hebel® lintels and custom floor panels.

**Scaffold** – Scaffold is required when building block walls. The amount of scaffold depends on the height of the walls.

**Sealant Gun** – required to fill the control joints in the Hebel® PowerBlock™ Walls.
11.0 Fixings for use with Hebel®

### LIGHT DUTY UP TO 20 kg
Door bell, light fittings, taps

<table>
<thead>
<tr>
<th>Product</th>
<th>Diameter</th>
<th>Length</th>
<th>Max. Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coarse thread screw</td>
<td>10 - 12g</td>
<td>50mm</td>
<td>25kg</td>
</tr>
<tr>
<td>Mungo Nylon Plug - MN4</td>
<td>4mm</td>
<td>20mm</td>
<td>2kg</td>
</tr>
<tr>
<td>Hilti impact anchor - HPS-1</td>
<td>5mm</td>
<td>30mm</td>
<td>3kg</td>
</tr>
<tr>
<td>Mungo Nylon Plug - MN5</td>
<td>5mm</td>
<td>25mm</td>
<td>4kg</td>
</tr>
<tr>
<td>Hilti impact anchor - HPS-1</td>
<td>6mm</td>
<td>40mm</td>
<td>4kg</td>
</tr>
<tr>
<td>Ramset Ramplug - nylon</td>
<td>5mm</td>
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<td>5kg</td>
</tr>
<tr>
<td>Mungo Nylon Plug - MN6</td>
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<td>6kg</td>
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<td>6mm</td>
<td>50mm</td>
<td>6kg</td>
</tr>
<tr>
<td>Mungo Nylon Plug - MN7</td>
<td>7mm</td>
<td>35mm</td>
<td>7kg</td>
</tr>
<tr>
<td>Ramset Ramplug - nylon</td>
<td>6mm</td>
<td>30mm</td>
<td>8kg</td>
</tr>
<tr>
<td>Fischer - 4 expansion plug</td>
<td>8mm</td>
<td>40mm</td>
<td>9kg</td>
</tr>
<tr>
<td>Mungo Nylon Plug - MN8</td>
<td>8mm</td>
<td>40mm</td>
<td>9kg</td>
</tr>
<tr>
<td>Ramset Ramplug - nylon</td>
<td>7mm</td>
<td>35mm</td>
<td>12kg</td>
</tr>
<tr>
<td>Ramset Ramplug - nylon</td>
<td>8mm</td>
<td>30mm</td>
<td>16kg</td>
</tr>
<tr>
<td>Ramset Ramplug - long</td>
<td>6mm</td>
<td>55mm</td>
<td>16kg</td>
</tr>
<tr>
<td>Mungo Nylon Plug - MN10</td>
<td>10mm</td>
<td>50mm</td>
<td>20kg</td>
</tr>
<tr>
<td>Tox TFS-L fixings</td>
<td>6mm</td>
<td>50mm</td>
<td>20kg</td>
</tr>
</tbody>
</table>

### MEDIUM DUTY 20-50
Large light fittings

<table>
<thead>
<tr>
<th>Product</th>
<th>Diameter</th>
<th>Length</th>
<th>Max. Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ramset Ramplug - long</td>
<td>8mm</td>
<td>65mm</td>
<td>22kg</td>
</tr>
<tr>
<td>Ramset Ramplug - nylon</td>
<td>10mm</td>
<td>50mm</td>
<td>25kg</td>
</tr>
<tr>
<td>Fischer 4 expansion plug</td>
<td>10mm</td>
<td>50mm</td>
<td>25kg</td>
</tr>
<tr>
<td>Fischer twist plug GB</td>
<td>8mm</td>
<td>50mm</td>
<td>25kg</td>
</tr>
<tr>
<td>Fischer Universal Frame fix</td>
<td>10mm</td>
<td>50mm</td>
<td>25kg</td>
</tr>
<tr>
<td>Tox Metal claw plug</td>
<td>6mm</td>
<td>32mm</td>
<td>25kg</td>
</tr>
<tr>
<td>Ramset Ramplug - long</td>
<td>10mm</td>
<td>80mm</td>
<td>27kg</td>
</tr>
<tr>
<td>Ramset Ramplug - long</td>
<td>12mm</td>
<td>95mm</td>
<td>28kg</td>
</tr>
<tr>
<td>Powers Zip-it</td>
<td>6mm</td>
<td>30mm</td>
<td>28kg</td>
</tr>
<tr>
<td>Hilti Frame anchor - HRD-U</td>
<td>10mm</td>
<td>80mm</td>
<td>30kg</td>
</tr>
<tr>
<td>Hilti Frame anchor - HRD-U</td>
<td>10mm</td>
<td>100mm</td>
<td>30kg</td>
</tr>
<tr>
<td>Tox-VLF Frame fixings</td>
<td>6mm</td>
<td>70mm</td>
<td>30kg</td>
</tr>
<tr>
<td>Ramset Ramplug - nylon</td>
<td>12mm</td>
<td>60mm</td>
<td>35kg</td>
</tr>
<tr>
<td>Ramset Ramplug - long</td>
<td>12mm</td>
<td>95mm</td>
<td>35kg</td>
</tr>
<tr>
<td>Powers Zip-it</td>
<td>12mm</td>
<td>60mm</td>
<td>35kg</td>
</tr>
<tr>
<td>Tox Metal claw plug</td>
<td>8mm</td>
<td>55mm</td>
<td>40kg</td>
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<tr>
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<td>12mm</td>
<td>60mm</td>
<td>40kg</td>
</tr>
<tr>
<td>Fischer twist plug GB</td>
<td>10mm</td>
<td>55mm</td>
<td>40kg</td>
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<tr>
<td>Tox TFS-L fixings</td>
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<td>70mm</td>
<td>40kg</td>
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<tr>
<td>Tox-VLF Frame fixings</td>
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<td>100mm</td>
<td>40kg</td>
</tr>
<tr>
<td>Tox-VLF Frame fixings</td>
<td>8mm</td>
<td>135mm</td>
<td>40kg</td>
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</table>

### HEAVY DUTY 50kg - 120kg
Grab rails, hose reels

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<thead>
<tr>
<th>Product</th>
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<th>Length</th>
<th>Max. Load</th>
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</thead>
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<tr>
<td>Hilti-RE500 Injection adhesive</td>
<td>8mm</td>
<td>80mm</td>
<td>50kg</td>
</tr>
<tr>
<td>Fischer Turbo plug</td>
<td>8mm</td>
<td>50mm</td>
<td>58kg</td>
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<tr>
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<td>60kg</td>
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<tr>
<td>Hilti-RE500 Injection adhesive</td>
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<td>12mm</td>
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<td>110kg</td>
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<td>10mm</td>
<td>200mm</td>
<td>110kg</td>
</tr>
<tr>
<td>Ramset Injection Mortar</td>
<td>10mm</td>
<td>130mm</td>
<td>120kg</td>
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<tr>
<td>Tox-KD-DV Heavy D Toggle</td>
<td>10mm</td>
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<tr>
<td>Tox-KD-DV Heavy D Toggle</td>
<td>10mm</td>
<td>200mm</td>
<td>120kg</td>
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<tr>
<td>Fischer Injection Mortar</td>
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<tr>
<td>Fischer Injection Mortar</td>
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<td>80mm</td>
<td>125kg</td>
</tr>
<tr>
<td>Ramset Injection Mortar</td>
<td>12mm</td>
<td>160mm</td>
<td>125kg</td>
</tr>
</tbody>
</table>

For further information on fixings for Hebel®, refer to the Hebel® Fixing Guide, Section 8 in the Hebel® Technical Manual, available on the website: hebelaustralia.com.au
12.0 PowerBlock™ Handling

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

- Use mechanical aids, such as trolleys, forklifts, cranes and levers, or team lifting to move Hebel®.
- Keep the work place clean to reduce the risk of slips, trips and falls, which can cause injury.
- Plan the sequence of installation to minimise panel movements and avoid awkward lifts.
- Good lifting techniques to be adopted to minimise the risk of injury.

Mechanically Assisted Handling
Moving and handling Hebel® Floor Panels and Hebel® Lintels should be done using mechanical aids such as forklifts, cranes and special panel lifting trolleys. Different panel lift attachments are available for installing panels. For purchasing or hire of these devices please contact CSR Panel Systems.

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 products.

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

For further information contact CSR Panel Systems or visit the website: hebelaustralia.com.au

Fig. 12.1 Standard personal protection equipment.

Cutting
The use of power tools when cutting masonry 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 appropriate hearing protection. Refer to the appropriate Hebel® MSDS. For further information, contact CSR Panel Systems or visit the website: hebelaustralia.com.au

Reinforcement exposed during cutting is to be coated with a liberal application of Hebel® corrosion protection paint.

13.0 Delivery & Storage

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

It is good practice to inspect the delivery for damaged blocks. Unnecessary handling will increase the risk of damage to the Hebel® PowerBlocks.

Care should be taken when cutting the packaging straps, blocks may come away and cause injury or become damaged.  

TIP - When a block is damaged it may be possible to cut away the damaged section and use the remaining portion in the wall.

Storage
All materials must be kept dry and preferably stored undercover. Hebel® PowerBlocks should be left on their pallet until they are required. Place the pallet on a level and stable surface. The project engineer should be consulted as to the adequacy of the structure to support Hebel® PowerBlocks if they are not stored directly on the ground or concrete slab.
14.0 Construction Details (Typical)

Base of Wall

Fig 14.1 Hebel® PowerBlock™ work on Stiffened Raft Slab Edge Foundation (elevation)

Fig 14.2 Hebel® PowerBlock™ work showing infill block to slab rebate (elevation)

Fig 14.3 Internal Load Bearing Hebel® PowerBlock™ work on stiffened raft slab foundation (elevation)

Fig 14.4 Concrete PowerBlock™ Sub-Floor Detail (elevation)
Fig 14.5 Roof Top to Plate Fixing to Hebel® Wall - Strap (elevation) - for vaulted/cathedral roofs

Fig 14.6 Roof Top to Plate Fixing to Hebel® Wall - Strap (elevation) - for typical trussed roof

Fig 14.7 Strap Fixing to Hebel® Walls (isometric - typical trussed roof)
**Top of Wall**

**Fig 14.10 Internal Hebel® Load Bearing Wall and Timber Floor Frame Junction (elevation)**

- **90 x 45 nailing plate** (cont. along length of wall)
- **Approved fixing**
- **Load bearing Hebel® PowerBlock™ Wall (150mm min. thick)**
- **Floor joists, fixed to plate**
- **Wall finish as specified**

**Fig 14.12 Timber Truss/Joist Fixed to Hebel® Walls (elevation)**

- **Internal or external wall finish as specified**
- **M12 rod to engineer’s detail**
- **Hebel® PowerBlock™ Wall (250mm min. thick)**

**Fig 14.11 Truss Spanning Over Non-Load Bearing Hebel® Walls (elevation)**

- **Bracket with slotted holes**
- **Bottom chord of truss**
- **Clearance as advised by truss manufacturer**
- **Do not glue cornice in this location**
- **Non- loadbearing Hebel® PowerBlock™ Wall**
- **Internal finish as specified**
Fig 14.13 Tiled Roof Eve and Hebel® Wall Junction (elevation)

- Seasoned timber framed tiled roof
- Seasoned timber top plate fixed to wall
- Hebel® HighBuild™ and texture coat system
- Window
- Grout around steel lintel
- Internal wall finish as specified
- Steel lintel to engineer’s detail
- Ring beam
- Hold down fixing to engineer’s detail
- Ceiling insulation

Note: Position of top plate and type of hold down to engineer’s detail

Fig 14.14 Vaulted Ceiling & Roof Top Plate Fixing To Hebel® Wall (elevation)

- 90 x 45 timber top plate
- Bond beam to engineer’s specification
- External Hebel® PowerBlock™ Wall (250mm min thick)
- Threaded rod reinforcement to be full wall height in length. Fully coupled with footing starter bars

Note:
- Bond beam to be continuous around area with vaulted ceiling
- Fixing, rod size & spacing as detailed by engineer
Wall Junctions

Fig 14.15  External Wall and Internal Partition Wall Junction (plan)

Hebel® Highbuild™
and texture coat system

Control joint tie every third course

Internal Hebel®
Partition Wall

Internal wall finish as specified

Backing rod & polyurethane sealant, installed to manufacturer’s specification

External Hebel®
PowerBlock™
Wall (250mm thick)

Fig 14.16  External Corner with Control Joint (plan)

Control joint tie every third course

Hebel® HighBuild™
and texture coat system

Backing rod & polyurethane sealant, installed to manufacturer’s specification

External Hebel®
Bracing Wall

10mm min.
Control Joints

Fig 14.17 Control Joint detail (elevation)

Control joint tie - place with crimp upwards to avoid filling with adhesive and dust, etc.

Control joint tie bedded into Hebel® Adhesive

SECTION A-A

10mm wide control joint

Hebel® Highbuild

Acrylic texture body coat

Foam backing rod

Sealant flush with finish coat

Finish coat
Control joints every third course max.

Terminates bond beam 200mm embedment typ.

Backings rod & sealant

Control joint tie at every third course max.

Wall lining

10mm min.

Fig 14.18 Typical Bond Beam Control Joint - elevation

Fig 14.19 Typical Control Joint - plan

250mm Hebel® PowerBlock™ wall

Hebel® Mortar

DPC Slip Joint

Terminates ring beam 200mm embedment typ.

Fig 14.20 Typical Ring Beam Control Joint - elevation
Control joint tie at every third course

Hebel® PowerBlock™ work

Typical Movement Joint Detail (elevation)

Hebel® PowerBlock™ work

Typical Movement Joint Detail (plan)

Control joint inside

10mm min.

Hebel® HighBuild™ and texture coat system

Backer rod & polyurethane sealant, installed to manufacturer’s specification

5mm min. clearance to blockwork

10mm min. at control joint

RHS/SHS Column

Fig 14.21 Hebel® PowerBlock™ work Typical Movement Joint Detail (elevation)

Fig 14.22 Hebel® PowerBlock™ work
Typical Movement Joint Detail (plan)

Fig 14.23 Built-in Column Detail (plan)

Fig 14.24 Built-in Column Detail (elevation)
Floors

Fig 14.25 Non-Load Bearing Hebel® PowerBlock™ Wall and Hebel® Floor Panel Detail (elevation)

Fig 14.26 Loadbearing Hebel® PowerBlock™ Wall and Floor Panel Junction Detail (elevation)

Fig 14.27 Loadbearing Hebel® PowerBlock™ Wall and Timber Floor Frame Junction Detail (elevation)
Fig 14.28 Timber Floor Support Detail (elevation)

- Loadbearing Hebel® PowerBlock™ wall (250mm min. thick)
- Blocking as required
- 10-20mm gap to be kept clear of debris
- 20mm strap to restrain plate
- 90x45 kiln dried timber plate x150 long
- Ring beam
- 250

Fig 14.29 Hebel® Flooring Panels using Ring Anchor Construction on Load Bearing Interior Wall (elevation)

- Hebel® PowerBlocks
- 150mm Min.
- 450 or 600 Typ.
- 40mm Min.
- Tie Rods to engineers details
- Loadbearing internal Hebel® PowerBlock™ Wall
- Hebel® Floor Panel
- N12 Ring Anchor continuous over support, reinforcement and grout to specifications
- 10mm clearance at each end of bearing plate
NOTE: Refer to section 7.12 of the Hebel® Technical Manual for the full set of Details on the Floor Panel System.
Fig 14.33 Balcony Detail (elevation)

- **External Hebel® PowerBlock™ Wall** (250mm min. thick)
- **Compressible filler**
- **Flexible waterproof membrane**
- **Ceramic tiles on mortar**
- **Hebel® Floor Panels**
- **Internal wall lining as specified**
- **Hebel® Mortar**
- **Ableflex filler**
- **Ring anchor (N12)**
- **40mm min. (edge only)**
- **50mm min. (edge only)**

Fig 14.34 Deck Connection Detail (side elevation)

- **10-20mm gap**
- **Flashing**
- **Fixing and spacing to engineers documentation**
- **Waling plate**
- **Waterproof membrane**

Fig 14.35 Deck Connection Detail (front elevation)

- **Waterproof membrane**
- **Fixing and spacing to engineers documentation**
- **Waling plate**
- **Joists**
- **Flashing**
Stairs

Fig 14.36  Stairwell (isometric)

Hebel® infill PowerBlock™ glued to wall supporting treads

Hebel® stair treads

Hebel® PowerBlocks

Fig 14.37  Stair Tread Set-Out (isometric)

Fig 14.38  200mm wide x 50mm thick Hebel® PowerBlocks adhered to walls on their ends to provide support for treads (isometric)
Openings

Fig 14.39 Steel Door Frame (Internal or External) to Hebel® Wall Fixing (plan)

- Hebel® PowerBlock™ Wall
- Wall finish as specified
- Flowable non shrink grout poured between blockwall and door frame
- Ties to be set flush in blockwork joint
- Steel door frame

Note: Refer to door frame manufacturer for construction detail

Fig 14.40 Steel Door Frame (Internal or External) to Hebel® Wall Fixing (plan)

- Hebel® PowerBlock™ Wall
- Wall finish as specified
- Flowable non shrink grout poured between blockwall and door frame
- Fixing @ 600mm CTS. max.
- Check requirements and type with door manufacturer
- Steel door frame

Note: Refer to door frame manufacturer for construction detail

Fig 14.41 Timber Door Frame (External) to Hebel® Wall Fixing (plan)

- External Hebel® PowerBlock™ Wall (250 min. thick)
- Hebel® HighBuild™ and texture coat system
- Storm mould
- Timber door jamb nail to ply
- 12mm ply packer glued & screwed to blockwork
- Architrave
- Wall finish as specified
- 14-10 x 100mm bugle head course threaded screw

Note: Refer to door frame manufacturer for construction detail
Fig 14.42 Timber Door Frame (Internal) to Hebel® Wall Fixing (plan)

Wall finish as specified
Timber door jamb nail to ply
12mm ply packer glued & screwed to blockwork

Fig 14.43 Aluminium Window Frame - Window Sill Detail (elevation)

>15°
Waterproof membrane
Hebel® HighBuild™ and texture coat system

Fig 14.44 Aluminium Window Frame - Window Jamb Detail (elevation)

Internal wall finish as specified
Sealant to manufacturer’s detail compatible with waterproof membrane

Hebel® HighBuild™ and texture coat system
**Fig 14.46 lintel installation**

(a) Elevation

- **Min. bearing length:** 150mm or span/8
- **Hebel® Lintel**
- **Hebel® PowerBlocks over Hebel® PowerBlocks wall**
- **Lintel must bear on full blocks**

(b) Section

- **Wall thickness**
- **Hebel® PowerBlock™ wall**
- **Grout around steel lintel**
- **T-bar lintel**

---

**Fig 14.45 Aluminium Window Frame - Window Head Detail (elevation)**

- **Hebel® HighBuild and Texture coat system**
- **Internal wall finish as specified**
- **Sealant to manufacturer’s detail**
- **Drip groove**
- **Window frame**
- **Glazing**

---

**Hebel® PowerBlock™ Design and Installation Guide**

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15.0 Construction Details - Tie-down

Required only if specified by design / project engineer

Table 15.1 Top-Plate & Hold-Down selection

<table>
<thead>
<tr>
<th>Wind Classification</th>
<th>Top Plate &amp; Hold-Down</th>
<th>Tile Roof</th>
<th>Sheet Roof</th>
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<tbody>
<tr>
<td>N1</td>
<td>A / B / C</td>
<td>B / C</td>
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<tr>
<td>N2</td>
<td>A / B / C</td>
<td>D / F</td>
<td></td>
</tr>
<tr>
<td>N3</td>
<td>D / F</td>
<td>D / F</td>
<td></td>
</tr>
<tr>
<td>N4</td>
<td>D / F</td>
<td>D / F</td>
<td></td>
</tr>
<tr>
<td>N5</td>
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</tr>
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<td>N6</td>
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<td>E / G</td>
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<tr>
<td>C1</td>
<td>D / F</td>
<td>D / F</td>
<td></td>
</tr>
<tr>
<td>C2</td>
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</tr>
<tr>
<td>C4</td>
<td>G</td>
<td>G</td>
<td></td>
</tr>
</tbody>
</table>

Legend

A  90x45 F7 timber top plate / 700mm deep strap @ 1200mm ctrs.
B  90x45 F17 timber top plate / 1700mm deep strap @ 2400mm ctrs.
C  90x45 F17 timber top plate / Ø12mm rod @ 2400mm ctrs.
D  90x45 F17 timber top plate / Ø12mm rod @ 1200mm ctrs.
E  90x45 F17 timber top plate / Ø12mm rod @ 900mm ctrs.
F  100x50x3.0 RHS top plate / Ø12mm rod @ 2400mm ctrs.
G  100x50x3.0 RHS top plate / Ø12mm rod @ 1200mm ctrs.

Tie down rods/engineering restraints must be embedded into the footing and pass up through the sub floor and into the Hebel PowerBlock work.
Table 15.2 provides ultimate racking capacities of reinforced 150mm and 250mm Hebel® PowerBlock™ walls. The reinforcement is N12 bar or 12mm threaded rod at nominal 1000mm centres. The reinforcement must be tied to the footings and wall top plate through the bond beam.

Walls resisting racking forces should be evenly distributed within a house and spaced at a maximum of 8.0m. Ceiling and floor diaphragms must be adequately tied to walls to ensure transfer of forces through to the footings.

For more information about bracing, refer to Section 6.11 of the Hebel® Technical Manual.

**Top Plate Hold-Down**

Two tie-down methods are provided in this design guide.

1. Strap – 30x0.8mm cut into inside face of external wall min. 700mm deep.
2. 12mm threaded rod continuous from footing through bond beam to top plate.

Three top plates options are provided in this design guide:

1. 90x45 F7 timber
2. 90x45 F17 timber
3. 100x50x3.0 RHS

The type of hold-down method and spacing depends on the top plate, roof type/span, and wind classification. Refer to Table 15.1 for specifications. For high wind areas, the bracing design is likely to require tie-down rods which will drive that as the hold-down method.

<table>
<thead>
<tr>
<th>Wall Length (mm)</th>
<th>Min. No. of N12 Bars</th>
<th>Ultimate Racking Capacity (kN)</th>
</tr>
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<tr>
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<td>150mm PowerBlock™</td>
</tr>
<tr>
<td>900</td>
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<td>1200</td>
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<td>4800</td>
<td>6</td>
<td>54</td>
</tr>
<tr>
<td>6000</td>
<td>7</td>
<td>63</td>
</tr>
</tbody>
</table>
**Base of Wall**

Fig 15.6 Hebel® PowerBlock™ work on Stiffened Raft Slab Edge Foundation (elevation)

- **Internal lining as specified**
- **Top Plate**
- **Tie down rod**
- **Slab & footing to engineer’s details**
- **10mm max. overhang**
- **DPC & Hebel® Mortar**
- **75mm min.**
- **External Hebel® PowerBlock™ Wall (250mm min. thick)**
- **Internal lining as specified**
- **200mm**
- **External coating as specified**

---

**Fig 15.7 Concrete PowerBlock™ Sub-Floor Detail (elevation)**

- **Powerfloor™**
- **Bearer**
- **Joint as per engineer’s detail**
- **Ant cap + DPC slip joint**
- **Concrete Blocks**
- **Tie down rod 150mm min. embedment**
- **Engaged pier concrete blockwork**
- **Strip footing to engineer’s details**
- **Ant cap + DPC slip joint**
Fig 15.8 Double Brick Sub-Floor Detail (elevation)

- Powerfloor™ Joist
- Ant cap + DPC slip joint
- Brick engaged pier
- Tie down rod
- Strip footing to engineer’s details

Fig 15.9 Ring Beam Internal Non-Loadbearing Wall (elevation) (No tie down - as specified by design engineer)

- N1/2 bar located centrally
- Hebel® PowerBlock™ wall
- 100 min

Top of Wall

Fig 15.10 Roof Top Plate Fixing to Hebel® Wall - Tie-Down Rod (elevation)

- Fixing as specified
- 90 x 45 timber top plate
- Threaded rod reinforcement to be full wall height in length, fully coupled with footing starter bars.

Fig 15.11 Internal Hebel® Load Bearing Wall and Timber Floor Frame Junction (elevation)

- Floor joists, fixed to plate
- 90 x 45 nailing plate (cont. along length of wall)
- Tie down rod
- Load bearing Hebel® PowerBlock™ Wall (150mm min. thick)
- Wall finish as specified

Note: Fixing, rod size & spacing as detailed by engineer
Wall Junctions

Fig 15.12 External Wall and Internal Partition Wall Junction (plan)

External Hebel® PowerBlock™ Wall (250mm thick)

Internal Hebel® Partition Wall

10mm min. Control joint tie every third course

Backing rod & polyurethane sealant, installed to manufacturer’s specification

Internal wall finish as specified

Hebel® Highbuild™ and texture coat system

Fig 15.13 External Corner with Control Joint (plan)

Hebel® Highbuild™ and texture coat system

Control joint tie every third course

Back ing rod & polyurethane sealant, installed to manufacturer’s specification
**Control Joints**

Fig 15.14 Control Joint detail (elevation)

Control joint tie - place with crimp upwards to avoid filling with adhesive and dust, etc.

Control joint tie bedded into Hebel® Adhesive

10mm wide control joint

Hebel® Highbuild

Acrylic texture

body coat

Finish coat

Foam backing rod

Sealant flush with finish coat
Fig 15.15 Typical Bond Beam Control Joint - elevation
(Location where no tie down required - as specified by engineer)

Control joints every third course max.
Terminates bond beam 200mm embedment typ.

250mm Hebel® PowerBlock™ wall
Hebel® Mortar
DPC Slip Joint

Fig 15.16 Typical Ring Beam Control Joint - elevation
(Location where no tie down required - as specified by engineer)

Control joints every third course max.
Terminates ring beam 200mm embedment typ.

250mm Hebel® PowerBlock™ wall
Hebel® Mortar
DPC Slip Joint

Fig 15.17 Typical Control Joint - plan

Backing rod & sealant
Control joint tie at every third course max.
Wall lining

Hebel® PowerBlock™ Design and Installation Guide
Control joint tie at every third course 10mm min.

Expression joint in wall lining

Control joint inside

Hebel® HighBuild™ acrylic texture coating system

Backing rod & polyurethane sealant, installed to manufacturer’s specification

Fig 15.18 Hebel® PowerBlock™ work Typical Movement Joint Detail (elevation)

Fig 15.19 Hebel® PowerBlock™ work Typical Movement Joint Detail (plan)

Fig 15.20 Built-in Column Detail (plan)

Fig 15.21 Built-in Column Detail (elevation)

PLEASE NOTE:
For all other design details (eg. door, window, floor panels) please follow the previous construction details in Section 14.0)
Appendix A - Carpet Installation

Panel Surface Preparation

Sweep the floor surface to remove debris and loose particles. Expose all surface blemishes such as chips, cracks, gaps, ridges or the like. Fill all unacceptable locations with an appropriate and compatible patching compound such as Hebel® Patch or levelling compound as required. Ensure panels are then dry.

Table A.1 - Carpet Smooth Edge Fixings

<table>
<thead>
<tr>
<th>Fixing Type</th>
<th>Description</th>
<th>Application Method</th>
<th>Installation Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twist Nails</td>
<td>51mm dome head twist nail</td>
<td>Coil Nail Gun (Refer to Fig A.1)</td>
<td>The head of the twist nail should finish flush with the surface of the gripper strip</td>
</tr>
<tr>
<td>Screws</td>
<td>Type 17 point - course thread No. 8g x 50mm</td>
<td>Makita 6834 Auto Feed Screwdriver</td>
<td>The head of the twist nail should finish flush with the surface of the carpet gripper strip</td>
</tr>
<tr>
<td></td>
<td>- Countersinking screw</td>
<td>(Refer to Fig A.2)</td>
<td></td>
</tr>
<tr>
<td>Screws</td>
<td>Type 17 point-Trimhead deck Screw. 4.2 x 50mm 4.2 x 65mm</td>
<td>Quickdrive auto feed</td>
<td>The head of the screw should be flush with the smooth edge</td>
</tr>
</tbody>
</table>

Carpet Smooth Edge Installation

Installation of Carpet Smooth Edge (Gripper) is to be in accordance with AS/NZS 2455.1:1995.

Installation of carpet gripper prior to laying carpet requires the use of specifically selected nails or course threaded screws. Standard fixings supplied with the carpet gripper are not suitable for fixing to Hebel® PowerFloor™ panels. Carpet gripper strips are available without factory supplied nails. For carpet gripper installation near the panel edge, only glue is recommended. If relying on glue only, the carpet can not be stretched until the glue is set after approximately 24 hours.

Fig A.1 Fig A.2

Underlay Installation

Minimum medium duty underlay is to be used. No other special requirements.

Carpet Installation

As per carpet manufacturer’s guidelines. No other special requirements.
Health and safety
Information on any known health risks of our products and how to handle them safely is on product packaging and / or the accompanying documentation.

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

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

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

Disclaimer
Information presented in this document is supplied in good faith and to the best of our knowledge was accurate at the time of preparation. The provision of this information should not be construed as a recommendation to use any of our products in violation of any patent rights or in breach of any statute or regulation. Users are advised to make their own determination as to the suitability of this information in relation to their particular purpose or specific circumstances. Since the information contained in this document may be applied under conditions beyond our control, no responsibility can be accepted by CSR, or its staff for any loss or damage caused by any person acting or refraining from action as a result of misuse of this information.

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

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

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

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

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

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