Brick Veneer
Technical Guide

NORTH ISLAND & SOUTH ISLAND
The brick and supporting construction referred to in this section is to follow the requirements of New Zealand Building Code Section E2/AS1. The following standards are referenced in that section: NZS 3604 Timber Framed Buildings. NZS 4210 Masonry Construction: Materials and Workmanship. Additionally, the provisions of this section may be applied when used in conjunction with construction to NZS 4229, Concrete Masonry Buildings Not Requiring Specific Design. If the scope of the proposed work is outside the limitations and requirements of the above then specific engineering design advice must be sought.
Disclaimer: Please keep in mind when choosing Firth concrete products, the beauty and appeal of concrete means there will be natural variation in colours. Colours may vary from batch to batch, and regionally as materials are natural and sourced locally. We advise viewing a current product sample before making your final decision, please contact your local Firth office and they will be happy to assist.
CLEAR SEALING

FIRTH RECOMMEND SEALING THE BRICKS TO REDUCE POTENTIAL EFFLORESCENCE AS SOON AS PRACTICAL RATHER THAN AFTER THE PROJECT IS COMPLETED. ALTHOUGH WEATHERTIGHTNESS IS NOT A COMPLIANCE REQUIREMENT, SUITABLE PRODUCTS SHOULD BE SELECTED TO PRE-CLEAN THE SURFACE, MINIMISE EFFLORESCENCE, PROVIDE A BARRIER TO ALGAL GROWTH OR GRAFFITI AND GIVE A ‘WET-LOOK’ TO THE BRICK SURFACE IF DESIRED. REFER TO THE SEALER MANUFACTURER’S INSTRUCTIONS FOR PRODUCT AND APPLICATION INFORMATION.

DRICON® CONCRETE TREATMENT (CT)
EFFLORESCENCE REMOVAL & GENERAL CONCRETE CLEANER FOR CONCRETE PAVERS, BRICK, DECORATIVE CONCRETE.

• Water soluble for easy, residue free rinsing
• No acid fumes - can be used indoors and outdoors without special breathing equipment
• No corrosion or rusting of most metals in surrounding environment
• Non aggressive to skin & metals
• Significantly less corrosive to steel and aluminium compared to hydrochloric acid
• On-demand technology - Dricon® CT only becomes active when exposed to the target surface (concrete) unlike normal acids that release all their available activity immediately and indiscriminately

AVAILABLE IN 1L / 5L / 20L

APPLICATIONS:

LIGHT: Removal of powdery dust and fines from new concrete / General etching (‘acid washing’) prior to sealing bricks and concrete
MEDIUM: Restoring decorative concrete, bricks & plaster work / Removing powdery efflorescence
HEAVY: Removing built up efflorescence / Cleaning concrete tools, pumps and mixers / Removing concrete, plaster and mortar build up

CONCENTRATION:

LIGHT: Use between 10 to 20 parts water to 1 part Dricon® CT. Wet the substrate prior to applying
MEDIUM: Use 4 parts water to 1 part Dricon® CT. Wet the substrate prior to applying
HEAVY: Use undiluted. Substrate, tools or build up should be dry prior to applying

* When cleaning anodized aluminium framed windows, mask off the aluminium or rinse any run-off/overspray immediately.

EFFLORESCENCE BEFORE

EFFLORESCENCE AFTER
MORTAR

ON SITE MIX RATIO IS THREE BUCKETS OF SAND TO ONE BUCKET OF CEMENT. REMEMBER YOU MAY BE CALLED UPON TO VERIFY YOUR SITE MIX STRENGTH SO CYLINDERS SHOULD BE TAKEN AT REGULAR INTERVALS.

The minimum requirement for Firth brick veneers is 12.5MPa. The volume of water, additives, and mixing time, all need to be consistent to achieve a quality mortar of an even colour. If the temperature exceeds 27 degrees Celsius, ensure the bricks are kept damp for the first 24 hours to prevent rapid loss of moisture. Discard any mortar which is over 1.5 hours old, in summer; and for temperatures below 5 degrees Celsius discard after 2 hrs old. Avoid re-tempering mortar with water. NZS4210 sect 2.2.2.2 (e).

The correct time to tool a mortar joint is when a clear thumb print can be made on the surface. If joints are not tooled at the same moisture content they will vary in colour. Dricon bagged mortar is recommended for quality control to ensure compliance with the code. Refer to Firth’s “Designer Brick” brochure for available colours. Firth’s Masonry Veneers Planner is an online tool to help you choose your size of brick and match it with your choice of coloured mortar. Visit firth.co.nz for more.

MORTAR JOINTS

GROOVED JOINT
Also known as Concaved or rolled. This type of joint is formed by using a curved steel jointing tool. Its recessed profile and tight seal mean that it is very effective at resisting moisture penetration. This type of joint can be good for hiding small irregularities. Should be tooled to a maximum depth of 6mm after initial stiffening has occurred.

RAKED JOINT
For this type of joint the mortar is raked out and once pointed and tooled shall not exceed a maximum depth of 6mm. It is important to compact the mortar to improve its weather tight performance, this design creates a form of ledge where water can pool and therefore should only be used for internal walls. Not recommended for exterior walls.

FLUSH JOINT
Firth does not recommend the use of flush joints unless they are compacted. If the mortar is flush jointed and not compacted it can lead to the following issues:
• When brick veneer is to be honed, the mortar can ‘flick’ out with honing process.
• When brick veneer is to be plastered it can lead to hairline cracking in the plaster where the outline of the brick can be seen.

DRICON® ARCHITECTURAL MORTAR
Architectural Mortar is an ideal spreadable and workable mortar for use with Masonry, Bricks and Stone.
• Available in 3 colours
• Strength of 12.5MPa after 28 days
• Minimises on site waste
• Consistent colour & strength throughout the job
• Endorsed by BBFNZ
• Meets NZS 4210 Masonry Construction: Materials and Workmanship
• Made to order

DRICON® COLOURED MORTARS
Coloured Mortar is an ideal spreadable and workable mortar for all types of masonry, brick and stone work.
• Available in 15 colours
• Strength of 12.5MPa after 28 days
• Minimises on site waste
• Consistent colour & strength throughout the job
• Endorsed by BBFNZ
• Meets NZS 4210 Masonry Construction: Materials and Workmanship

<table>
<thead>
<tr>
<th>Bricks</th>
<th>Notes</th>
<th>Size (W x H x D)</th>
<th># Bricks Per m2</th>
<th>Bricks per 30kg Bag</th>
</tr>
</thead>
</table>
| MASONRY
H10.01 block veneer | Cored | 390 x 90 x 90 | 25 | 24 – 30 |
10.01 block veneer | Cored | 390 x 190 x 90 | 12.5 | 18 – 24 |
FIRTH
Devonstone® 70 series/Cored | 290 x 160 x 70 | 19.6 | 40 – 46 |
Manorstone® 90 series/Cored | 390 x 190 x 90 | 12.5 | 18 – 24 |
Focus® Brick & Pioneer Solids | 230 x 90 x 75 | 42.0 | 33 – 38 |
Strata | 290 x 75 x 70 | 39 | 35 – 42 |
JOINT TYPES

Figure 1 shows some of the tooling details commonly practiced. Some are not recommended for external application because of their poorer weatherproofing properties, but this will be of lesser significance where cavity protects the inner wall.

Because of the positive barrier to ingress of moisture, any of the joint details illustrated in Figure 1 may be applied to external cavity or brick veneer walls without risk to inside finishes.

Of the details shown, types A, B and C are suitable for internal or external use. Raked and extruded joints should not be used externally except in cavity or brick veneer construction. Raked joints will also accentuate the normal horizontal rough edge on brick veneer blocks and increase the potential for efflorescence to present.

The flush joint is recommended only for walls which receive a later applied finish or coating.

The joints A, B and C, should only be tooled to a maximum depth of 6mm after initial stiffening has occurred. The delaying of the tooing operation is vital if a tight weatherproof joint is to be produced in horizontal and, particularly, vertical joints.


Figure 2 illustrates in an exaggerated way what is happening in the joint and how tooing gives an improved weather tightness. The whole matter of the tooling of external joints is of paramount importance and strict attention to delaying the operation after initial set of the mortar must be given.

LAYING OPTIONS

STACK BOND IS OUTSIDE THE SCOPE OF NZS4229 & NZS 3604 AND THEREFORE REQUIRES SPECIFIC ENGINEERING DESIGN.

STACK BOND

For stack bond applications a guide for 10series and Manorstone® is available from the New Zealand Concrete Masonry Association website under the Masonry Manual/ Veneers/Veneer - Stack bond. www.nzcma.org.nz

Studs in timber framed walls to be at 400mm centres. Wall ties, to the requirements of NZS 4210, are to be provided at 400mm centres both vertically and horizontally.

Lattice mesh shall be laid continuously in horizontal courses at 800mm maximum vertical centres, commencing no higher than the second course above the brick veneer base.

Lattice mesh shall also be laid in the course directly above and below openings, extending a minimum 800mm past the edge of the opening.

Lap joins in lattice mesh shall be made at midlength of 390mm block units and shall be staggered so that adjacent laps do not occur within the same vertical block stack. Lattice mesh may be discontinued only at control joints.

Use purpose made ‘L’ formed lattice mesh at corner intersections.

Not permitted for Focus Bricks.
LAYING OPTIONS CONT.

LATTICE MESH SHALL BE EAGLE WIRE BRICKLOCK, OR EQUIVALENT, AND COMPLY WITH THE FOLLOWING REQUIREMENTS:

Comprise 2 parallel longitudinal steel rods of minimum 4mm diameter, held apart approximately 55mm on centre by welded cross wires of 2mm diameter, at 200mm centres.

Steel shall have a minimum yield strength of 300 MPa and be hot dip galvanised to minimum 470gm/m2. Mesh to be supplied and installed in minimum 2m length modules, lapped to detail shown in figure below.

Steel shall have a minimum yield strength of 300 MPa and be hot dip galvanised to minimum 470gm/m2. Mesh to be supplied and installed in minimum 2m length modules, lapped to detail shown in figure below.


Note: For a narrower brick use appropriate lattice mesh to get cover

BEDDING DETAILS

LATTICE MESH LAP DETAIL

LATTICE MESH

WALL TIE
WALL TIES / ZONING GUIDE

Wall ties and screws shall be determined by the durability zone outlined in NZS 3604 and as outlined in E2/AS1 table 18A and 18C.

<table>
<thead>
<tr>
<th>ZONE</th>
<th>316, 316L, or 304 stainless steel</th>
<th>470 g/m² galvanising on mild steel</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZONE B</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>ZONE C</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>ZONE D &amp; E</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

Note - Zone D includes all offshore Islands, the area within 500m of the coastline of New Zealand, and those areas shown in white. The map shall be read in conjunction with NZS 3604 section NZS 3604: 4.2.2.
### TABLE 18A
**SPECIFICATION OF MAXIMUM TIE SPACINGS FOR TYPE B (4) BRICK VENEER TIES**
**PARAGRAPH 9.2.7**

<table>
<thead>
<tr>
<th>SEISMIC ZONE</th>
<th>MASONRY BRICK VENEER LESS THAN 180 KG/M²</th>
<th>MASONRY BRICK VENEER 180-220 KG/M²</th>
<th>MASONRY BRICK VENEER MORE THAN 220 KG/M²</th>
</tr>
</thead>
<tbody>
<tr>
<td>REFER NZS 3604</td>
<td>TIE TYPE (4)(5) MAXIMUM SPACINGS (1) HORIZONTAL VERTICAL</td>
<td>TIE TYPE (4)(5) MAXIMUM SPACINGS (1) HORIZONTAL VERTICAL</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>EL 600 400</td>
<td>EM 600 400</td>
<td>SED (2)</td>
</tr>
<tr>
<td>2 (6)</td>
<td>EM 600 400</td>
<td>EH (3) 600 400</td>
<td>SED (2)</td>
</tr>
<tr>
<td>3</td>
<td>EH (3) 600 400</td>
<td>EH (3) 600 400</td>
<td>SED (2)</td>
</tr>
<tr>
<td>4</td>
<td>SED (2) SED (2) SED (2)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTES:**
1. Maximum masonry tie spacings of 600mm horizontally and 400mm vertically.
2. Spacing of ties to be determined by specific engineering design (SED).
3. EM may be used if the horizontal spacings do not exceed 400mm and the vertical spacings to not exceed 300mm.
4. Type B and Prefix E indicate masonry ties manufactured to AS/NZS 2699.1.
5. L (Light), M (Medium), H (High) indicate strength capability of ties in AS/NZS 2699.1.
6. Use seismic zone 2 (minimum) for Christchurch region comprising Christchurch City, Waimakariri District and Selwyn District.

Reference: Acceptable Solution E2/AS1

**COMMENTS**
Variations in cavity width will require compensating adjustments to the length of masonry tie used.
Refer to Brick Weights and Weather Step Dimensions table on page 14.

---

### 2.7.3 CLASSIFICATION OF TYPE B TIES

Brick veneer ties for use in seismic areas shall be classified in accordance with their characteristic strength and stiffness as shown in Table 2.

The classification is as follows:
(a) Earthquake light duty (EL).
(b) Earthquake medium duty (EM).
(c) Earthquake heavy duty (EH).

**TABLE 2**
**TYPE B BRICK VENEER TIES (FLEXIBLE OR NON-FLEXIBLE)**

<table>
<thead>
<tr>
<th>CLASSIFICATION FOR SEISMIC BRICK TIE</th>
<th>MINIMUM CHARACTERISTIC AXIAL STIFFNESS KN/MM</th>
<th>MINIMUM CHARACTERISTIC AXIAL STRENGTH (AT THE END OF 4TH, 10 MM TENSION CYCLE) KN</th>
<th>MINIMUM CHARACTERISTIC RESIDUAL STRENGTH (AT END OF 15 MM CYCLE) KN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light duty (EL)</td>
<td>0.150</td>
<td>0.500</td>
<td>0.350</td>
</tr>
<tr>
<td>Medium duty (EM)</td>
<td>0.175</td>
<td>0.750</td>
<td>0.550</td>
</tr>
<tr>
<td>Heavy duty (EH)</td>
<td>0.200</td>
<td>1.500</td>
<td>1.100</td>
</tr>
</tbody>
</table>

**NOTE:** Type B non-flexible brick veneer ties are known as ‘standard ties’ in New Zealand.

Reference AS/NZS 2699.1
WALL TIES - 9.2.7

Brick veneer shall be attached to wall framing by wall ties. Wall ties and their spacings and embedment shall be in accordance with the requirements of NZS 4210 and E2/AS1 Tables 18A, 18B and 18C. Screw fixings shall be minimum 12 gauge, 35mm long hex washer face, galvanised or stainless steel to suit the ties required under Table 18C.

TABLE 18B PLACEMENT OF WALL TIES
PARAGRAPH 9.2.5 AND 9.2.7

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>PLACEMENT OF MASONRY TIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unsupported panel sides and edges of openings</td>
<td>Within 300mm of panel side or edge</td>
</tr>
<tr>
<td>Top of brick veneer panels and top of panels under openings</td>
<td>Within 300mm or two courses (whichever is the smaller) of top of brick</td>
</tr>
<tr>
<td>Bottom of brick veneer panel in masonry rebate sealed with liquid applied damp-proof course</td>
<td>Within 300mm or two courses (whichever is the smaller) from bottom of brick</td>
</tr>
<tr>
<td>Bottom of brick veneer panel supported on steel angle lintel</td>
<td>In each of the first two courses</td>
</tr>
<tr>
<td>Bottom of brick veneer panel in masonry rebate with membrane damp-proof course</td>
<td>In each of the first two courses</td>
</tr>
</tbody>
</table>

NOTES: Ties are to be screw fixed (ie. non-impact method) using screws outlined in Table 24.

Reference: Acceptable Solutions E2/AS1 External Moisture

The tie length is governed by the cavity width and the width of the brick veneer being laid. The tie when fixed should extend to a minimum of half way across the width of the brick but also have a minimum cover of 15mm to the outside. The tie should also have a 5 degree downslope from the frame. Ties should also be positioned within 300mm of openings.
**THE BRICK CAVITY**

The minimum cavity width is 40mm and the maximum is 75mm – (E2/AS1 Fig 73D and section 9.2.6 Cavities). It’s important to maintain the minimum cavity width of 40mm after allowing for construction tolerances and thickness of wall underlays and sheet bracing. E2/AS1 allows for a maximum overhang of 20mm. Mortar should not encroach into the cavity more than 5mm (NZS4210).

**FIGURE 73D**

**MASONRY BRICK VENEER DETAILS**

- Turn-up flashing tape 100 mm min. against trimmer studs
- Packer to suit Air seal
- Floor finishes
- Frame block
- Sill tray to Paragraph 9.1.10.5 c) with 8 mm min. upstand and sloped end dam
- Flashing to extend back past last line of aluminium profile
- Refer 9.1.3 for ground clearance dimensions
- Masonry brick veneer
- Masonry brick veneer wall ties
- Drainage/vent openings
- 100 mm min. to paved ground, 150 mm min. to unpaved ground
- 25 mm min. to paved ground, 100 mm min. to unpaved ground
- 0 - 20 mm overhang

**Reference:** Acceptable Solutions E2/AS1 External Moisture
Masonry brick veneer

Masonry brick veneer wall ties
Refer Table 18B

100 mm min. to paved ground,
150 mm min. to unpaved ground

25 mm min. to paved ground,
100 mm min. to unpaved ground

DPC between timber
and concrete

Concrete nib

Damp proof course

Masonry block course

Overhang

Drainage/ vent openings

Waterproof membrane

Building underlay

Masonry brick veneer

Masonry brick veneer wall ties
above membrane DPC -
Refer Table 18B

FIGURE 73D CONT.

(j) MASONRY BRICK VENEER - MASONRY BELOW GROUND

FIGURE 73E

(k) MASONRY BRICK VENEER - ABOVE GROUND SUPPORT

Reference: Acceptable Solutions E2/AS1 External Moisture
WEATHER STEP/SLAB RECESS

The minimum depth of the rebate is 50mm (E2/AS1 Fig 73D) however it's common to see the depths specified at 100mm for added safety to prevent the ingress of moisture. A sloping concrete or mortar fillet at the base of the cavity to direct water to the outside prior to water proofing is good practice.

The code requires this rebate to have a damp proof course. (E2/AS1 section 9.2.5 Foundation Support and Damp Proofing.)

DAMP PROOFING MATERIAL SHALL BE EITHER

REBATES LOWER THAN GROUND FLOOR LEVEL:
• Two coats of bituminous liquid, or
• 1mm of butyl rubber or bituminous sheet, or
• 0.25mm polythene or polyethylene damp proof membrane.

FOR REBATES ABOVE GROUND LEVEL:
• 1mm of butyl rubber or bituminous sheet, or
• 0.25mm polythene or polyethylene damp proof membrane.

Lap joints in flashings minimum of 150mm.

BRICK WEIGHTS AND WEATHER STEP DIMENSIONS

<table>
<thead>
<tr>
<th>NAME</th>
<th>SIZE (mm)</th>
<th>NORTH ISLAND</th>
<th>SOUTH ISLAND</th>
<th>WEIGHTS PER M²</th>
<th>CAVITY WIDTH</th>
<th>SLAB RECESS WIDTH</th>
<th>SLAB RECESS DEPTH MINIMUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>MANORSTONE® (WITH CORES)</td>
<td>390 LONG x 190 HIGH x 90 WIDE</td>
<td>12.5</td>
<td>11</td>
<td>148</td>
<td>12.2</td>
<td>165</td>
<td>LESS THAN 180KG/M²</td>
</tr>
<tr>
<td>DEVONSTONE® (WITH CORES)</td>
<td>290 LONG x 160 HIGH x 70 WIDE</td>
<td>20</td>
<td>5.8</td>
<td>125</td>
<td>6.2</td>
<td>133</td>
<td>LESS THAN 180KG/M²</td>
</tr>
<tr>
<td>FOCUS® BRICK (WITH FROG)</td>
<td>230 LONG x 90 HIGH x 75 WIDE</td>
<td>42</td>
<td>3.3</td>
<td>158</td>
<td>3.4</td>
<td>163</td>
<td>LESS THAN 180KG/M²</td>
</tr>
<tr>
<td>FOCUS® BRICK (WITH FROG)</td>
<td>230 LONG x 75 HIGH x 90 WIDE</td>
<td>49</td>
<td>3.3</td>
<td>188</td>
<td>3.4</td>
<td>193</td>
<td>180-220KG/M²</td>
</tr>
<tr>
<td>MASONRY 1001 (WITH CORES)</td>
<td>390 LONG x 190 HIGH x 90 WIDE</td>
<td>12.5</td>
<td>11</td>
<td>148</td>
<td>12.2</td>
<td>165</td>
<td>LESS THAN 180KG/M²</td>
</tr>
<tr>
<td>STRATA® (WITH CORES)</td>
<td>290 LONG x 75 HIGH x 70 WIDE</td>
<td>59</td>
<td>2.9</td>
<td>125</td>
<td>3.0</td>
<td>133</td>
<td>LESS THAN 180KG/M²</td>
</tr>
</tbody>
</table>

* Weights Kg per m² including mortar
CAVITY VENTILATION

Drainage/weep/vent holes should be a minimum of 75mm high and the width of the mortar joint. They should be installed at centres not exceeding 800mm. If the vent holes are less than 75mm high decrease the spacing to achieve a ventilation area of 1000mm²/m wall length. The cavity shall be ventilated to the outside at the top of walls by either similar vents as at the bottom, or a continuous 5mm minimum gap between the top course and soffit board, with a cover bead to outside that maintains a minimum 2mm gap to masonry (E2/AS1 section 9.2.6 (d) Cavities and Fig 73E). It is good practice to install vent holes under window sills over 2.4m wide. The cavity shall be sealed off from the floor and roof space.
OPENINGS / LINTELS
LINTELS CAN BE INSTALLED 2 DIFFERENT WAYS:

1 ANGLE IS SUPPORTED BY THE BRICK
Seating as per E2/AS1 section 9.2.9 Openings in brick veneer
Minimum seating into adjacent brick of:
A) 100mm for spans up to and including 2m
B) 200mm for spans over 2m

2 ANGLE IS FIXED TO THE TIMBER FRAME
Keep the angle 5mm short of the openings at each end to allow for movement
Lintel coach-screwed to timber framing using 75mm x 10mm screws at 400 centres

TABLE 18E - MASONRY BRICK VENEER LINTEL SIZES (MINIMUM)

<table>
<thead>
<tr>
<th>SPAN OF LINTEL (M) UP TO:</th>
<th>MAXIMUM THICKNESS OF MASONRY BRICK VENEER (MM)</th>
<th>MAXIMUM HEIGHT OF BRICK VENEER SUPPORTED (MM)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>70</td>
<td>90</td>
</tr>
<tr>
<td>0.800</td>
<td>60 x 60 x 6L</td>
<td>60 x 80 x 6L</td>
</tr>
<tr>
<td>2.000</td>
<td>60 x 60 x 6L</td>
<td>60 x 80 x 6L</td>
</tr>
<tr>
<td>2.500</td>
<td>60 x 60 x 6L</td>
<td>80 x 80 x 6L</td>
</tr>
<tr>
<td>3.000</td>
<td>80 x 80 x 6L</td>
<td>125 x 75 x 6L</td>
</tr>
<tr>
<td>3.500</td>
<td>80 x 80 x 6L</td>
<td>125 x 75 x 6L</td>
</tr>
<tr>
<td>4.000</td>
<td>80 x 80 x 6L</td>
<td>125 x 75 x 6L</td>
</tr>
<tr>
<td>4.500</td>
<td>125 x 75 x 6L</td>
<td>125 x 75 x 10L</td>
</tr>
<tr>
<td>4.800</td>
<td>125 x 75 x 6L</td>
<td>125 x 75 x 10L</td>
</tr>
</tbody>
</table>

All lintels shall comply with the corrosion requirements as in Table 18D and exposure zones as in NZS3604.

SEE PAGE 9 FOR MAPS AND ZONING GUIDE

Reference: Acceptable Solutions E2/AS1 External Moisture
FLASHINGS

THE MOST IMPORTANT FLASHINGS ARE AROUND OPENINGS SUCH AS DOORS AND WINDOWS; THE HEAD FLASHING BEING THE CRITICAL ELEMENT. REFER E2/AS1 FIG 73C.

If a metal head flashing is used and fixed to the framing, ensure it is kept 5mm short at each end, and the ends of the flashing turned up. This will allow for any movement in the framing without interfering with the bricks. A 5 – 10mm gap between the underside of the lintel bar and the flashing allows for both drainage and ventilation eliminating the need for weep holes in the bricks across the head of the opening.

Jamb flashings are simple and inexpensive. Use a 200mm wide polyethylene flashing, tucked into the joinery flange.

The open end of the flashing is to be held off the building wrap using a kick-out batten or protruding clouts. The junction between the bricks and the joinery does not need to be sealed. The sill flashing is equally important; any moisture driven up the sill brick needs to be stopped from reaching the timber framing and directed into the bottom of the cavity as shown. Extend flashings 200mm past the sides of any openings where practical to do so. (NZS 3604 sect 11.7.7)

ALTERNATIVE TO E2/A5 FIG 73C - BRICK VENEER WINDOW AND DOOR INSTALLATION

Reference: Acceptable Solutions E2/AS1 External Moisture

ROOF TO WALL JUNCTION

TABLE 2.2 MAXIMUM TOLERANCES

<table>
<thead>
<tr>
<th>Item</th>
<th>Tolerances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deviation from the position shown on plan for a building more than one storey in height</td>
<td>15mm</td>
</tr>
<tr>
<td>Deviation from vertical within a storey</td>
<td>10mm per 3m of height</td>
</tr>
<tr>
<td>Deviation from vertical in total height of building</td>
<td>20mm</td>
</tr>
<tr>
<td>Relative vertical displacement between masonry courses</td>
<td>3mm</td>
</tr>
<tr>
<td>a) Nominated fair face (one side only)</td>
<td>5mm</td>
</tr>
<tr>
<td>b) Structural face</td>
<td>5mm</td>
</tr>
<tr>
<td>Relative displacement between loadbearing walls in adjacent storeys intended to be in vertical alignment</td>
<td>5mm</td>
</tr>
<tr>
<td>Deviation from line in plan a) In any length up to 10m</td>
<td>5mm</td>
</tr>
<tr>
<td>b) In any length over 10m</td>
<td>10mm total</td>
</tr>
<tr>
<td>Deviation of bed joint from horizontal a) In any length up to 10m</td>
<td>5mm</td>
</tr>
<tr>
<td>b) In any length over 10m</td>
<td>10mm total</td>
</tr>
<tr>
<td>Average thickness of bed joint, cross joint, or perpend</td>
<td>3.3mm on thickness specified</td>
</tr>
</tbody>
</table>

Note: Tolerances shall not breach minimum cavity widths.
FIRTH CONTROL JOINT
FIRTH CONTROL JOINT SPECIFICATION

Construction
Control joints controlling wall movement shall be achieved by providing a bond break between blocks and mortar at the specified locations.

Application
This alternative control joint is suitable for all Firth brick veneers except for plaster applications. H10.01 to comply with Firth ‘Brick Construction Detail’ document.

Installation
At each control joint a thin layer of suitable polythene tape or similar shall be placed on top and at ends of each unit covering at least 75% of its width. The polythene layer must cover any cavities within the units. Mortar shall then be placed on the horizontal bed and the end of the unit to be laid.

Location
Control joints shall be located at edges of windows closest to 4.0m intervals on each wall. Windows exceeding 2.0m in width shall have a control joint at each end. High windows of less than 800mm deep can be excluded. Spacing on plain walls shall not exceed 5.0m.
BRICK VENEER CONSTRUCTION - BUILDING HEIGHTS

THE MAXIMUM HEIGHT FOR SINGLE STOREY BRICKS IS 4.0M FROM THE FOUNDATION. AT THE GABLE AREA YOU MAY GO TO A MAXIMUM OF 5.5M TO THE APEX.

These requirements apply when the brick is supported by a timber frame, as stipulated in NZS3604. For masonry bricks refer to manufacturer’s website for two storey design options. If the brick is supported by a masonry structure, NZS4229 permits a brick height of 6.0m for wall and up to 10.0m to the top of any gable. Also refer to E2/AS1 73B for other options.

TWO STOREY BRICK VENEER

Refer to Firth’s “Two Storey Brick Veneer Solutions”

FIGURE 73B - MASONRY VENEER HEIGHT LIMITATIONS
BRICK VENEER TOLERANCES & AESTHETIC APPEARANCE

IT IS POSSIBLE FOR A BRICK VENEER TO BE BUILDING CODE COMPLIANT BUT NOT HAVE THE VISUAL LOOK THAT REFLECTS THE SKILLS OF AN EXPERIENCED BRICKLAYER. THIS IS REFERRED TO AS ‘WORKMANSHP QUALITY’.

It is important to discuss with your bricklayer the aesthetic look you are hoping to achieve with your brick veneer and if possible, include them in your selection process.

The Brick and Blocklayers Federation recommends that parties to a brick construction enter into a clear, written contract that sets out the expectations of parties including agreed workmanship quality standards, quality checking responsibilities and an agreement on how disputes will be managed – even if it is not a compulsory requirement under legislation.

VIEWING DISTANCE

Due to the nature of bricks, no two bricks are the same and no brick is perfect when examined close-up. ASTM C90 has been adopted as the industry standard for viewing brickwork – it states that ‘for exposed wall construction chips and imperfections shall not be evident when viewed from a distance of not less than 6.1m in diffused light’.

CHIPPING

Bricks may be transported several times before arriving onsite and occasionally chipping can occur. Chips are more noticeable on bricks that have a surface colour different from the body of the brick. A workmanship quality standard is achieved if imperfections, including chips, are not visible when viewed from a distance of not less than 6.1m under diffused light as per ASTM C90.

New Zealand does not have a standard to assist a Bricklayer to evaluate the level of chipping acceptable in a brick prior to laying however ASTM C216-15 has been adopted by BBFNZ.

ASTM C216-15 for a general purpose face brick (FBS textured) basically has the following requirements:

• Chips from the edge should not be deeper than 8mm
• Corner chips should not be deeper than 13mm
• When all the length of the chips are added up that the total does not exceed 10% of the perimeter of the brick face (as an example, the accumulative lengths of the chips for a 230mm x 75mm brick shall not exceed 61mm).

Although brick veneers have two faces, it is good practice for Bricklayers to set aside bricks that do not meet this standard and to assess whether to discard it or use it for cuts.

Reference: Brick and Blocklayers Federation New Zealand, “Brick Veneer Best Practice Guide” www.bbfnz.co.nz