1 GENERAL

1.1 RESPONSIBILITIES

General
Requirement: Provide brick and block construction, as documented.

1.2 CROSS REFERENCES

General
Requirement: Conform to the following worksection(s):
- General requirements.
- [complete/delete]

1.3 STANDARDS

General
Materials and construction: To AS 3700.

1.4 INTERPRETATION

Definitions
General: For the purposes of this worksection the definitions in AS 3700 clause 1.5.2, AS/NZS 4455.1 and the following apply:
- Facework: Masonry intended to be exposed in a wall.

1.5 INSPECTION

Notice
Inspection: Give notice so that inspection may be made of the following:
- Set out.
- Unit type, colour and texture.
- Bottoms of cavities, after cleaning out.
- Bottoms of core holes, before grouting.
- Reinforcement type and diameter.
- Positioning of reinforcing before grouting.
- Control joints, ready for insertion of joint filler.
- Damp-proof courses, in position.
- Flashings, in position.
- Lintels, in position.
- Structural steelwork, including bolts and shelf angles, in position.

1.6 TOLERANCES

General
Requirement: To AS 3700 Table 12.1.

1.7 SUBMISSIONS

Samples
Face units: Submit face units of each type illustrating the range of variation available, including colour, texture, surface irregularities, defective arrises, and shape.
- Number of each type: 6.
Facework sample panel: Provide, in a suitable position, a sample panel of each type of facework including pigmented face or pointing mortar.
- Minimum size (face of panel): 1200 mm high x 1190 mm or closest unit module long.
Sand: Submit a 2 kg sample of each type of sand required to be of a particular colour, grade or source.

Tests
Type tests: Submit results, as follows:
- Characteristic unconfined compressive strength of masonry unit: To AS/NZS 4456.4.

Other tests: [complete/delete]

2 PRODUCTS

2.1 DURABILITY

General
Exposure environment: [complete/delete]
Exposure locations: To AS 3700 clause 5.4.

2.2 MATERIALS

Brick and block units
Selections: As documented in the Brick and block construction schedule.
Standard: To AS/NZS 4455.1 and AS/NZS 4455.3.
Salt attack resistance grade: To AS 3700 Table 5.1.
Minimum age of clay bricks: 7 days.

Mortar materials
Mortar class: To AS 3700 Table 5.1.
Cement: To AS 3972.
- Type: [complete/delete]
White cement: With ≤ 1% iron salts content.
Lime: To AS 1672.1.
Sand: Fine aggregate with a low clay content and free from efflorescing salts, selected for colour and grading.
Water: Clean and free from any deleterious matter.
Admixtures: To AS 3700 clause 11.4.2.4.
Pigment: To BS EN 12878, and as follows:
- Integral pigment mix proportion: ≤ 10% by weight of cement.
Mix proportions: As documented in the Masonry cement mortar mix proportions table and Cement (GP/GB) mortar mix proportions table.

<table>
<thead>
<tr>
<th>Mortar class to AS 3700</th>
<th>Clay</th>
<th>Concrete</th>
<th>Calcium silicate</th>
<th>Water thickener</th>
</tr>
</thead>
<tbody>
<tr>
<td>M3</td>
<td>1:0:4</td>
<td>1:0:4</td>
<td>n/a</td>
<td>Yes</td>
</tr>
<tr>
<td>M4</td>
<td>1:0:3</td>
<td>n/a</td>
<td>n/a</td>
<td>Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mortar class to AS 3700</th>
<th>Clay</th>
<th>Concrete</th>
<th>Calcium silicate</th>
<th>Water thickener</th>
</tr>
</thead>
<tbody>
<tr>
<td>M2</td>
<td>1:2:9</td>
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<td>n/a</td>
<td>No</td>
</tr>
<tr>
<td>M3</td>
<td>1:1:6</td>
<td>1:1:6</td>
<td>n/a</td>
<td>Optional</td>
</tr>
<tr>
<td>M3</td>
<td>1:0:5</td>
<td>1:0:5</td>
<td>1:0:5</td>
<td>Yes</td>
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<tr>
<td>M4</td>
<td>1:0:5:4.5</td>
<td>1:0:5:4.5</td>
<td>n/a</td>
<td>Optional</td>
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<tr>
<td>M4</td>
<td>1:0:4</td>
<td>1:0:4</td>
<td>1:0:4</td>
<td>Yes</td>
</tr>
<tr>
<td>M4</td>
<td>1:0-0.25:3</td>
<td>1:0-0.25:3</td>
<td>n/a</td>
<td>Optional</td>
</tr>
</tbody>
</table>
Grout
Standard: To AS 3700 clause 11.7.
Minimum characteristic compressive strength: 12 MPa.

2.3 BUILT-IN COMPONENTS

General
Durability class of built-in components: To AS 3700 Table 5.1.

Steel lintels
Angles and flats: To AS/NZS 3679.1.
Cold formed proprietary lintels: Designed to AS/NZS 4600.
Corrosion protection: To AS/NZS 2699.3.
Galvanizing: Do not cut after galvanizing.

Reinforcement
Standard: To AS/NZS 4671.
Corrosion protection: To AS 3700 clause 5.9.
Minimum cover: To AS 3700 Table 5.1.

Wall ties
Standard: To AS/NZS 2699.1.
Type: [complete/delete]
Corrosion protection: To AS/NZS 2699.1.
Strength classification:
- Masonry veneer: [complete/delete]
- Normal cavity construction and at abutments:[complete/delete]
- Cavities > 60 mm and < 200 mm wide: Heavy duty.
- Cavities > 200 mm wide: [complete/delete]

Connectors and accessories
Standard: To AS/NZS 2699.2.
Corrosion protection: To AS/NZS 2699.2.
Design criteria for flexible masonry ties: [complete/delete]

Flashings and damp-proof courses
Standard: To AS/NZS 2904.

Slip joints
Standard: To AS 3700 clause 4.13.
Material: [complete/delete]

3 EXECUTION

3.1 GENERAL

Mortar mixing
General: Measure volumes accurately to the documented proportions. Machine mix for at least six minutes.

Protection from contamination
General: Protect masonry materials and components from ground moisture and contamination.

Bond
Type: Stretcher bond.

Building in
Embedded items: Build in wall ties and accessories as the construction proceeds. If it is not practicable to obtain the required embedment wholly in the mortar joint in hollow masonry units, fill appropriate cores with grout or mortar.
Steel door frames: Fill the backs of jambs and heads solid with mortar as the work proceeds.
Clearance for timber frame shrinkage
General: In timber frame brick veneer construction, leave clearances between window frames and brick sill and between roof frames and the brick veneer as follows:
- Additional clearance: To accommodate additional shrinkage of unseasoned floor timbers.
- Single storey frames and ground floor windows (not for slab on ground): 10 mm.
- Two storey frames and upper floor windows: 20 mm.

Construction at different rates or times
Monolithic structural action: If two or more adjoining sections of masonry, including intersecting walls, are constructed at different rates or times, rake back or tie the intersections between those sections so that monolithic structural action is obtained in the completed work.

Joining to existing
General: Provide a control joint where joining to existing structures. Do not tooth new masonry into existing work unless approved by a professional engineer.

Mortar joints
Solid and cored units: Lay on a full bed of mortar. Fill perpends solid. Cut mortar flush.
Face-shell bedded hollow units: Fill perpends solid. Cut mortar flush.
Finish: Conform to the following:
- Externally: Tool to give a dense water-shedding finish.
- Internally: If wall is to be plastered, do not rake more than 10 mm to give a key.
- Thickness: 10 mm.
Cutting: Set out masonry with joints of uniform width and minimum cutting of masonry units.

Monolithic structural action
Header units: Except in stretcher bond facework, provide brick and block header units, to AS 3700 clause 4.11.2.
Spacing: 600 mm maximum.
Location: Provide header units in the following locations:
- At engaged piers.
- At engagement of diaphragms with the leaves in diaphragm walls.
- At intersections of flanges with shear walls.
- At intersections with supporting walls and buttresses.
- Between leaves in solid masonry construction.

Rate of construction
General: Regulate the rate of construction to eliminate joint deformation, slumping or instability.

Rods
Set out: Construct masonry to the following rods:
- 75 mm high units: 7 courses to 600 mm.
- 90 mm high units: 6 courses to 600 mm.
- 190 mm high units: 3 courses to 600 mm.

Protection
General: Cover the top surface of brickwork and blockwork to prevent the entry of rainwater and contaminants.
Single leaf and solid walls: Moisture protection to AS 3700 clause 4.7.4.

Temporary support
General: If the final stability of the masonry is dependent on construction of (structural) elements after the brickwork and blockwork is completed, provide proposals for temporary support or bracing.

3.2 FACEWORK

Cleaning
General: Clean progressively as the work proceeds to remove mortar smears, stains and discolouration. Do not erode joints if using pressure spraying.
Acid solution: Do not use.
Colour mixing
Distribution: In facework, distribute the colour range of units evenly to prevent colour concentrations and banding.

Below ground
Facework: Commence face brickwork at least 1 full course for blockwork, or 2 full courses for brickwork, below adjacent finished surface level.

Double face walls
Selection: Select face units for uniform width and double-face qualities.
Preferred face: Before starting, obtain approval of the preferred wall face, and favour that face should a compromise be unavoidable.

Perpends
General: If other than vertically aligned perpends in alternate courses are proposed, provide details.

Sills and thresholds
General: Solidly bed sills and thresholds and lay them with the top surfaces draining away from the building.
Minimum size of cut unit: Three quarters full width.

3.3 SUBFLOOR WORK

Access openings
General: In internal walls, leave door width openings beneath doorways to give access to underfloor areas.

Air vent locations
General: Provide air vents to give adequate cross ventilation to the space under suspended ground floors.
Cavity walls: Provide matching vents in the internal leaves located as near as practicable to the vents in the external leaves.
Location: Below damp-proof course to internal and external walls.

Air vent types
Blockwork: Select from the following:
- Concrete framed: Bronze wire mesh in concrete frame 390 x 190 mm.
- Vent blocks: Purpose-made vent blocks.
Brickwork: Select from the following:
- Concrete framed: Bronze wire mesh in concrete frames, 470 x 160 mm.
- Cut brick: 2 cut bricks laid vertically and evenly spaced in a 230 mm wide x 2 course high opening, backed with bronze wire mesh built in.
- Terra cotta: Perforated, 230 x 160 mm.

Underpinning
Requirement: Install underpinning while maintaining the building undamaged.
Grouting: Pack dry mix M4 mortar between underpinning and existing structure at the completion of each panel of underpinning.

3.4 CAVITY WORK

Cavity clearance
General: Keep cavities clear at all times.

Cavity fill
General: Fill the cavity with mortar to 1 course above adjacent finished (ground) level. Fall the top surface towards the outer leaf.

Cavity width
General: Provide minimum cavity widths in conformance with the following:
- Masonry walls: 50 mm.
- Masonry veneer walls: 40 mm between the masonry leaf and the load bearing frame and 25 mm minimum between the masonry leaf and sheet bracing.
Openings
Care: Do not close the cavity at the jambs of external openings.

Wall ties connectors and accessories
Protection: Install to prevent water passing across the cavity.

3.5 DAMP-PROOF COURSES

Location
General: Provide damp-proof courses as follows:
- Timber floors: In the first course below the level of the underside of ground floor timbers in internal walls and inner leaves of cavity walls.
- Cavity walls built off slabs on ground: In the bottom course of the outer leaf, continuous horizontally across the cavity and up the inner face bedded in mortar, turned 30 mm into the inner leaf 1 course above.
- Masonry veneer construction: In the bottom course of the outer leaf, continuous horizontally across the cavity. Fasten to the inner frame 75 mm above floor level.
- Walls adjoining infill floor slabs on membranes: In the course above the underside of the slab in internal walls and inner leaves of cavity walls. Project 40 mm and dress down over the membrane turned up against the wall.

Height: Not less than:
- 150 mm above the adjacent finished ground level.
- 75 mm above the finished paved or concrete area.
- 50 mm above the finished paved or concreted area and protected from the direct effect of the weather.

Installation
General: Lay in long lengths. Lap full width at angles and intersections and at least 150 mm at joints. Step as necessary, but not exceeding 2 courses per step for brickwork and 1 course per step for blockwork. Sandwich damp-proof courses between mortar.

3.6 FLASHINGS

Location
General: Provide flashings as follows:
- Floors: Full width of outer leaf immediately above slab or shelf angle, continuous across cavity and up the inner face bedded in mortar, turned 30 mm into the inner leaf 2 courses above for brick and 1 course above for block. If the slab supports the outer skin and is not rebated, bed the flashing in a suitable sealant.
- Under sills: 30 mm into the outer leaf bed joint 1 course below the sill, extending up across the cavity and under the sill in the inner leaf or the frame. Extend at least 150 mm beyond the reveals or each side of the opening.
- Over lintels to openings: Full width of outer leaf immediately above the lintel, continuous across cavity, turned 30 mm into the inner leaf 2 courses above for brick and 1 course above for block or turned up against the inner frame and fasten to it. Extend at least 150 mm beyond the lintels.
- At abutments with structural frames or supports: Vertical flash in the cavity using 150 mm wide material, wedged and grouted into a groove in the frame opposite the cavity.
- At jams: Vertically flash jamb, extending 75 mm into the cavity, interleaved with the sill and head flashing at each end. Fix to jams.
- At roof abutments with cavity walls: Cavity flash immediately above the roof and over-flash the roof apron flashing.

Installation
General: Sandwich flashings between mortar except where on lintels or shelf angles. Bed flashings, sills and copings in one operation to maximise adhesion.

Laps: If required, lap full width at angles and intersections and at least 150 mm at joints. Step as necessary, but not exceeding 2 courses per step for brickwork and 1 course per step for blockwork.
Lap sealing: Seal with a bituminous adhesive and sealing compound.
Pointing: Point up joints around flashings, filling voids.

**Weepholes**
Location: Provide weepholes to external leaves of cavity walls in the course immediately above flashings, and cavity fill, and at the bottoms of unfilled cavities.
Form: Open perpends.
Maximum spacing: 1200 mm.

### 3.7 WALL TIES

**Location**
General: Space wall ties in conformance with AS 3700 clause 4.10 or AS 4773.2, as appropriate, and at the following locations:
- Not more than 600 mm in each direction.
- Adjacent to vertical lateral supports.
- Adjacent to control joints.
- Around openings.

**Installation**
Fixing of masonry veneer ties:
- To timber frames: Screw fix to outer face of timber frames with fixings to AS 3566.1.
- To concrete: Masonry anchors.
- To steel frames: Screw fix to outer face of steel studs with fixings to AS 3566.1.

### 3.8 CONTROL JOINTS

**General**
Location and spacing: Provide contraction joints, expansion joints or articulation joints to AS 3700 clause 4.8.

**Control joint filling**
Filler material: Provide compatible sealant and bond breaking backing materials which are non-staining to brickwork and blockwork. Do not use bituminous materials with absorbent masonry units.
- Bond breaking materials: Non-adhesive to sealant, or faced with a non-adhering material.
- Foamed materials: Closed-cell or impregnated, not water-absorbing.
Installation: Clean the joints thoroughly and insert an easily compressible backing material before sealing.
Sealant depth: Fill the joints with a gun-applied flexible sealant for a depth of at least two-thirds the joint width.

**Fire rated control joints**
General: If a control joint occurs in an element of construction required to have a fire resistance rating, construct the control joint with fire stopping materials which maintain the fire resistance rating of the element.
Fire stopping: To AS 4072.1.

### 3.9 BRICKWORK AND BLOCKWORK DUCT RISERS

**Location**
General: Build a one-piece corrosion resistant metal tray to the masonry duct risers at roof level.

**Material:** [complete/delete]

**Installation**
General: Cut an opening for the riser. Turn tray edges up 25 mm around the opening 13 mm clear of the walls.Externally turn the tray up 100 mm under the stepped flashing and down 100 mm over the apron flashing. Lap and solder joints.

**Weepholes**
General: Provide 2 weepholes through the masonry duct riser walls on opposite sides immediately above the tray.
3.10  BRICKWORK BED JOINT REINFORCEMENT

Location  
General: Locate as follows:
- In 2 bed joints below and above head and sill flashings to openings.
- In 2 bed joints below and above openings.
- In third bed joint above bottom of wall.
- In second bed joint below top of wall.

Maximum vertical intervals: 500 mm.

Installation  
General: Lap 450 mm at splices. Fold and bend at corners so that the longitudinal wires are continuous. Stop 50 mm short of control joints. Extend 450 mm beyond each side of openings.

Reinforcement  
Material: Galvanized welded wire mesh.
Width: Equal to the width of the leaf, less 15 mm cover from each exposed surface of the mortar joint.

3.11  REINFORCED AND GROUTED BLOCKWORK

Cleaning core holes  
General: Provide purpose-made cleanout blocks or machine cut a cleaning hole at the base of each grouted core.
Location: Locate on the side of the wall which is to be rendered or otherwise concealed.
Cleaning: Rod cores to dislodge mortar fins protruding from the blocks and mortar droppings from reinforcement. Remove through the clean-out blocks.

Grouting  
Commencement: Do not commence until grout spaces have been cleaned out and the mortar joints have attained sufficient strength to resist blow-outs.
Height of lift: Limit the height of individual lifts in any pour to make sure that the grout can be thoroughly compacted to fill all voids.
Compaction: Compact by vibration or by rodding.
Topping up: On the completion of the last lift, top up the grout after 10 min to 30 min, and vibrate or rod to mix with the previous pour.

3.12  LINTELS

Location  
General: Provide 1 lintel to each wall leaf as documented in the Lintel schedule.

Installation  
General: Do not cut on site. Keep lintels 10 mm clear of heads of frames.
Steel lintels: Pack mortar between any vertical component and supported masonry units. For angles, install the long leg vertical.
Minimum bearing each end:
- Span ≤ 1000 mm: 100 mm.
- Span > 1000 mm ≤ 3000 mm: 150 mm.
- Span > 3000 mm: To structural drawings.

Propping: Provide temporary props to lintels to prevent deflection or rotation.
Minimum propping period: 7 days.

3.13  CONNECTORS AND ACCESSORIES

Slip joints  
General: Provide slip joints to top of all unreinforced masonry walls supporting concrete slabs and other concrete elements.
Protection: Keep the slip joints in place and protect from displacement.

Flexible masonry ties  
General: Provide stabilising ties at control joints and abutting structural elements, including columns, beams and slab soffits.
Locations and details: To structural drawings.

### 3.14 ARCHES

**Arch voussoirs**
General: Cut units using a masonry saw.

**Shapes and dimensions**
General: Form arches using solid or cored (not hollow) masonry units.

### 3.15 BAGGING

**Preparation**
General: Cut joints flush before bagging.

**Dry bagging**
Application: Apply laying mortar to the surface using a hessian bag or similar. Flush up irregularities, but leave a minimum amount of mortar on the surface.

**Textured bagging**
Application: Apply laying mortar to the surface using a sponge float. Flush up irregularities, but leave approximately 2 mm of mortar on the surface. When initial set is reached, texture using a hand bristle brush.

### 3.16 TESTING

**Mortar**
Durability: Scratch index test to AS 3700 Appendix E.
Compressive strength: To AS 3700 Appendix C.
Flexural strength: To AS 3700 Appendix D.

**Special masonry**
Sampling and testing: To AS 3700 clause 12.7.
Performance: As documented in the *Brick and block construction performance schedule for special masonry*.

### 4 SELECTIONS

#### 4.1 SCHEDULES

**Brick and block construction schedule**

<table>
<thead>
<tr>
<th>Property</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bricks and blocks: Name or type</td>
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<tr>
<td>Bricks and blocks: Fire resistance level (FRL)</td>
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<tr>
<td>Bricks and blocks: Work size (mm)</td>
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<tr>
<td>Bricks and blocks: Category</td>
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<tr>
<td>Bricks and blocks: Salt attack resistance category</td>
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<tr>
<td>Bricks and blocks: Characteristic unconfined compressive strength (MPa)</td>
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<tr>
<td>Bricks and blocks: Coefficient of contraction</td>
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</tr>
<tr>
<td>Bricks and blocks: Coefficient of expansion</td>
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<td></td>
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<tr>
<td>Bricks and blocks: Air</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Property | A | B | C
--- | --- | --- | ---
**vent units** | | | |
Bricks and blocks: Sill units | | | |
Bricks and blocks: Threshold units | | | |
Mortar: Cement | | | |
Mortar: Colour | | | |
Mortar: Mix proportions or mortar class | | | |
Mortar: Sand | | | |
Unit mortar joints: Bond | | | |
Unit mortar joints: Depth (mm) | | | |
Unit mortar joints: Shape or profile | | | |
Built-in components: Durability class | | | |
Built-in components: Damp-proof course type | | | |
Built-in components: Flashings material | | | |
Built-in components: Lintel type | | | |
Built-in components: Weep hole insect barriers | | | |
Built-in components: Wall ties | | | |
Grout: Composition | | | |
Grout: Compressive strength (MPa) | | | |
Control joints: Backing rod | | | |
Control joints: Primer | | | |
Control joints: Sealant | | | |
Control joints: Width (mm) | | | |

### Brick and block construction performance schedule for special masonry

| Property | A | B | C |
--- | --- | --- | ---
**Durability test** | | | |
**Compressive strength (MPa)** | | | |
**Flexural strength** | | | |

### Lintel schedule

| Opening dimensions (mm) | Lintel type | Depth¹ (mm) | Width (mm) | Thickness (mm) |
--- | --- | --- | --- | --- |
<p>| | | | | |
| | | | | |</p>
<table>
<thead>
<tr>
<th>Opening dimensions (mm)</th>
<th>Lintel type</th>
<th>Depth (mm)</th>
<th>Width (mm)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Note: Lintel length required is equal to sum of (opening dimension + 2x bearing at each end).