

0331 BRICK AND BLOCK CONSTRUCTION

This worksection has been written for Class 1 and 10a buildings that fully conform to the scope of AS 4773.1. If the works include isolated structures, (totally separate from the main conforming building), that do not conform to the scope of AS 4773.1, include the references to AS 3700 as noted in *Guidance*. If the buildings do not conform to the scope of AS 4773.1 delete all references to AS 4773.1 in the specification and change the specification to references AS 3700, as noted in the *Guidance*.

Retaining walls: Consult the local approval authority to determine where walls over a certain height require design by a professional engineer.

Energy efficiency requirements at BCA 2.6 set out minimum insulation performance requirements for walls, roofs, floor slabs and external glazing depending on climate zone and orientation.

1 GENERAL

1.1 STANDARDS

General

Materials and construction: To AS 4773.1 and AS 4773.2.

For isolated structures not conforming to the scope of AS 4773 series amend to AS 3700.

2 PRODUCTS

2.1 MATERIALS

Bricks and blocks

Standard: To AS/NZS 4455.1 and AS/NZS 4455.3.

Minimum age of clay bricks: 7 days.

Masonry durability

Requirement: Conform to AS 4773.1 Table 4.1.

For isolated structures not conforming to the scope of AS 4773 series amend to AS 3700 Table 5.1.

Problems are being experienced with salt attack on brickwork below damp-proof course level on sites which had once been heavily fertilised. Exposure class bricks are normally readily available for such locations.

Mortar materials

Sand: Fine aggregate with a low clay content and free from efflorescing salts, selected for colour and grading.

Proportions: Conform to BCA 3.3.1.6, BCA Table 3.3.1.2 and AS 4773.1 Table 3.2

2.2 COMPONENTS

Steel lintels

Angles and flats: Sizes to BCA Figure 3.3.3.5.

Cold-formed lintels: Designed to AS/NZS 4600.

Corrosion protection: To AS/NZS 2699.3, and BCA Table 3.3.3.2.

Galvanizing: Do not cut after galvanizing.

Wall ties

Standard: To AS/NZS 2699.1.

Type: A.

Corrosion protection: To BCA Table 3.3.3.1.

Flashings and damp-proof courses

Standard: To AS/NZS 2904.

For suitable flashings and DCP material see AS 4773.2 Table 5.2.

3 EXECUTION

3.1 GENERAL

Mortar mixing

General: Measure volumes accurately to achieve 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 unit brickwork or blockwork, fill appropriate cores with grout or mortar.

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: 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.

Joining to existing

General: Provide a control joint where joining to existing structures. Do not tooth new masonry into existing work.

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 the minimum of cutting of masonry units.

For jointing, see AS 4773.1 clause 14.2 *Mortar joints*.

Mortar joints are normally tooled, weatherstruck or raked. Mortar joints which are not completely filled and tooled may not provide adequate weatherproofing. A flush joint which is cut with the trowel without compacting the mortar should not be used externally unless agreed.

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.

Chimneys and fireplaces

Guidance: For construction refer to Clay Brick and Paver Institute Technical Notes CBPI Tech 05.

CBPI Tech 05 also deals with design. For buildings with chimneys conform to AS 3700.

3.2 FACEWORK

Cleaning

General: Clean progressively as the work proceeds to remove mortar smears, stains and discolouration. Do not use an acid solution. Do not erode joints if using pressure spraying.

Colour mixing

Distribution: In facework, distribute the colour range of units evenly to prevent colour concentrations and banding.

Sills and thresholds

General: Solidly bed sills and thresholds and lay them so that the top surfaces drain away from the building.

Set out: Set out so that no unit is cut smaller than three quarters full width.

3.3 SUBFLOOR WORK**Bearer piers**

Provide engaged or free standing unreinforced masonry piers to support bearers at 1800 mm maximum centres and to the **Bearer pier table**.

Bearer pier table

Type	Minimum size (mm)
Engaged	230 x 110 bonded or tied to walls
Freestanding up to 1500 mm high	230 x 230
Freestanding 1500 to 2700 mm high	350 x 350

Access openings

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

Air vent location

General: Provide air vents to give adequate cross ventilation to the space under suspended ground floors.

For subfloor ventilation, BCA 3.4.1 and AS 4773.2 clause 6.2 provides minimum requirements for various climates.

Cavity walls: Provide matching vents in the internal leaves located as near as practicable to the air vents in the external leaves.

Location: Below damp-proof course to internal and external walls.

Minimum provision: 6000 mm² net ventilation area per linear metre of wall.

The area for ventilation of 6000 mm² per linear metre of wall is based on the acceptable construction practice in BCA Table 3.4.1.2.

Underpinning

Requirement: Install underpinning while maintaining the building undamaged.

Grouting: Pack dry mix M4 mortar between underpinning and existing structure within 24 and 48 hours of completion of each panel of underpinning.

Check with the structural consultant and amend as instructed.

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 loadbearing frame and 25 mm minimum between the masonry leaf and sheet bracing.

Width of cavity may need to be increased if wall insulation is required to BCA 3.12.1.4.

Openings

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. Fastened 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 the full width of angles and intersections and 150 mm at joints. Step as necessary, but not more than 2 courses per step for brickwork and 1 course per step for blockwork. Sandwich damp-proof courses between mortar.

Junctions: Preserve continuity of damp-proofing at junctions of damp-proof courses and waterproof membranes.

3.6 FLASHINGS

See also *Roofing* for roof flashings.

Location

General: Provide flashings as follows:

- Floors: Full width of outer leaf immediately above slab, 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 for block. Where 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 on 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 for block or turned up against the frame and fastened to it. Extend at least 150 mm beyond the ends of the lintels.
- At abutments with structural frames or supports: Vertical flash in the cavity from 150 mm wide material, wedged and grouted into a groove in the frame opposite the cavity.
- At jambs: Full height flashing extending 75 mm beyond the closure into the cavity, interleaved with the sill and head flashing at each end. Fix to jambs.
- At roof abutments with cavity walls: Cavity flash immediately above the roof and over-flash the roof apron flashing.

Installation

Any significant interruption of the cavity, including at conduits, should be flashed. Head and sill flashings should not be taut across the cavity and threshold flashings should be bedded in mortar to run vertically and horizontally, not diagonally.

General: Sandwich flashings between mortar except where on lintels.

Pointing: Point up joints around flashings to fill voids.

Weepholes

See AS 3700 clauses 4.7.2 *Prevention of moisture penetration - Weepholes* and 11.4.14 *Workmanship - Weepholes*. Preferably indicate location and detail on the drawings, and delete this subclause. See AS 3959 for building in bushfire prone areas; all vents and weep holes require a corrosion resistant wire mesh to prevent ingress of embers.

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 perpend.

Maximum spacing: 1200 mm.

Weephole guards: Provide access barrier.

- Type: [complete/delete]

3.7 WALL TIES**Location**

Spacing: To BCA Figure 3.3.3.1 and AS 4773.2 Tables 9.2 and 10.6.

Installation

Embedment: At least 50 mm into mortar ensuring that mortar cover is 15 mm minimum to the outside face of the mortar.

3.8 CONTROL OF MOVEMENT**Control joints**

General: Provide joints to AS 4773.2 Section 7 and as follows:

- Contraction joints for concrete and calcium silicate masonry:
 - . Maximum length of continuous wall: 5 m.
 - . Minimum width of control joint: 10 mm.
- Expansion joints for clay brickwork:
 - . Maximum length of continuous wall: 6 m.
 - . Width of vertical joint: $\geq 10 \text{ mm} \leq 20 \text{ mm}$.
 - . Width of horizontal joint: $\geq 15 \text{ mm} \leq 20 \text{ mm}$.

Flexible ties and anchors

Requirement: If ties or anchors extend across control joints, provide ties or anchors which maintain the stability of the masonry without impairing the effectiveness of the joint.

Control joint filling

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.

Sealant type: External: UV stable.

Refer to BCA Figure 3.3.1.9 for joint detail.

3.9 REINFORCED AND GROUTED BLOCKWORK

Reinforced blockwork should be specified by a professional engineer.

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 and make sure bond between grout and masonry.

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.

3.10 LINTELS

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 with the long leg vertical.

Propping: To prevent deflection or excessive rotation, temporarily prop lintels until the masonry reaches its required strength.

3.11 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.

4 SELECTIONS

4.1 SCHEDULES

Brick and block construction schedule

Property	Code		
	A	B	C
Bricks and blocks			
Type			
Manufacturer			
Work size			
Sill units			
Colour			
Feature colour			
Mortar			
Type			
Colour			
Units joints			
Shape or profile			

Bricks and blocks

Type: Clay, concrete, or calcium silicate bricks. Concrete or AAC blocks.

Work size: Commonly 230 x 110 x 76 mm for bricks and 390 x 190 x 190 mm for blocks.

Mortar

Type: Nominate for exposure condition and type of masonry unit.

Colour: Classified as grey cement, off-white cement or others.

Joints

Joints: Select mortar joints as tooled, raked, weatherstruck or others.