

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 (2015). If the works include isolated structures, (totally separate from the main conforming building), that do not conform to the scope of AS 4773.1 (2015), include the references to AS 3700 (2018) as noted in Guidance. If the buildings do not conform to the scope of AS 4773.1 (2015) delete all references to AS 4773.1 (2015) in the specification and change the specification to references AS 3700 (2018), 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 in BCA (2022) H6 set out minimum insulation performance requirements for walls, roofs, floor slabs and external glazing depending on climate zone and orientation.

1 GENERAL**1.1 STANDARD****General**

Materials and construction: To AS 4773.1 (2015) and AS 4773.2 (2015).

For isolated structures not conforming to the scope of AS 4773 series amend to AS 3700 (2018).

2 PRODUCTS**2.1 DURABILITY****General**

Exposure environment: To AS 4773.1 (2015) clause 4.3.

Exposure environment is project specific and applies to all masonry materials, accessories and built-in items.

Exposure locations: To AS 4773.1 (2015) clause 4.4.

There might be different exposure locations within one project: exterior, exterior-coated or interior.

For isolated structures not conforming to the scope of the AS 4773 series amend to AS 3700 (2018) clause 5.4.

2.2 MATERIALS**Masonry units**

Standard: To AS/NZS 4455.1 (2008) and AS/NZS 4455.3 (2008).

Minimum age of clay bricks: 7 days.

Salt attack resistance grade: To AS 4773.2 (2015) Table 2.1.

For isolated structures not conforming to the scope of AS 4773 series amend to AS 3700 (2018) 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, free from efflorescing salts and deleterious matter, selected for colour and grading.

Mortar mixes: To AS 4773.1 (2015) Table 3.1.

Grout

Standard: To AS 4773.2 (2015) clause 4.2.

2.3 BUILT-IN COMPONENTS**General**

Durability class of built-in components: To AS 4773.1 (2015) Table 4.1.

For isolated structures not conforming to the scope of AS 4773 series amend to AS 3700 (2018) Table 5.1.

Steel lintels

Angles and flats: Sizes to AS 4773.1 (2015) Table 12.2.

Cold-formed proprietary lintels: Designed to AS/NZS 4600 (2018).

Corrosion protection: To AS 2699.3 (2020).

Cutting: Do not cut after galvanizing.

Reinforcement

Standard: To AS/NZS 4671 (2019).

Wall ties

Standard: To AS 2699.1 (2020).

Type: A.

Corrosion protection: To AS 2699.1 (2020).

Connectors and accessories

Standard: To AS 2699.2 (2020).

Corrosion protection: To AS 2699.2 (2020).

Flashings and damp-proof courses

Standard: To AS/NZS 2904 (1995).

For suitable flashings and DCP material see AS 4773.2 (2015) Table 5.2.

3 EXECUTION

3.1 GENERAL

Mortar mixing

General: Measure volumes accurately to the documented proportions. Machine mix for at least six minutes. If the initial set of the cement has taken place, discard the mortar. Do not retemper.

Storage and handling

Masonry units: Store above the surface of the ground and cover to prevent entry of rainwater and contaminants. Locate away from surface and ground water runoff.

Mortar materials: Protect from contamination and as follows:

- Sand: Store away from surface and ground water runoff and allow for free drainage of rainwater.
- Cement and lime: Store bags in a dry, under cover and above ground environment.

Bond

Type: Stretcher bond.

Building in

Embedded items: Build in wall ties and accessories as the construction proceeds. If not practicable to obtain the required embedment within the mortar joint in cored or hollow masonry units, fill appropriate cores with grout or mortar.

Minimum clearance for timber frame shrinkage

General: In timber framed masonry veneer construction, provide clearances to allow for long-term shrinkage of timber including at windows, doors, thresholds, at the underside of eaves where the masonry and soffit meet and as follows:

- Single storey (slab on ground): 10 mm.
- Two storey (slab at ground floor): 32 mm.
- Additional clearance: Accommodate additional shrinkage of unseasoned floor timbers.

Amend the minimum clearance above to suit the type of frame/construction adopted for the project. AS 4773.2 (2015) Table 9.1 provides minimum clearance for timber framing shrinkage for different frame/construction.

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

General: Set out masonry with joints of uniform width and the minimum of cutting of masonry units.

Solid and cored units: Lay on a full bed of mortar. Fill perpends solid. Cut mortar flush.

Hollow units: Face-shell bedded. Fill perpends solid. Cut mortar flush.

Joint thickness: 10 mm.

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.

For jointing, see AS 4773.1 (2015) 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.

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.

Sills and thresholds

General: Solidly bed sills and thresholds and lay them with the top surfaces draining away from the building.

Minimum size of unit: 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, provide 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.

See BCA (2022) H2D5 and AS 4773.2 (2015) clause 6.2 for subfloor ventilation requirements. The requirements vary for different climate zones. See AS 3959 (2018) for buildings in bushfire-prone areas; vents require a corrosion resistant wire mesh to prevent ingress of embers.

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.

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 information in ABCB Housing Provisions (2022) Table 6.2.1a.

Underpinning

Requirement: Install underpinning without causing damage to the building.

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

Confirm with the structural engineer and amend as required.

3.4 CAVITY WORK

Cavity clearance

General: Keep cavities clear at all times.

Cavity fill

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

Cavity width

General: Construct minimum cavity widths in conformance with the following:

- Masonry walls: 40 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 or services.

Width of cavity may need to be increased if wall insulation is required to BCA (2022) H6D2(1)(b)(i).

Openings

Jambs of external openings: Do not close the cavity.

Wall ties connectors and accessories

Protection: Install to prevent water passing across the cavity.

3.5 DAMP-PROOF COURSES

Location

General: Locate 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 one course above. Project 10 mm beyond the external slab edge and turn down 45°.
- 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.
- Internal walls built off slabs on ground in the first course 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 areas that slope away from the wall.
- 50 mm above the finished paved or concreted areas that slope away from the wall and are protected from the direct effect of the weather.

Installation

General: Lay in long lengths. Sandwich damp-proof courses between mortar.

Joints: Locate away from weepholes.

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

Laps: Lap the full width of angles and intersections and 150 mm at joints.

Steps: Step as necessary, but not more than two courses per step for brickwork and one course per step for blockwork.

3.6 FLASHINGS

See also Roofing for roof flashings.

Location

General: To AS 4773.2 (2015) clause 9.6 and clause 10.5.

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 (2018) clause 4.7.2 Prevention of moisture penetration - Weepholes and AS 3700 (2018) clause 11.4.14 Workmanship - Weepholes. Preferably indicate location and detail on the drawings, and delete this subclause. See AS 3959 (2018) for building in bushfire-prone areas; 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 insect barrier.

3.7 WALL TIES**Location**

Spacing: To AS 4773.2 (2015) clause 9.7 and clause 10.6.

Installation

Embedment: At least 50 mm into mortar. Provide at least 15 mm of mortar cover to any exposed surface.

Flexible masonry ties

Requirement: Provide stabilising ties at control joints and abutting structural elements, including columns, beams and slab soffits.

3.8 CONTROL JOINTS**General**

Location and spacing: Provide control joints to AS 4773.2 (2015) Section 7.

Control joint filling

Installation: Clean the joints thoroughly and insert an easily compressible backing material before filling with a gun-applied flexible sealant.

Sealant joint depth to width ratio (depth:width): 1:2.

Minimum sealant depth: 6 mm.

Sealant type: External: UV stable.

3.9 REINFORCED AND GROUTED BLOCKWORK

Reinforced blockwork should be specified by a professional engineer.

Reinforcement

Cover: Maintain cover to vertical and horizontal steel reinforcement using plastic clips or wheels, as appropriate.

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 that 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.

3.10 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 vertically.

Propping: Provide temporary props to lintels to prevent deflection or rotation.

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

Schedules are a tool to specify properties required for products or systems. If the principal permits documentation of the product or system by proprietary name, some of the properties may be unnecessary and can be deleted. Document the product or system's location or application here and/or on the drawings with a matching project code. Refer to NATSPEC TECHnote GEN 024 for guidance on using and editing schedules.

4.1 SCHEDULES

Durability schedule

Exposure environment	
Exposure location	

Exposure environment: Mild, moderate, industrial, marine or severe marine to AS 4773.1 (2015) clause 4.3.

Exposure location: Exterior, exterior coated or interior locations to AS 4773.1 (2015) clause 4.4.

Masonry schedule

Masonry	
Type	
Manufacturer	
Work size (mm)	
Sill units	
Colour	
Feature colour	
Mortar	
Type	
Colour	
Joints	
Shape or profile	
Accessories	
Damp-proof course	
Flashings	
Weepholes guards	

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

Masonry: Work size (mm): 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.

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

Joints: Shape or profile: e.g. Tooled, raked, weatherstruck or others.