

0331 BRICK AND BLOCK CONSTRUCTION

Worksection application

This full worksection *Template* is applicable to manufactured units comprising of clay, calcium silicate or concrete and autoclaved aerated concrete (AAC) used in buildings and associated structures. It includes details on mortar, reinforcement, prestressing, ties and other accessories, lintels, damp proofing and flashings.

Guidance text

All text within these boxes is provided as guidance for developing this worksection and should not form part of the final specification. This *Guidance* text may be hidden or deleted from the document using the NATSPEC Toolbar or the hidden text Hide and Delete functions of your word processing system. For additional information visit FAQs at www.natspec.com.au.

Optional text

Text in this font (blue with a grey background) covers items specified less frequently. It is provided for incorporation into *Open* text where it is applicable to a project.

Related material located elsewhere in NATSPEC

If a listed worksection is not part of your subscription package and you wish to purchase it, contact NATSPEC.

Related material may be found in other worksections. See for example:

- *Adhesives, sealants and fasteners.*
- *ANCON structural steel components.*
- *Monolithic stabilised earth walling.*
- *Mud brick walling.*
- *Stone masonry.*
- *Sheet flooring and decking.*
- *Roofing – combined.*
- *Partitions – brick and block, for interior fitout masonry walls.*
- *Plastering.*

Cross references

Worksections that cross reference this worksection are:

- *Green star – as built submissions.*
- *Green star – office as built submissions.*
- *Adhesives, sealants and fasteners.*

Material not included in NATSPEC

Some projects may include items not covered by NATSPEC. For these you may need to create new text or modify this text or a suitable worksection.

Documenting this and related work

You may document this and related work as follows:

- Lateral stability issues are appropriately dealt with in the drawings.
- If durability or fire resistance are issues, ensure that they are dealt with in the **SELECTIONS**.
- For masonry in small buildings, AS 4773.1 and AS 4773.2 may be used.
- Earthquake design: Buildings with an earthquake parameter k_{pz} greater than 0.11, are outside the scope of AS 4773, irrespective of the buildings configuration. Refer to AS 1170.4 Table 3.2 for z values in different Australian locations ($k_p = 1$ for housing, $P=1/500$ – see AS/NZS 1170.0 Supp 1 clause CF2b), and AS 1170.4 Appendix A for material types requiring specific earthquake design.
- Search acumen.architecture.com.au for notes on the growth of brickwork.

Specifying ESD

Refer to NATSPEC TECHreport - *Specifying ESD*. The following may be specified here:

- Category for appropriate durability.

1 GENERAL

1.1 RESPONSIBILITIES

General

General: Provide brick and block construction as documented.

1.2 CROSS REFERENCES

General

Requirement: Conform to the following:

- *General requirements.*

The *General requirements* worksection contains umbrella requirements for all worksections.

- [complete/delete]

List the worksections cross referenced by this worksection. The *General requirements* worksection references the *Common requirements* worksections. It is not necessary to repeat them here. However, you may also wish to direct the contractor to other worksections where there may be work that is closely associated with this work.

NATSPEC uses generic worksection titles, whether or not there are branded equivalents. If you use a branded worksection, change the cross reference here.

1.3 STANDARD

General

Materials and construction: To AS 3700.

Familiarity with this standard is essential. Design to AS 3700 is assumed not to be the contractor's responsibility. Therefore it is essential that the drawings indicate the design requirements for the masonry elements, including dimensions, strength and fire resistance rating.

AS 3700 Section 3 covers design properties for masonry units, masonry, ties and accessories, grout, reinforcement and tendons. AS 3700 Section 10 covers general requirements of masonry, masonry units, mortar, wall ties, connectors, accessories, lintels, damp-proof courses, flashings, weatherings, grout, reinforcement and tendons.

AS 3700 Section 11 covers general requirements for construction, including protection of materials, moisture content of masonry units, bedding, preparation of control joints, cutting and chasing of masonry units, rate of construction, construction during adverse weather conditions, construction of grouted masonry, protection of new and incomplete work, tolerances, cavity construction, jointing, installing damp-proof courses and flashings, cleaning, and other matters that should not be repeated in this worksection.

CMAA publications CMAA MA45, CMAA MA54 and CMAA MA55 available from www.cmaa.com.au provide more information on concrete masonry.

Various publications of the Clay Brick and Paver Institute (CBPI) are of general application, particularly Think Brick Manual 2 and Think Brick Manual 9.

For works including building designs conforming to AS 4773, amend with the following *Optional text*:

Materials and construction: To AS 3700 or AS 4773, as appropriate.

For restoration work, see also BS 6576 on rising damp in walls and the installation of chemical damp-proof courses.

Only particular requirements for the project should be added to this worksection.

1.4 INTERPRETATION

Definitions

General: For the purposes of this worksection the definitions in AS 3700 clause 1.5.2 and those given below apply:

- Brick: A masonry unit that does not exceed 338 mm long x 225 mm wide x 113 mm high, of a size that allows it to be picked up with one hand while the other is used to apply mortar with a trowel.
- Block: A masonry unit exceeding the size of a brick in any dimension, for use in the construction of walls or partitions.

From SAA HB 50.

- Brickwork and blockwork types:
 - . Common or ordinary: Brickwork and blockwork which is not tested for specified strength values, is not especially treated for texture and colour and can include reject face units.

- . Face units: Bricks or blocks used in facework, including purpose-made units such as squints, sills and thresholds.
- Facework: Brickwork or blockwork in which the form, or form and colour, of the face units and joints is visible in the completed works.

Edit the **Definitions** subclause to suit the project or delete if not required.

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.

Customise for the project. Add **Hold points**, if required.

Amend to suit the project adding critical stage or mandatory inspections required by legislation or regulation.

1.6 TESTS

Durability

Preferably show on the drawings, or in the **Brick and block construction schedule**, mortars conforming with AS 3700 Tables 10.1 or AS 4773.2 Table 3.2, as appropriate, and delete this clause. For other mortars, retain this clause. For metal components consider the corrosivity categories documented in AS 4312 and AS/NZS 2312 in selecting the appropriate category and coating system.

Consider soil conditions and other exposure issues carefully before modifying or deleting the defaults. For example, AS 3700 permits M3 mortar below damp proof courses in internal walls in non-aggressive soils so the default text could be changed if the nature of the soil conditions is fully understood.

Consider the benefits of adopting one class of mortar for the project versus the cost of using a higher class of mortar than would normally be required for internal work.

Mortar: Mortar durability tests are required.

Conformance: Test to verify conformance as follows:

- Standard: To AS 3700 Appendix FA.
- Acceptance criteria:
 - . Class M2: 0.5 mm.
 - . Class M3: 0.3 mm.
 - . Class M4: 0.1 mm.

AS 3700 Appendix FA is designed to be easily applied on site to finished work.

Special masonry

Special masonry is defined in AS 3700 clause 1.5.2.21(f), as structural masonry construction with design strengths higher than those specified in the standard. Retain this clause only if special masonry is required. Special masonry is outside the scope of AS 4773 series.

Conformance: Test to verify conformance with the **Brick and block performance schedule** and as follows:

- Compressive strength: To AS 3700 Appendix C.
- Flexural strength: To AS 3700 Appendix D.

1.7 SUBMISSIONS

Particular samples required may include accessories such as ties, ant caps, damp-proof course, flashing, sill bricks, squints and vents. AS 3700 clause 11.7.2 covers rate of sampling for special masonry sampling. Add requirements here.

Brick or block unit 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 panels

General: 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.

If final design decisions have not been made about mortar colour and joint finish, it may be necessary to specify several trial sample panels illustrating different combinations. However, to reduce cost, consider locating sample panels so that they may be retained if approved, and incorporated into the works. Rely on these panels for definition of quality e.g. accuracy, neatness.

Sand samples

Type: Submit a 2 kg sample of each type of sand required to be of a particular colour, grade or source.

Samples of sand may be required where a particular source or colour is required, and for major works, where testing for grading is necessary.

1.8 TOLERANCES

Masonry construction

Conformance: Conform to AS 3700 Table 11.1.

AS 3700 Table 11.1 does not specify facework tolerances for what many architects might regard as critical visual features – the horizontality, regularity and verticality of edges, joints etc.

In some instances (e.g. verticality) the permitted deviations seem excessive. The ratio of permitted deviation to length of 1:300 sometimes used in AS 3700 hardly seems tight enough for good work which is what facework should surely be.

It will be necessary to identify face units either as a proprietary item (brand name, manufacturer) or by reference to preselected samples. These remarks also apply to selected commons specified to be used as face bricks. Preferably use clay commons with clay face units. If using different types in close proximity, e.g. in the two leaves of a cavity wall, make sufficient provision for differential movement between them. See AS 3700, Section 6 for fire rated units.

2 PRODUCTS

2.1 MATERIALS

One or more of the admixture materials listed in AS 3700 clause 10.4.2.4, are permitted. Plasticisers are not recommended as a substitute for lime. A CBPI survey found that bricklayers routinely add between 4 and 20 times the recommended amount, resulting in low bond strength and durability. Specify limits to suit the project.

Refer to CCAA T60 for guidance on sand in mortar. If a particular source or colour is specified, a sample is required. If possible, mortar colour should be achieved by the natural colour of the sand (including blended sands), if necessary in combination with white or off-white cement, rather than by the addition of colouring pigments.

See AS 3700 clause 1.4 or AS 4773.1 clause 1.4, as appropriate, for information to be provided on the project documentation.

Bricks and blocks

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

Salt attack resistance grade: To AS 3700 Table 5.1.

- Bricks and blocks: Below damp-proof course, and in external leaves in the corrosivity categories D and F, provide Exposure grade to AS/NZS 4455.1 Table 2.3 or AS/NZS 4455.3 Table 2.4, as appropriate.

This default is marginally more severe than some allowances in AS 3700 in part in response to increasing problems of ground salinity and in part in the interests of simplicity.

Note that the Salt attack resistance grades are aligned with the requirements of AS 3700. Grade definitions are set out in AS/NZS 4455.1 and AS/NZS 4455.3

For works including building designs conforming to AS 4773, amend with the following *Optional text*:

Salt attack resistant grade: To AS 3700 Table 5.1 or AS 4773.2 Table 2.1, as appropriate.

Minimum age of clay bricks: 7 days.

Brick growth is a particular problem with polychromatic brickwork – detail accordingly.

Mortar materials

Durability classification.

- Above the damp-proof-course: Conform to the **Corrosion resistance and durability table** .
- Below the damp-proof-course: M4 mortar conforming to the **Mortar mix table** .

Admixtures: To AS 3700 clause 10.4.2.4.

For works including building designs conforming to AS 4773, amend as follows:

Admixtures: To AS 3700 clause 10.4.2.4 or AS 4773.2 clause 3.2.6, as appropriate.

Lime: To AS 1672.1.

Cement: To AS 3972.

- Type: [complete/delete] .

Cement type is normally GP. Where sulphate attack is possible, specify SR (see AS 3700 clause 5.4). Note AS 3972 advises caution in expecting Type SR to address sulphate attack under all conditions. If fly ash is permitted, the cement will be to Type GB or Type LH. The cement contents may need varying.

Masonry cement: To AS 1316.

Proportions: Conform to the **Mortar mix table** .

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.

White cement: With ≤ 1% iron salts content.

Pigment: To BS EN 12878, and as follows:

- Quantity: Less than 10% of the mass of cement in the mix.

For light colours: Use off-white cement in the mix.

Mortar mix table

Mortar class to AS 3700	Cement, lime, sand ratios (by volume)			Water thickener
	Clay	Concrete	Calcium silicate	
Masonry cement				
M3	1:0:4	1:0:4	n/a	No
M4	1:0:3	n/a	n/a	No
Cement (GP/GB)				
M2	1:2:9	n/a	n/a	No
M3	1:1:6	1:1:6	n/a	Optional
1:0:5	1:0:5	1:0:5	Yes	
M4	1:0.5:4.5	1:0.5:4.5	n/a	Optional
1:0:4	1:0:4	1:0:4	Yes	

Edit for the mortar mixes required for the project, and schedule the location where each is to be used.

Where options exist within a Mortar class, the choice of a mix containing lime increases the chance of post demolition reuse of bricks.

Thin bed mortars for autoclaved aerated concrete (AAC) are proprietary materials purpose-made, and are not covered by this table.

For works including building designs conforming to AS 4773, make sure the mortar mix table conforms to AS 4773.2 clause 3.1 and AS 4773.2 Table 3.2.

2.2 COMPONENTS

Steel lintels

Angles and flats: To AS/NZS 3679.1 .

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

Durability Classification to AS/NZS 2699.3: [complete/delete]

Durability classifications R0 to R5 are defined in AS/NZS 2699.3 clause 2.4. For lintel deemed to satisfy durability criteria, see AS/NZS 2699.3 Tables 1, 2 and 3. Durability requirements for masonry structures are defined in AS 3700 Table 5.1 and AS 4773.1 Table 4.1, as appropriate.

Corrosion resistance: Conform to the **Corrosion resistance and durability table**.

If the **Corrosion resistance and durability tables** are not used, use the following text:

Corrosion protection: To AS/NZS 2699.3.

Galvanizing: Do not cut after galvanizing.

Wall ties

Standard: To AS/NZS 2699.1.

Type: [complete/delete]

Nominate Type B where specific seismic design characteristics are required. Otherwise nominate Type A. For wall tie types, including those for seismic conditions, see AS/NZS 2699.1 clause 1.4.15.2.

Durability Classification to AS/NZS 2699.1: [complete/delete]

Durability classifications R0 to R5 are defined in AS/NZS 2699.1 clause 2.4. Durability requirements for masonry structures are defined in AS 3700 Table 5.1 and AS 4773.1 Table 4.1, as appropriate. For wall ties deemed to satisfy durability criteria, see AS/NZS 2699.1 Tables 3 and 4. This standard is based on a wall tie life of not less than 50 years, see clause 2.2 (b).

Corrosive resistance and durability: In conformance with the **Corrosion resistance and durability table**.

If the **Corrosion resistance and durability tables** are not used, use the following text:

Corrosion protection: To AS/NZS 2699.3.

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]

See AS 3700 clauses 4.10 and 10.5 for design principles. For BCA Class 1 and 10 buildings, see also BCA 3.3.3.2 and AS 4773, as appropriate. Note that resilient ties may be needed for BCA sound insulation conformance.

Minimum characteristic strength and stiffness values are given in AS/NZS 2699.1 clause 2.7. The strength classification is dependant on the tie type, loading and spacing. For building designs conforming to AS 4773, see AS 4773.1 Tables 7.1 and 8.3. Document strength classification here or detail on the drawings.

Connectors and accessories

Standard: To AS/NZS 2699.2.

Durability Classification to AS/NZS 2699.2: [complete/delete]

Durability classifications R0 to R5 are defined in AS/NZS 2699.2 clause 2.4. For connectors and accessories deemed to satisfy durability criteria, see AS/NZS 2699.2 Tables 1 and 2. Durability requirements for masonry structures are defined in AS 3700 Table 5.1 and AS 4773.1 Table 4.1, as appropriate.

Corrosive resistance and durability: Conform to the **Corrosion resistance and durability table**.

If the **Corrosion resistance and durability tables** are not used, use the following text:

Corrosion protection: To AS/NZS 2699.2

Flexible masonry ties: If accommodation of movement is required at control joints and where masonry abuts structural elements such as column faces and slab soffits, provide details.

These should preferably be shown on the drawings. If this is not the case and selection is left to the builder, at least the requirements for movement and associated load transfer should be provided.

Corrosion resistance and durability

Durability: 15 – 25 years to first maintenance, to AS/NZS 2312.

The **Corrosion resistance and durability tables** contain default values based on AS/NZS 2312 and AS 3700. BCA Volume 2 also has specific values for domestic construction components in environmental corrosivity categories which are aligned with AS/NZS 2312. Edit the tables to suit the project and coordinate with other worksections. The project corrosivity category is nominated in the *General requirements* worksection from the following categories: A (very low), B (low), C (medium), D (high), E

(very high) and F (inland tropical). These are described in AS/NZS 2312 and are consistent with AS 4312 and the categories of ISO 9223 and the ISO 12944 series. The E categories, E-I (industrial) and E-M (marine), are not addressed in these tables. For categories not covered in the tables, consider corrosion protection requirements in more detail. See *Commentary* and *Guidance* for the *General requirements* worksection and NATSPEC TECHnote DES 010 for a comparison of the atmospheric corrosivity categories given in AS/NZS 2312, AS 3700 and AS 4312. See also the various parts of AS/NZS 2699 where there are duplex protective coatings systems in addition to those given here. If internal elements are being painted, lower levels of zinc-coating may be considered.

The **Corrosion resistance and durability tables** call for different levels of protection for internal and external situations. Where an aggressive internal atmosphere may arise, for example due to activities to be carried out inside the building, consider internal corrosion protection requirements in more detail as default values for the internal situation may not be appropriate.

Compliance: Conform to the **Corrosion resistance and durability table(s)**, or provide proprietary products with metallic and/or organic coatings of equivalent corrosion resistance and as follows:

- Galvanizing: To AS/NZS 4680 .
- Built-in products below damp proof course: Stainless steel 316 or engineered polymer.

Some of these defaults are marginally in excess of some allowances in AS 3700; in part in response to increasing problems of ground salinity and in part in the interests of simplicity.

Corrosion resistance and durability table – Atmospheric corrosivity category – A and B to AS/NZS 2312

Designate the corrosivity category of the project in *General requirements*. Delete the tables for corrosivity that do not apply.

Situation	Steel lintels (each surface)	Wall ties, connectors and other structural steel accessories above damp proof course (each surface)	Minimum mortar classification above damp proof course
Internal	Galvanize after fabrication 600 g/m ²	- Galvanize after fabrication 300 g/m ² - Metallic-coated sheet Z275/AZ150 - Galvanized wire 470 g/m ² - In line galvanized sections with after fabrication coating repair ILG/150	M2
External (including cavity air space)	Galvanize after fabrication 300 g/m ²	- Galvanize after fabrication 300 g/m ² - Metallic-coated sheet Z600 - Galvanized wire 470 g/m ²	M2

Corrosion resistance and durability table – Atmospheric corrosivity category – C to AS/NZS 2312

Designate the corrosivity category of the project in *General requirements*. Delete the tables for corrosivity that do not apply.

Situation	Steel lintels (each surface)	Wall ties, connectors and other structural steel accessories above damp proof course (each surface)	Minimum mortar classification above damp proof course
Internal	Galvanize after fabrication 300 g/m ²	- Galvanize after fabrication 300 g/m ² - Galvanized wire 470 g/m ² - Metallic-coated sheet Z275/AZ150	M2
External (including cavity air space)	Galvanize after	- Galvanize after	M3

Situation	Steel lintels (each surface)	Wall ties, connectors and other structural steel accessories above damp proof course (each surface)	Minimum mortar classification above damp proof course
air space)	fabrication 600 g/m ²	fabrication 600 g/m ² - Galvanized wire 470 g/m ²	

Corrosion resistance and durability table – Atmospheric corrosivity category – D and F to AS/NZS 2312

Designate the corrosivity category of the project in *General requirements*. Delete the tables for corrosivity that do not apply.

Situation	Steel lintels (each surface)	Wall ties, connectors and other structural steel accessories above damp proof course (each surface)	Minimum mortar classification above damp proof course
Internal	Galvanize after fabrication 600 g/m ²	Galvanize after fabrication 600 g/m ²	M2
External (including cavity air space)	- Stainless 316 - Galvanize after fabrication 600 g/m ² plus organic coating ¹	- Stainless 316 - Engineered polymer	M4
¹ Avoid organic coating in Category F zones.			

Flashings and damp-proof courses

Standard: To AS/NZS 2904.

For works including building designs conforming to AS 4773, see AS 4773.2 Table 5.2 for suitable materials for flashings and damp-proof courses.

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.

Other options include English, Flemish, stack, or running 100 mm stagger for AAC units. For existing work you may wish to include the following text:

Existing work: Rod and bond to match existing.

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.

Steel door frames: Fill the backs of jambs and heads solid with mortar as the work proceeds.

Heads of some steel door frames may be used as lintels. Consult manufacturer.

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.

If structural action across the vertical control joint is required, the joint should be detailed (e.g. with flexible masonry anchors) by the structural engineer on the drawings

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 mortar jointing, see AS 3700 clauses 4.9.

Monolithic structural action

General: Provide brick or block header units, except in stretcher bond facework, to AS 3700 clause 4.11.2.

Spacing: 600 mm maximum.

Location: Conform to the following:

- 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.

Aerated autoclaved concrete blocks and perforated clay blocks will be to rods other than those listed in the worksection. Refer to manufacturer's details.

Protection

General: Keep the top surface of brickwork and blockwork covered to prevent the entry of rainwater and contaminants.

Protect single leaf and solid walls to AS 3700 clause 4.7.4.

Temporary support

General: If the final stability of the brickwork or blockwork is dependent on (structural) elements to be constructed after the brickwork or blockwork, 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 use an acid solution. Do not erode joints if using pressure spraying.

See also CBPI Manual 3 and product application at www.thinkbrick.com.au under *The brick cleaning manual* and CMAA MA41. Appropriate detailing, protection of bricks and brickwork, careful finishing, and prompt cleaning should reduce the need for subsequent cleaning. Acids can damage metal and plastic items, such as window frames and damp-proof courses. See AS 3700 clause 11.10 for cleaning. AS 4773.2 Appendix B also provides extensive guidance on this topic. Choice of correct cleaning method is the contractor's responsibility.

Colour mixing

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

Commencement

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

Delete or amend if facework commences at a higher level.

Double face walls

Selection: Select face units for uniform width and double-face qualities.

Preferred face: Before starting, obtain a ruling as to which is the preferred wall face, and favour that face should a compromise be unavoidable.

Delete if shown on the drawings.

Perpends

General: If it is proposed to use other than vertically aligned perpends in alternate courses, provide details.

Delete if already covered on the drawings.

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.

Add here clauses specifying other trim items, if required; e.g. copings, string courses, corbel courses, parapets, if not shown on the drawings.

Sill units: Detail or schedule on the drawings (e.g. squint bricks, brick on edge, purpose-made blocks, tiles).

Threshold units: Detail or schedule on the drawings. Schedule type of unit (e.g. brick on edge, purpose-made blocks, tiles).

3.3 SUBFLOOR WORK

Delete if the building does not have a suspended floor. Otherwise, show support layout on the drawings and coordinate with the *Decking and platform floors* worksection.

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 ground floors.

See also AS 1860.2 clause 5 on Subfloor ventilation. Air vents may also be used for cavity ventilation at, say, 2000 mm² free area per metre run of storey-height brickwork.

For subfloor ventilation, BCA F1.12 and BCA Table F1.12 provides minimum requirements for various climates. For building designs conforming to AS 4773, see also AS 4773.2 clause 6.2.

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.

Show on the drawings. Location of air vents is often a critical design issue.

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.

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

Delete if shown on the drawings or amend to suit.

Openings

Care: Do not close the cavity at the jambs of external openings.

Delete if drawings indicate closed cavities.

Wall ties connectors and accessories

Protection: Install to prevent water passing across the cavity.

3.5 DAMP-PROOF COURSES

See AS 3700 clause 10.6.2 for mortar weatherings. The use of damp-resisting additives is not recommended; they are not listed in AS 3700 clause 10.4.2.4. See AS 3700 clauses 4.7.3 *Damp-proof courses and flashings* and 10.6 *Damp-proof courses, flashings and weatherings*. BCA F1.9(b) permits two options for damp-proof courses: to AS/NZS 2904 or impervious termite shields to AS 3660.1. This is varied in South Australia to address the effects of salt damp.

Location

The defaults are not comprehensive. Typical damp-proof course and flashing applications should be shown on the drawings. If they are, delete the following as appropriate. Coordinate damp-proof courses with slip joints and with termite shields.

General: Provide damp-proof courses as follows:

For building designs conforming to AS 4773, replace with the following text:

General: Provide damp-proof courses to AS 4773.2, as appropriate, and 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.

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

Lap sealing: Seal with a bituminous adhesive and sealing compound.

3.6 FLASHINGS

Location

The locations, profiles and fixings of flashings are best shown on the drawings. If they are shown there, delete the following as appropriate. These defaults are not comprehensive. See the *Roofing – combined* worksection for roof flashings.

General: Provide flashings as follows:

For building designs conforming to AS 4773, replace with the following text:

General: Provide flashings to AS 4773.2, as appropriate, and 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. Where the slab supports the outer skin and is not rebated, bed the flashing in a suitable sealant.

Position depends upon masonry support detail - shelf angle, slab or rebated slab.

- 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 jambs: Full height flash 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 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

See AS 3700 clause 4.7.2 and AS 3700 clause 11.4.14. 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.

3.7 WALL TIES

Location

General: Space wall ties in conformance with AS 3700 clause 4.10 or BCA Figure 3.3.3.1 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.

For cavities exceeding 80 mm width, closer horizontal spacing may be necessary. If spacings other than those given in the standard are required, specify them here. Wall ties for cavity walls and masonry veneer require design to transfer the appropriate loads, also see AS 3700 clause 7.7 and 7.8 or AS 4773.2 clause 9.7 and 10.6, as appropriate.

Installation

Detail or specify fixing of masonry veneer ties to steel frames: e.g. Welded, or Drilled and bolted, on the drawings. Refer to AS 3700 clause 4.10, for general design principles.

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

Fixing of masonry veneer ties at abutments:

- To timber frames: Screw fix to outer face of timber frames with AS 3566 fixings.
- To concrete: Masonry anchors.

To steel frames: Screw fix to outer face of steel studs with AS 3566 fixings.

3.8 CONTROL OF MOVEMENT

Location and details of control joints are best shown on the drawings. For vertical joints in articulated walling on reactive sites, see CCAA TN61, AS 4773.1 and AS 4773.2.

Control joints in concrete masonry are required to prevent cracking caused by shrinkage and other potential movements. Consult manufacturers' recommendations. AS 3700 clause 4.8 has principles for design and detailing of control joints in masonry. Control joints are frequently rendered useless during construction by mortar droppings and the like. Inspection before filling is therefore provided for in **INSPECTION**.

Joints

General: To AS 3700.

Refer to BCA 3.3.1.8 for more details on articulation joints. For works including building designs conforming to AS 4773, refer to AS 4773.2 Section 7 and amend text as follows:

General: To AS 3700 or AS 4773.2, as appropriate.

For sealants in external masonry joints see *Adhesives, sealants and fasteners*.

Filler material: Provide compatible sealant and bond breaking backing materials which are non-staining to masonry. 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.

Consult manufacturers for proprietary sealants e.g. external neutral cure silicone, and for joint fillers e.g. closed cell expanded polythene. Rigid fillers such as pulp board, cork or semi-rigid foam should not be specified.

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.

Location and details of joints are best shown on the drawings. If they are shown there, modify the above.

Fire rated control joints

For service penetrations, coordinate with the services worksections.

General: If a control joint occurs in an element of construction required to have a fire resistance rating, construct the control joint using fire stopping materials so that the fire resistance rating of the element is not reduced.

Fire stopping: To AS 4072.1.

AS 4072.1 is cited in BCA C3.15(a), on openings in fire-resistant elements for service installations.

3.9 MASONRY DUCT RISERS

Buildings with chimneys or parapets cantilevering higher than 600 mm or in wind categories stronger than N3 are outside the scope of AS 4773.

Location

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

Material: [complete/delete]

Material: e.g. 0.6 mm metallic coated steel sheet, 20 kg/m² sheet lead, 0.6 mm copper sheet.

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 BRICK BED JOINT REINFORCEMENT

Refers to light-gauge mesh or fabric, used in brickwork and in solid blockwork. Essentially for crack control only and of doubtful value in any case although it may hold together fractured masonry. See AS 3700 clause 5.7.3 for reinforcement in mortar joints. Delete clause if not required.

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.

- In brickwork: 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

Design of reinforced masonry including bond beams is in conformance with AS 3700 Section 8 *Structural design of reinforced masonry* and, if applicable, Section 6 *Design for fire resistance*. The sizes and locations of reinforcement should be shown on the drawings.

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 ensure 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.

3.12 LINTELS

Location

General: Provide 1 lintel to each wall leaf in conformance with 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: 200 mm.

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

- Minimum propping period: 7 days.

3.13 ARCHES

Show radius, number of voussoirs, springing, and so on, on the drawings. For designs conforming to AS 4773, see AS 4773.2 clause 8.4 for unreinforced masonry arches.

Arch voussoirs

General: Cut units using a masonry saw.

Shapes and dimensions

General: Form arches using solid or cored (not hollow) masonry units.

3.14 BAGGING

Preparation

General: Cut joints flush before bagging.

Select from **Dry bagging** or **Textured 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.

Preparation: Cut joints flush before bagging.

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.

4 SELECTIONS

Schedules refer to the selection of proprietary products or to systems or generic products by their properties. Provide their locations either here or on the drawings. **Schedules** are well suited to multiple variants of the same item. If there is only a single instance of different items, a simple list may be sufficient.

Duplicate and customise these **Schedules**, adding and deleting rows and columns, as required.

Make sure there is an entry for every item specified as a default value.

4.1 SCHEDULES

This schedule refers to the selection of the product/material by its properties, but does not locate it within the project. For this you should prepare a separate document e.g. a Finishes schedule or a notated elevation to locate the various finishes by reference to a designation code or abbreviation of the finish.

Brick and block construction schedule

Property	Code		
	A	B	C
Bricks and blocks			
Name or type			
Fire resistance level: - FRL - Core filled			
Work size			
Category			
Salt attack resistance category			
Characteristic unconfined compressive strength			
Coefficient of contraction			
Coefficient of expansion			
Air vent units			
Sill units			
Threshold units			
Mortar			
Cement			
Colour			
Proportions or class			
Sand			
Units mortar joints			
Bond			
Depth			
Shape or profile			
Built-in components			
Damp-proof course type			
Flashings material			
Lintel type			
Weephole insect barriers			
Resilient wall ties			
Grout			
Composition			
Compressive strength			
Control joints			
Backing rod			
Primer			
Sealant			
Width			

Brick and blocks

Code: Designation code for location.

Name or type: Verify that the nominated manufacturer can supply the selected bricks or blocks in the necessary quantities, including purpose-made specials if required, in time to meet the construction program. Alternative sources may be given where practicable. See AS 3700clause 1.5.2.22(b).

Fire resistance level: Core filled or block type (Scoria) are alternatives. If bricks are used nominate FRL only.

Work size: Commonly 230 x 110 x 76 mm for bricks and 390 x 190 x 190 mm for blocks, but many other sizes are available (e.g. for blocks: 90, 140 and 290 mm thick). For AAC blocks and perforated clay blocks, check with manufacturers. For AAC units the wall blocks are all 200 mm high and 600 mm long - thickness ranges from 75 to 300 mm.

Category: To AS 3700clause 1.5.2.22(a); e.g. solid unit, cored unit, hollow unit etc.

Salt attack resistance category: e.g. Exposure, General purpose or Protected as described in AS/NZS 4455.1Table 2.3 or AS/NZS 4455.3Table 2.4.

Characteristic unconfined compressive strength: For engineered masonry, where standard defaults (e.g. AS/NZS 4455.1clause 2.3) are inadequate; a certificate may be required.

Mortar

Cement: Nominate type.

Colour: Nominate pigment.

Sand: Nominate supplier where essential for the selected colour.

Units mortar joints

Unit mortar joints: e.g. Ironed with a 12 mm diameter rod, Cut and struck, Weatherstruck, Flush jointed, Raked out 5 mm deep and ironed square (or half round), Broomed, To match existing, or As shown on the drawings, etc. Raked joints are generally not recommended. The exposed mortar face should be compressed. Tuck pointing, if required, should be clearly specified.

Built-in components

Damp-proof course type: e.g. Bitumen coated and flashing material, metal, polyethylene, see AS/NZS 2904clause 7.

For proprietary systems such as AAC blockwork, manufacturer's recommendations and CSIRO Appraisal limitations, if any, should be applied. Repair of AAC blockwork, which is easily damaged in handling, requires careful documentation.

For building designs conforming to AS 4773, make sure all assigned properties are not in contradiction with the deemed-to-satisfy values in AS 4773.

Brick and block construction performance schedule

Property	Type		
	A	B	C
Compressive strength			
Durability test			
Flexural strength			

Testing for strength of special masonry is mandatory in AS 3700. Deemed-to-satisfy masonry is normally not tested except where doubt exists whether the required properties are being achieved on site, see AS 3700clause 11.6.

Lintel schedule

Opening dimensions (mm)	Lintel type	Dimensions (mm)		
		D1 ¹	D2 ²	Thickness ³

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

¹ D1 is depth of lintel.

² D2 is width of lintel.

³ Thickness applies only to steel T or angle lintels.

Lintel type: e.g. steel angle or product name.

BCA Figure 3.3.3.5 has acceptable steel lintel sizes in domestic situations. Lintel types include steel, precast reinforced concrete or prestressed concrete and reinforced terra cotta. Precast proprietary concrete lintels are also available and may be specified as an alternative to steel. Consult the structural engineer before using proprietary lintels with concrete or calcium silicate bricks, or clay bricks with more than 25% perforation. If proprietary lintels are required, specify. Heads of some steel door frames may be used as lintels. Consult manufacturer.

REFERENCED DOCUMENTS

The following documents are incorporated into this worksection by reference:

AS 1170		Structural design actions
AS 1170.4	2007	Earthquake actions in Australia
AS 1316	2003	Masonry cement
AS 1672		Limes and limestones
AS 1672.1	1997	Limes for building
AS 1860		Particleboard flooring
AS 1860.2	2006	Installation
AS/NZS 2312	2002	Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings
AS/NZS 2699	various	Built-in components for masonry construction
AS/NZS 2699.1	2000	Wall ties
AS/NZS 2699.2	2000	Connectors and accessories
AS/NZS 2699.3	2002	Lintels and shelf angles (durability requirements)
AS/NZS 2904	1995	Damp-proof courses and flashings
AS 3660		Termite management
AS 3660.1	2000	New building work
AS/NZS 3679		Structural steel
AS/NZS 3679.1	2010	Hot-rolled bars and sections
AS 3700	2001	Masonry structures
AS 3959	2009	Construction of buildings in bushfire prone areas
AS 3972	2010	General purpose and blended cements
AS 4072		Components for the protection of openings in fire-resistant separating elements
AS 4072.1	2005	Service penetrations and control joints
AS/NZS 4455		Masonry units, pavers, flags and segmental retaining wall units
AS/NZS 4455.1	2008	Masonry units
AS/NZS 4455.3	2008	Segmental retaining wall units
AS/NZS 4600	2005	Cold-formed steel structures
AS/NZS 4680	2006	Hot-dipped galvanized (zinc) coatings on fabricated ferrous articles
AS 4773		Masonry in small buildings
AS 4773.1	2010	Design
AS 4773.2	2010	Construction
BCA 3.10		Acceptable construction – Additional construction requirements
BCA 3.3.1.0		Acceptable construction – Masonry – Unreinforced masonry – Acceptable construction manual
BCA 3.3.2.0		Acceptable construction – Masonry – Reinforced masonry – Acceptable construction manual
BCA 3.3.3.0		Acceptable construction – Masonry – Masonry accessories – Acceptable construction manual
BCA Figure 3.3.3.1		Acceptable construction - Masonry - Masonry accessories - Typical brick ties spacing in cavity and veneer construction
BCA 3.3.3.2		Acceptable construction - Masonry - Masonry accessories - Wall ties
BCA 3.10.1.0		Additional construction requirements - High wind areas - Acceptable construction manuals
BCA 3.11.6		Acceptable construction – Structural design manuals – Structural design manuals – Determination of structural resistance of materials and forms of construction
BCA 3.3.4.0		Acceptable construction – Masonry – Weatherproofing of masonry – Acceptable construction manual
BCA Spec A2.3		General provisions - Acceptance of design and construction - Fire resistance of building elements
BCA B1.2		Structure - Structural provisions - Determination of individual actions
BCA B1.4		Structure - Structural provisions - Determination of structural resistance of materials and forms of construction
BCA F1.9		Health and amenity - Damp and weatherproofing - Damp-proofing
BCA G5.2		Ancillary provisions - Construction in bushfire prone areas - Protection
BS EN 12878	2005	Pigments for the colouring of building materials based on cement and/or lime. Specifications and methods of test

The following documents are mentioned only in the Guidance text:

AS 1170		Structural design actions
AS/NZS 1170.0 Supp 1	2002	General principles - Commentary (Supplement to AS/NZS 1170.0:2002)
AS/NZS 2699	various	Built-in components for masonry construction
AS 3566		Self-drilling screws for the building and construction industries
AS 4312	2008	Atmospheric corrosivity zones in Australia
SAA HB 50	2004	Glossary of building terms
BCA 3.3.1.8		Acceptable construction - Masonry - Unreinforced masonry - Vertical articulation joints
BCA Figure 3.3.3.5		Acceptable construction - Masonry - Masonry accessories - Lintels supporting roofs and masonry walls

BCA C3.15(a)		Fire resistance - Protection of openings - Openings for service installations
BCA F1.12		Health and amenity - Damp and weatherproofing - Sub-floor ventilation
BCA F1.9(b)		Health and amenity - Damp and weatherproofing - Damp-proofing
BCA Table F1.12		Health and amenity - Damp and weatherproofing - Sub-floor ventilation and clearance
CBPI		Clay Brick and Paver Institute
Think Brick Manual 2	2009	The properties of clay masonry units
CBPI Manual 3	1996	The full brick manual
CCAA T60	2008	Guide to the specification and use of manufactured sand in concrete
CCAA TN61	2008	Articulated walling
CMAA MA41		Concrete Masonry Structures - Cleaning and maintenance
CMAA MA45	2010	Concrete masonry handbook. Manual 45
CMAA MA54	2011	Single-leaf masonry design manual
CMAA MA55	2010	Guide to permeable interlocking concrete pavements
NATSPEC DES 010	2011	Atmospheric corrosivity categories for ferrous products
NATSPEC TECHreport	2011	Specifying ESD
Think Brick Manual 9	2008	Detailing of clay masonry
BS 6576	2005	Code of practice for diagnosis of rising damp in walls of buildings and installation of chemical damp-proof course
ISO 9223	1992	Corrosion of metals and alloys - Corrosivity of atmospheres - classification
ISO 12944	1998	Paints and varnishes - Corrosion protection of steel structures by protective paint systems

BCA citations of the above referenced standards include:

AS 1170.4

- BCA B1.2 Structure - Structural provisions – Determination of individual actions
- BCA B1.4 Structure - Structural provisions – Determination of structural resistance of materials and forms of construction

AS 1860.2

- BCA B1.4 Structure - Structural provisions – Determination of structural resistance of materials and forms of construction

AS/NZS 2699.1

- BCA 3.3.3.2 Acceptable construction – Masonry – Masonry accessories – Wall ties

AS/NZS 2904

- BCA F1.9 Health and amenity - Damp and weatherproofing - Damp-proofing

AS 3660.1

- BCA B1.4 Structure - Structural provisions – Determination of structural resistance of materials and forms of construction
- BCA F1.9 Health and amenity - Damp and weatherproofing - Damp-proofing

AS 3700

- BCA Spec A2.3 General provisions - Fire-resistance of building elements
- BCA B1.4 Structure - Structural provisions – Determination of structural resistance of materials and forms of construction

AS 3959

- BCA G5.2 Ancillary provisions - Construction in bushfire prone areas - Protection

AS/NZS 4600

- BCA B1.4 Structure - Structural provisions – Determination of structural resistance of materials and forms of construction

AS 4773.1

- BCA 3.3.1.0 Acceptable construction – Masonry – Unreinforced masonry – Acceptable construction manual
- BCA 3.3.2.0 Acceptable construction – Masonry – Reinforced masonry – Acceptable construction manual
- BCA 3.3.3.0 Acceptable construction – Masonry – Masonry accessories – Acceptable construction manual
- BCA 3.3.4.0 Acceptable construction – Masonry – Weatherproofing of masonry – Acceptable construction manual
- BCA 3.10 Acceptable construction – Additional construction requirements
- BCA 3.10.1.0 Acceptable construction – Additional construction requirements – High wind areas – Acceptable construction manual
- BCA 3.11.6 Acceptable construction – Structural design manuals – Structural design manuals – Determination of structural resistance of materials and forms of construction

AS 4773.2

- BCA 3.3.1.0 Acceptable construction – Masonry – Unreinforced masonry – Acceptable construction manual
- BCA 3.3.2.0 Acceptable construction – Masonry – Reinforced masonry – Acceptable construction manual
- BCA 3.3.3.0 Acceptable construction – Masonry – Masonry accessories – Acceptable construction manual
- BCA 3.3.4.0 Acceptable construction – Masonry – Weatherproofing of masonry – Acceptable construction manual
- BCA 3.10 Acceptable construction – Additional construction requirements

- BCA 3.10.1.0 Acceptable construction – Additional construction requirements – High wind areas – Acceptable construction manual
- BCA 3.11.6 Acceptable construction – Structural design manuals – Structural design manuals – Determination of structural resistance of materials and forms of construction