



# WESTERN AUSTRALIA SPECIFICATION

274

# MASONRY WALLS



**Amendment Record for this Specification Part**

This Specification is Council's edition of the AUS-SPEC generic specification part and includes Council's primary amendments.

Details are provided below outlining the clauses amended from the Council edition of this AUS-SPEC Specification Part. The clause numbering and context of each clause are preserved. New clauses are added towards the rear of the specification part as special requirements clauses. Project specific additional script is shown in the specification as italic font.

The amendment code indicated below is 'A' for additional script 'M' for modification to script and 'O' for omission of script. An additional code 'P' is included when the amendment is project specific.

<b>Amendment Sequence No.</b>	<b>Key Topic addressed in amendment</b>	<b>Clause No.</b>	<b>Amendment Code</b>	<b>Author Initials</b>	<b>Amendment Date</b>
<i>EXAMPLE 1</i>	<i>Provision for acceptance of nonconformance with deduction in Payment</i>	<i>XYZ.00</i>	<i>AP</i>	<i>KP</i>	<i>2/6/97</i>



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## SPECIFICATION 274 : MASONRY WALLS

### GENERAL

#### 274.01 SCOPE

1. This Specification covers the laying of concrete, brick or stone masonry units and construction for retaining walls and free-standing walls such as noise attenuation, dwarf and feature walls for landscaping or similar structures.

2. The work to be executed under this Specification consists of excavation for foundations, construction of reinforced concrete footing, placement of masonry units, backfill and subsurface drainage to the wall as shown on the Drawings.

**General  
Requirements**

3. Requirements for quality control and testing, including maximum lot sizes and minimum test frequencies, are cited in the Specification Part for Quality Requirements.

**Quality**

#### 274.02 REFERENCE DOCUMENTS

1. Documents referenced in this Specification are listed in full below whilst being cited in the text in the abbreviated form or code indicated.

**Documents  
Standards  
Test Methods**

##### (a) Council Specifications

- |     |   |                                      |
|-----|---|--------------------------------------|
| 211 | - | Control of Erosion and Sedimentation |
| 230 | - | Subsurface Drainage - General        |
| 231 | - | Subsoil and Foundation Drains        |
| 271 | - | Minor Concrete Works                 |

##### (b) Australian Standards

- |               |   |   |
|---------------|---|---|
| AS 1012.3.1   | - | Determination of properties related to the consistency of concrete - Slump test.    |
| AS 1012.9     | - | Determination of the compressive strength of concrete specimens.                    |
| AS 1141.11    | - | Particle size distribution by dry sieving.  |
| AS 1289.5.4.1 | - | Compaction control test - Dry density ratio, moisture variation and moisture ratio. |
| AS/NZS4680    | - | Hot-dip galvanised (zinc) coatings on fabricated ferrous articles.                  |
| AS 2758.1     | - | Concrete aggregates.  |
| AS 3700       | - | Masonry in buildings (SAA Masonry Code).  |
| AS 3972       | - | Portland and blended cements.   |
| AS/NZS 4455   | - | Masonry units and segmental pavers.   |

##### (c) Other Publications

NSW Building and Construction Authority Training Committee Limited.  
Cleaning of Masonry Code of Practice, 1985.

#### 274.03 CONTROL OF EROSION AND SEDIMENTATION

1. The Contractor shall install and maintain effective erosion and sedimentation control measures during the construction of the masonry wall in accordance with the Specification for CONTROL OF EROSION AND SEDIMENTATION.

**MATERIALS**

**274.04 MASONRY**

1. Masonry units shall comply with AS/NZS 4455 and shall be manufactured from either:
  - (a) autoclaved aerated concrete
  - (b) calcium silicate (sand-lime)
  - (c) concrete (dense or lightweight)
  - (d) dimension stone (cut or dressed)
  - (e) fired clay (with or without shale).
2. The masonry unit material, type and category shall be as shown on the Drawings.
3. For concrete masonry, irregular faced units shall be either split face, profiled, textured or rock-faced as shown on the Drawings or as directed by the Superintendent.
4. The colour of masonry units shall be as shown on the Drawings and shall be within the agreed range as approved by the Superintendent.
5. Dimension stone shall be of the type and quality, and to the dimensions as shown on the Drawings or as directed by the Superintendent.
6. Masonry units shall not be placed in position until the Contractor has produced documentary evidence to the Superintendent that the units conform to the requirements of this Specification and AS/NZS 4455. This action constitutes a HOLD POINT. The Superintendent's approval of the documentary evidence is required prior to the release of the hold point.

**Conformance**

**HP**

**274.05 CEMENT**

1. The cement used shall be Type GP portland cement complying with AS 3972.

**274.06 SAND**

1. The sand shall conform to AS 2758.1. It shall be clean, sharp and free from salts, vegetable matter and impurities.

**274.07 MORTAR**

1. The mortar shall consist of 1 part of portland cement, 4 parts of sand and 0.005 parts of a water thickener approved by the Superintendent. Suitable pigments shall be used to match the colour of the adjacent units.

**274.08 CONCRETE**

1. Concrete supplied and placed for the reinforced concrete footing and 50mm mass concrete blinding layer shall comply with the Specification for MINOR CONCRETE WORKS.

**Specification**



2. Unless otherwise indicated on the Drawings, the concrete shall have a compressive strength not less than 20MPa when tested in accordance with AS 1012.9, with a maximum nominal size of aggregate of 20mm and a nominated slump at the point of placement **not exceeding 80mm** as determined by AS 1012.3.1.

**Strength**

**274.09 STEEL REINFORCEMENT**

1. Steel reinforcement provided for concrete shall comply with the Specification for MINOR CONCRETE WORKS.

**Specification**

2. In addition, where galvanising of reinforcing steel is indicated on the Drawings or otherwise specified, such galvanising shall be an average minimum coating thickness of 85µm of not less than 98 per cent by mass of zinc when tested in accordance with AS/NZS4680.

**Galvanising**

**SITING AND EXCAVATION**

**274.10 SET OUT**

1. The Contractor shall set out the masonry wall structure as shown on the Drawings in sufficient detail to identify the location, length and height of the wall.

2. Should the Contractor propose changes to location, length, height, design levels or strength, to suit the Contractor's purposes or construction techniques, the Contractor's proposals shall be presented for the Superintendent's approval. Changes to suit the Contractor's construction procedures shall be at the Contractor's cost.

**Changes**

**Contractor's Cost**

3. The Contractor shall present the masonry wall structure set out, including any changes proposed by the Contractor, for the Superintendent's approval prior to commencing excavation. This action constitutes a **HOLD POINT**. The Superintendent's approval of the set out is required prior to the release of the hold point.

**HP**

**274.11 FOUNDATION LEVEL**

1. The foundation level shall be defined as the level at the underside of the 50mm mass concrete blinding layer below the reinforced concrete footing.

**Definition**

2. The levels and dimensions of foundations shall be recognised as subject to confirmation or alteration before construction, and the Superintendent may direct such changes of the levels and of dimensions of footings as may be necessary to ensure a satisfactory foundation.

**Confirmation of Foundation**

**274.12 EXCAVATION**

1. Excavation shall be undertaken to the required width, depths and dimensions of footings shown on the Drawings, including the 50mm mass concrete blinding layer. All loose material shall be removed. Minor fissures in rock shall be thoroughly cleaned out and filled with concrete, mortar or grout.

2. The base of the excavation shall be compacted in accordance with the requirements of Clause 274.22 and trimmed to ensure that at no point the level is more than 25mm above the design Foundation Level. The levels of the base of the excavation shall be confirmed by survey.

**Compaction**

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3. Any over-excavation in rock below foundation level shall be filled with concrete of the same quality as that of the footing, while over-excavation in earth below foundation level shall be backfilled and recompact to the requirements of Clause 274.22. **Over-excavation**
4. Surplus excavated material shall be used in the construction of embankments, or spoiled as directed by the Superintendent.
5. The Contractor shall supply and erect any necessary sheeting and bracing to support the excavation in a safe manner and in accordance with statutory requirements. The excavation shall be kept free of water. **Excavation Regulations**
6. Following excavation to Foundation Level, the Contractor shall present the foundation on which the footing for the wall is to be placed for inspection and approval by the Superintendent. If the foundation is composed of material which the Superintendent deems to be unsuitable to support the proposed structure, such material shall be excavated to the extent directed by the Superintendent, backfilled with sound material, and recompact to the requirements of Clause 274.22. The foundation shall then be presented again for the approval of the Superintendent. The unsuitable material from the excavation below Foundation Level shall be spoiled as directed by the Superintendent. This action constitutes a **HOLD POINT**. The Superintendent's approval of the foundation is required prior to the release of the hold point. **Unsuitable Material**
- HP**

## CONSTRUCTION

### 274.13 REINFORCED CONCRETE FOOTING

1. The reinforced concrete footing shall be constructed to the details as shown on the Drawings.
2. Unless otherwise indicated on the Drawings, forms shall be used for all vertical concrete surfaces. All formwork shall comply with the Specification for MINOR CONCRETE WORKS. **Formwork**
3. For the reinforced concrete footing and 50mm mass concrete blinding layer, the placement and compaction of concrete, including joints, finishing, curing and protection of concrete, and the placement of the reinforcing steel, including starter bars, shall comply with the Specification for MINOR CONCRETE WORKS. **Placement and Compaction**
4. The finished concrete footing shall not vary by more than 10mm from the specified levels and by more than 25mm from the specified horizontal alignment. **Tolerance**

### 274.14 MASONRY

1. All workmanship and site control in masonry construction shall be in accordance with AS 3700. **Standard**
2. The surface on which the first course is to be laid shall be clean. It shall be checked for vertical and horizontal alignment and any excessive discrepancy shall be corrected before masonry construction is commenced. **First Course**
3. Masonry shall be placed in horizontal courses and to the details as shown on the Drawings. **Horizontal Courses**
4. Weepholes shall be provided in the wall as shown on the Drawings. **Weepholes**

**274.15 MORTAR JOINTS**

1. Bed joints and perpendicular joints shall be 10mm thick. In hollow masonry units, mortar shall be face shell bedded and for structural work shall be ironed. To control cracking, joint reinforcement, consisting of two 3.0mm galvanised wires shall be incorporated at a maximum of 600mm centres. All joints shall be ironed on both sides.

***Reinforcement***

**274.16 CONTROL MOVEMENT JOINTS**

**(a) Location and Detail**

1. Control movement joints shall be built into masonry where shown on the Drawings and at all points of potential cracking. The joint spacing shall not be greater than 10 metres.

***Potential Cracking***

2. The joints shall be 12mm wide and completely clean and free from any hard or incompressible material for the full width and depth of the joint.

***Width***

**(b) Joint Filling**

1. After completion of the walls, a suitable backing rod shall be inserted on both sides of the joint and the joint filled with an elastic polyurethane joint sealant approved by the Superintendent.

***Joint Sealant***

2. Sealing of joints shall be carried out in accordance with the Sealant Manufacturer's instructions and recommendations.

3. The colour of the joint sealant shall be selected by the Superintendent from samples provided by the Contractor.

***Colour***

**274.17 REINFORCEMENT**

1. Vertical steel reinforcement shall be tied to steel starter bars through cleanout holes in each reinforced hollow unit and fixed in position at the top of the wall by plastic clips. Horizontal steel may be laid in contact with rebated webs. It shall be held in position by plastic clips when vertical steel is to be positioned subsequent to wall construction. Cover to horizontal steel in lintel blocks shall be maintained by the use of wheel type plastic clips. The minimum cover to the inside face of the block shall be 15mm unless specified otherwise.

***Horizontal and Vertical***

**274.18 CONCRETE GROUT**

1. Concrete grout shall be a minimum portland cement content of 300kg/cubic metre, sufficient slump to permit it to completely fill the hollow units and a minimum compressive cylinder strength of 20MPa when tested to AS 1012.9.

***Hollow Unit Filling***

2. The Contractor shall ensure that the bottoms of hollows are cleaned of loose material before being filled with grout.

**274.19 RATE OF CONSTRUCTION**

1. The rate of new construction shall be limited so as to eliminate any possibility of joint deformation, slumping or instability which may reduce bond strength in the wall.

**274.20 CLEANING OF MASONRY**

1. Cleaning of masonry shall comply with the publication "Cleaning of Masonry

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Code of Practice - 1985".

2. Where the wall is constructed as a free standing wall, both sides of the wall shall be cleaned of all mortar splashes and stains.
3. Where acid cleaning is required, the following shall apply:
  - (a) The acid mixture shall be 1 part of hydrochloric acid to 15 parts of water.
  - (b) Mortar joints must be a minimum of 7 days old before cleaning commences.
  - (c) All masonry being cleaned shall be thoroughly wetted by hosing before any acid solution is applied and kept wet ahead of the acid application.
  - (d) The acid mixture shall be thoroughly hosed off as the cleaning proceeds.
4. If high pressure water jet method is used for cleaning, extreme care shall be taken to avoid "blowing out" the joints.

### 274.21 BACKFILLING FOR RETAINING WALLS

1. Where masonry walls are constructed as retaining walls, all timbering, bracing and rubbish of all descriptions shall be removed before backfill is placed. No backfilling shall be placed against retaining walls until the Contractor can demonstrate that 95 per cent of the design strength of the masonry wall has been achieved. This action constitutes a HOLD POINT. The Superintendent's approval of the 95 per cent design strength documentation is required prior to the release of the hold point.

**HP**

2. Behind the masonry wall, and for the full height of the wall, a continuous granular drainage layer of width as shown on the Drawings (measured perpendicular to the face of the wall) shall be progressively placed in layers not exceeding 150mm and compacted in accordance with Clause 274.22. It shall consist of broken stone or river gravel, consisting of clean, hard, durable particles graded from 50mm to 10mm to AS 1141.11 such that:

- (a) The maximum particle dimension shall not exceed 50mm;
- (b) No more than 5 per cent by mass shall pass the 9.5mm AS sieve.

3. A subsoil drainage line shall be constructed at the base of the drainage layer as shown on the Drawings. It shall outlet either into adjacent stormwater gully pits or headwalls, or alternatively through adjacent fill batter, and be suitably marked. The subsoil drain shall comply with the requirements of the Specifications for SUBSURFACE DRAINAGE - GENERAL and SUBSOIL AND FOUNDATION DRAINS and shall consist of 100mm diameter slotted corrugated plastic pipe and seamless tubular filter fabric, surrounded by a maximum of 100mm of Type A Filter Material contained within a layer of geotextile. Unless shown otherwise on the Drawings, the subsoil pipe shall be laid to an even line and uniform grade of not less than two per cent fall towards the outlet.

**Subsoil Pipe**

4. Except as specified above, excavations for foundations and for the construction of the masonry walls shall be backfilled to the level of the surrounding ground with material from cuttings, or with other material acceptable to the Superintendent, and compacted in accordance with Clause 274.22.

**Other Backfill Material**

5. Complete sealing utilising compacted earth, or other treatment as shown on the Drawings, shall be provided at the top of masonry walls over the full length and at the vertical edge at both ends of all masonry walls to the satisfaction of the Superintendent.

**Sealing Tops and Ends of Walls**

6. Where erosion is likely to occur the Superintendent may direct that backfilling around the ends of walls be of stone fill or lean mix concrete, in which case the extra work will be paid for as a Variation to the Works.

**Other Forms  
of Sealing**

**274.22 COMPACTION**

1. Foundations and backfill shall be compacted to the following requirements when tested in accordance with AS 1289.5.4.1 for standard compactive effort:-

	<b>Relative Compaction</b>
(a) Foundations or base of excavation to a depth of 150 mm below foundation levels	95%
(b) Granular drainage layer, subsoil filter material, material replacing unsuitable material and backfill material	95%

Unless otherwise directed by the Superintendent, all material shall be compacted in layers not exceeding 150mm compacted thickness.

**SPECIAL REQUIREMENTS**

**274.23 RESERVED**

**274.24 RESERVED**

**274.25 RESERVED**

**274.26 RESERVED**

## LIMITS AND TOLERANCES

### 274.27 SUMMARY OF LIMITS AND TOLERANCES

1. The limits and tolerances applicable to the various clauses in this Specification are summarised in Table 274.1 below.

Item	Activity	Limits/Tolerances	Spec Clause
1	<b>Excavation</b>		
	(a) Foundation Level	Level of foundation for footing at any point shall not be more than 25mm.	274.12
2.	<b>Reinforced Concrete Footing</b>		
	(a) Finished Level	Finished level of footing shall not vary more than 10mm from the specified levels.	274.13
	(b) Horizontal Alignment	Horizontal alignment of footing shall not vary more than 25mm from the specified alignment.	274.13
3.	<b>Masonry</b>		
	(a) Control Movement Joint	Spacing $\leq$ 10m.	274.16a

**Table 274.1 - Summary of Limits and Tolerances**

## MEASUREMENT AND PAYMENT

### 274.28 PAY ITEMS

1. Payment shall be made for all the activities associated with completing the work detailed in this Specification on a schedule of rates basis in accordance with Pay Items 274(a) to 274(d) inclusive.
2. A lump sum price for any of these items shall not be accepted.
3. If any item, for which a quantity of work is listed in the Schedule of Rates, has not been priced by the Contractor, it shall be understood that due allowance has been made in the prices of other items for the cost of the activity which has not been priced.
4. Erosion and sedimentation control measures are measured and paid in accordance with the Specification for CONTROL OF EROSION AND SEDIMENTATION.
5. Construction of footings, including concrete, reinforcement, formwork, etc, is measured and paid in this Specification and not in the Specification for MINOR CONCRETE WORKS.
6. The granular drainage layer, subsoil drainage pipe and filter material is measured and paid in accordance with this Specification and not in the Specification for SUBSURFACE DRAINAGE - GENERAL or SUBSOIL AND FOUNDATION DRAINS.

#### Pay Item 274(a) EXCAVATION

1. The unit of measurement shall be the cubic metre measured in bank volume of excavation.
2. The volume shall be determined by the End Area Method using design cross-sectional areas calculated at each change in height or width of the wall.
3. The disposal of surplus material shall be included in the excavation rates.
4. No additional payment shall be made for drying out wet excavated material or replacement of over excavation beyond the design cross-sectional limits defined above.
5. The schedule rate for excavation shall allow for excavation and backfilling of all types of materials. Separate rates shall not be included for earth and rock.
6. The control of stormwater runoff shall be included in the rate for excavation.

#### Pay Item 274(b) UNSUITABLE MATERIAL BELOW FOUNDATION

1. The unit of measurement shall be the cubic metre measured as bank volume of excavation below foundation level which is directed to be removed and replaced.
2. The schedule rate under this Pay Item shall include all operations involved in the excavation and removal to spoil of unsuitable material below foundation level of the concrete footing and the backfilling and compaction to foundation level with replacement material.

#### Pay Item 274(c) REINFORCED CONCRETE FOOTING

1. The unit of measurement shall be the cubic metre of reinforced concrete.
2. The volume shall be taken from the Drawings, excluding the volume of the 50mm mass concrete blinding layer.

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3. The schedule rate under this Pay Item shall include all operations involved in the supply and placement of all formwork, embedments, reinforcement (including starter bars where specified), concrete (including 50mm mass concrete blinding layer), stepping of footing, joints, curing and backfilling to the footing.

### **Pay Item 274(d) CONSTRUCT MASONRY WALL**

1. The unit of measurement shall be the square metre, measured as face area of masonry wall from the top of the footing to the top of the wall.

2. The schedule rate under this Pay Item shall include all operations involved in the supply and placement of all materials and workmanship required to provide the completed structure as shown on the Drawings including supply, placement and cleaning of masonry units, and where specified granular drainage layer behind the wall, earth backfill and capping, and subsoil drain at the base of the drainage layer.