

**DEVELOPMENT
CONSTRUCTION
SPECIFICATION**

C264

GUARDFENCE

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.

| Amendment Sequence No. | Key Topic addressed in amendment | Clause No. | Amendment Code | Author Initials | Amendment Date |
|-------------------------------|---|-------------------|-----------------------|------------------------|-----------------------|
| <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 C264 : GUARDFENCE

GENERAL

C264.01 SCOPE

1. The work to be executed under this Specification consists of the setting out, supply of all materials and erection of guardfence at the locations shown on the Drawings or as directed by the Superintendent.

C264.02 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

C201 - Control of Traffic
C271 - Minor Concrete Works

(b) Australian Standards

AS/NZS 1110 - ISO metric precision hexagon bolts and screws.
AS 1111 - ISO metric hexagon commercial bolts and screws.
AS 1143 - High temperature creosote for the preservation of timber.
AS 1214 - Hot-dip galvanised coatings on threaded fasteners.
AS 1365 - Tolerances for flat-rolled steel products.
AS 1391 - Method for tensile testing of metals.
AS 1594 - Hot-rolled steel flat products.
AS 1627.1 - Cleaning using liquid solvents and alkaline solutions.
AS 1627.4 - Abrasive blast cleaning.
AS 1650 - Hot-dipped galvanised coatings on ferrous articles.
AS 1906.2 - Retroreflective devices (non pavement application).
AS 2082 - Visually stress-graded hardwood for structural purposes.

MATERIALS

C264.03 STEEL COMPONENTS

1. Posts and blocking pieces shall be mild steel conforming to AS 1594, minimum Grade HU1, to the dimensions as detailed on the drawings.

Posts

2. Rail elements and terminal pieces shall be mild steel conforming to AS 1594, minimum Grade HA250, to the dimensions as detailed on the drawings.

Rails

3. The mechanical properties of the rail elements and terminal pieces, when tested in accordance with AS 1391, shall conform to the following requirements:

Tests

| | |
|----------------------------------|---------|
| Yield Stress, typical | 272 MPa |
| Ultimate Tensile Stress, typical | 372 MPa |
| Elongation in 80mm, typical | 31% |

4. The rail elements shall comply with AS 1365 to the following tolerances: **Tolerances**

| | |
|--|----------------|
| Metal thickness | 2.6mm ± 0.21mm |
| Mill tolerance on strip width | +2.50mm, -0.0 |
| Mill camber tolerance on 2000mm length | 4.0mm max |

5. All guardfence components are to be hot-dip galvanised after fabrication in accordance with AS 1650 to Class Z 600. Prior to galvanising, the surfaces shall be treated in accordance with AS 1627.1 and AS 1627.4. **Protection**

6. Splice and post bolts shall comply with AS/NZS 1110 Grade 8.8 and other bolts to AS 1111 Grade 4.6. All bolts, nuts and washers shall be hot-dip galvanised in accordance with AS 1214. **Bolts**

C264.04 TIMBER POSTS

1. Timber posts are to be used only in end panels, as detailed on the drawings. Timber posts and blocking pieces shall be cut from Select Grade hardwood and conform to structural Grade No. 1 of AS 2082. All surfaces shall be smooth and free from obvious saw marks. **Timber**

CONSTRUCTION

C264.05 GENERAL

1. The Contractor shall at all times conform to the requirements of the Specification for CONTROL OF TRAFFIC. **Traffic Control**

2. Guardfence is to be erected after the construction of the base on concrete pavements and after the placing of the initial layer of asphaltic concrete or sprayed seal on a flexible pavement, unless otherwise approved by the Superintendent. **Timing of Construction**

C264.06 ERECTION OF STEEL POSTS

1. Underground cables and ducts laid in the guardfence area shall be located prior to the erection of posts and all care must be taken not to damage such cables and ducts. **Cables and Ducts**

2. Steel posts are to be erected by driving, with the open section pointing in the same direction as adjacent traffic. **Orientation**

3. The face of guardfence posts are to be located 285mm from the edge of shoulder and the top of the post 700mm above the edge or ground level, unless otherwise shown on the Drawings. **Positioning of Posts**

4. Posts shall stand vertical and the spacing shall be such that when the guardfence is erected no post movement is necessary in order to align holes or for any other reason. **Spacing**

5. The posts should be driven to the full depth shown on the Drawings. If this is not possible due to the presence of an underground obstruction, an alternative method of setting the posts, as approved by the Superintendent, shall be used. **Underground Obstruction**

6. When erected in position the posts shall be on a smooth line both horizontally and vertically at a height of 530mm (± 10mm) from the nominal level of the pavement at the shoulder line to the centre of the guardfence attachment bolts. On flared ends the level of the posts shall be such as to conform to the extended crossfall of the main pavement. **Tolerances**

- | | | |
|----|--|---------------------------------|
| 7. | The posts are to be firm in the ground to the satisfaction of the Superintendent. | <i>Firmness</i> |
| 8. | The posts shall not have any obvious deformation as a result of driving. Any damage which does occur to the posts is to be repaired within 24 hours using an approved cold galvanising compound. | <i>Damage to Posts</i> |
| 9. | Any post which has been excessively damaged will be rejected and shall be replaced by the Contractor at his own expense. | <i>Contractor's Cost</i> |

C264.07 ERECTION OF TIMBER POSTS

- | | | |
|----|---|-----------------------------------|
| 1. | Timber posts shall be cut to the dimensions shown on the Drawings. | <i>Dimensions of Posts</i> |
| 2. | The surface area of the posts which will be in the ground shall be painted with creosote, conforming with AS 1143, prior to erection. | <i>Creosote Treatment</i> |
| 3. | The section of the timber posts in the ground shall be wrapped in 6mm thick polystyrene foam sheeting before being cast into a reinforced concrete footing. | <i>Polystyrene Foam</i> |
| 4. | Concrete used in the footings for timber posts shall have a minimum compressive strength of 20MPa at 28 days and shall conform with the requirements of the Specification for MINOR CONCRETE WORKS. | <i>Concrete</i> |
| 5. | Concrete footings shall be 500mm diameter, and shall have tolerances of minus zero or plus 50mm. Overbreak and excessive depth shall be filled with 20MPa concrete at no cost to the Principal. | <i>Footing Size</i> |
| 6. | Wire fabric reinforcing shall be as detailed on the Drawings. | <i>Reinforcing Fabric</i> |
| 7. | The surface area of the posts which will be above ground shall be painted with two coats of grey acrylic paint. | <i>Painting</i> |

C264.08 ERECTION OF GUARDFENCE PANELS

- | | | |
|----|--|---|
| 1. | Steel blocking pieces are to be erected with the open section pointing in the same direction as adjacent traffic. | <i>Orientation</i> |
| 2. | All rail laps shall be in the same direction as adjacent traffic. | <i>Rail Laps</i> |
| 3. | Backing/stiffening pieces, 300mm long, shall be used on intermediate posts. | <i>Backing Pieces</i> |
| 4. | Guardfence panels and steel blocking pieces are to be handled and erected in such a manner that no damage occurs to the galvanising. Any minor damage occasioned to the galvanising shall be repaired within 24 hours using an approved cold galvanising compound. | <i>Minor Damage to Galvanising</i> |
| 5. | Any guardfence panels or steel blocking pieces which have been excessively damaged will be rejected and shall be replaced by the Contractor at his own expense. | <i>Contractor's Cost</i> |
| 6. | Guardfence attachment bolts and splice bolts are to be tightened initially such that the fence can be erected. Adjustments are then to be made to the rails using the slotted holes provided to produce a smooth regular line, free of any kicks or bumps. The overall line of the top of the guardfence panels is to visually conform with the vertical alignment of the road pavement. | <i>Erection Procedure</i> |

7. When the alignment both vertically and horizontally is obtained the splice bolts are to be fully tightened. The bolt head (not the shoulder) should be in full bearing with the rail. The recess in the nut should face the bolt shoulder, otherwise the splice will not be tight. **Splices**

C264.09 END TREATMENT OF GUARDFENCE

1. For undivided carriageways both approach and departure ends of the guardfence shall be flared and end anchorage panels with terminal sections as detailed on the Drawings. **Undivided Carriageway**

2. For divided carriageways the approach end of the guardfence shall be flared and end anchorage panels with terminal section constructed and the departure end of the guardfence shall be unflared with end anchorage panel as detailed on the Drawings. **Divided Carriageway**

3. The approach and departure ends of double sided guardfences shall have end panels as detailed on the Drawings. **Double Sided Guardfence**

C264.10 DELINEATORS

1. Where shown on the Drawings, delineator brackets shall be attached to the centre of the guardfence under the special washer of the post bolt of the first post and then in accordance with the following table:- **Spacing**

| <u>Radius of Curve</u> | <u>Spacing of Reflectors on Guardfence</u> |
|---------------------------|--|
| m | every |
| 30 - 90 | 3rd post |
| 90 - 180 | 5th post |
| 180 - 275 | 8th post |
| 275 - 365 | 11th post |
| over 365 | 16th post |
| (including straight road) | |

2. Circular corner cube delineators, complying with AS 1906.2 shall be fixed to the brackets.

3. The delineators shall be so arranged that drivers approaching from either direction will see only red reflectors on their left side, and white reflectors on their right.

LIMITS AND TOLERANCES**C264.11 SUMMARY OF LIMITS AND TOLERANCES**

| Item | Activity | Tolerances | Spec Clause |
|-------------|---|---------------------|--------------------|
| 1. | Vertical Alignment (a) Nominal shoulder line level to centre of guardfence attachment bolts | 530mm ± 10mm | C264.06 |
| 2. | Concrete Footings (a) Diameter | 500mm -0mm or +50mm | C264.07 |

Table C264.1 - Limits and Tolerances**SPECIAL REQUIREMENTS****C264.12 RESERVED****C264.13 RESERVED****C264.14 RESERVED****C264.15 RESERVED**

MEASUREMENT AND PAYMENT

C264.16 PAY ITEMS

1. Payment shall be made for all activities associated with completing the work detailed in this Specification on a schedule of rates basis in accordance with Pay Items C264(a) to C264(g) 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 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. Concrete footings for timber posts are measured and paid in accordance with this Specification and not in the Specification for MINOR CONCRETE WORKS.
5. Miscellaneous minor concrete work not included in the pay items in this specification shall be in accordance with pay items described in the Specification for MINOR CONCRETE WORKS.
6. Traffic control is measured and paid in accordance with the Specification for CONTROL OF TRAFFIC.

Pay Item C264(a) SINGLE SIDED GUARDFENCE

1. The unit of measurement shall be the linear metre.
2. The distance shall be measured along the centre line of the rail, centre to centre of posts, excluding end anchorage panels and terminal sections.

Pay Item C264(b) END ANCHORAGE PANEL WITH FLARED TERMINAL SECTION

1. The unit of measurement shall be "each" end panel complete.

Pay Item C264(c) END ANCHORAGE PANEL WITH UNFLARED TERMINAL SECTION

1. The unit of measurement shall be "each" end panel complete.

Pay Item C264(d) TERMINAL CONNECTORS TO STRUCTURES

1. The unit of measurement shall be "each".

Pay Item C264(e) DELINEATOR BRACKETS

1. The unit of measurement shall be "each".

Pay Item C264(f) DOUBLE SIDED GUARDFENCE

1. The unit of measurement shall be the linear metre.
2. The distance shall be measured along the centre line of the rails, centre to centre of posts, excluding end anchorage panels and terminal sections.

Pay Item C264(g) END PANELS, DOUBLE SIDED GUARDFENCE

1. The unit of measurement shall be "each" end panel complete.

SPECIFICATION C264 - GUARDFENCE

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