

# ROADS AND MARITIME SERVICES (RMS)

## QA SPECIFICATION R143

### SIGNPOSTING

#### NOTICE

This document is a Roads and Maritime Services QA Specification. It has been developed for use with roadworks and bridgeworks contracts let by Roads and Maritime Services or by local councils in NSW. It is not suitable for any other purpose and must not be used for any other purpose or in any other context.

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#### REVISION REGISTER

Ed/Rev Number	Clause Number	Description of Revision	Authorised By	Date
Ed 1/Rev 2	Annexure R65/2	Retroreflective Sheeting table reformatted to 2 pages	GM, CMS	03.02.92
Ed 1/Rev 3	1.2 and 1.3 3.7	Notice attached to the back of the cover page. New number format for Clause numbers and lists. Reference to signs and Marking Manual has been modified. Clause on Sample Signs has been deleted	GM, CEC	07.10.94
Ed 1/Rev 4	5.1	Hold point has been reworded. 1st sentence has been reworded.	GM, CEC (J Woodward)	06.03. 95
Ed 2/Rev 0		Specification Number changed from R65 to R143. Converted to MS Word 6.0c. References to RTA Specifications changed.	GM, PSP (J Woodward)	01.07.96
Ed 2/Rev 1	Revisions to Edition 2 1.2, 4.1 2.3	Amended clause AS 1250 replaced by AS 4100. Reference to DR89052 deleted.	GM, RNIC (J Woodward)	18.02.97
Ed 3/Rev 0		Extensive revision RTA 3400 added as a reference	GM, RNIC	25.02.99
Ed 3/Rev 1	1.2 1.2, 3.2, 3.4, 4.4	Minor changes AS 1650 replaced by AS/NZS 4680	GM, RNIC	30.08.99

<b>Ed/Rev Number</b>	<b>Clause Number</b>	<b>Description of Revision</b>	<b>Authorised By</b>	<b>Date</b>
Ed 3/Rev 1 (cont'd)	Annexure R143/1	New schedule listing Identified Records		
Ed 4/Rev 0	Global  4.4 5.4 5.4	Text revised to direct imperative style. "Superintendent" replaced by "Principal". Reformatting and minor editing. "shall" replaced by "must". Clauses rearranged to fit the subject heading.  Additional requirements for holding down bolts inserted  Words "extruded sections" replaced by "stiffener rails".  Requirement to submit for approval proposed method for filling void beneath base plate inserted	GM, IC	23.10.08
Ed 4/Rev 1	1.1, 2, 3  Annexure R143/B	Clauses reworded.  Pay Item R143P1 revised to include Class 1X and remove Class 2A.	GM, IC	11.02.11
Ed 4/Rev 2	5.3  Annex M	Concrete for foundation footings of purpose-designed sign structures clarified to comply with RTA B80.  Referenced documents updated.	GM, IC	16.06.11



## SIGNPOSTING

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VERSION FOR: DATE:
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## FOREWORD

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### REVISIONS TO PREVIOUS VERSION

This document has been revised from RMS Specification R143 Edition 4 Revision 1.

All revisions to the previous version (other than minor editorial and project specific changes) are indicated by a vertical line in the margin as shown here, except when it is a new edition and the text has been extensively rewritten.

### PROJECT SPECIFIC CHANGES

Any project specific changes have been indicated in the following manner:

- (a) Text which is additional to the base document and which is included in the Specification is shown in bold italics e.g. ***Additional Text***.
- (b) Text which has been deleted from the base document and which is not included in the Specification is shown struck out e.g. ~~Deleted Text~~.

# RMS QA SPECIFICATION R143

## SIGNPOSTING

### 1 GENERAL

#### 1.1 SCOPE

This Specification sets out the requirements for:

- (a) the manufacture, supply and installation of all road sign panels (including temporary roadworks signs), and
- (b) the manufacture, supply and installation of sign support footings and structures to support the sign panels.

#### 1.2 STRUCTURE OF THE SPECIFICATION

This Specification includes a series of annexures that detail additional requirements.

##### 1.2.1 Details of Work

Project specific requirements are shown in Annexure R143/A.

##### 1.2.2 Measurement and Payment

The method of measurement and payment must comply with Annexure R143/B.

##### 1.2.3 Schedules of HOLD POINTS, WITNESS POINTS and Identified Records

The schedules list the **HOLD POINTS** and **WITNESS POINTS** that must be observed. Refer to specification RMS Q for definitions of **HOLD POINTS** and **WITNESS POINTS**.

The records listed in annexure R143/D are identified Records for the purposes of RMS Q Annexure Q/E.

##### 1.2.4 Reference Documents and Defintions

Unless otherwise specified, the applicable issue of a reference document, other than an RMS Specification, must be the issue current at the date one week before the closing date for tenders, or where no issue is current at that date, the most recent issue.

Standards, specifications and test methods are referred to in abbreviated form (e.g. AS 2350). For convenience, the full titles are given in Annexure R143/M.

The terms “you” and “your” mean “the Contractor” and “the Contractor’s” respectively.

## 2 GENERAL

The sign panels, and support footings and structures, to be provided under the Contract are shown on the Drawings. The position of the support footings and structures together with the position and mounting height for the sign panels must be as shown on the Drawings.

The dimensions, legend and background for each sign panel must comply with this Specification, RMS 3400 and the Drawings.

For details of sign panel fixing extrusions (type, size and location on the back of the sign panel), refer to RMS 3400 and the Drawings

For details of temporary roadworks signs for control of traffic, refer to specification RMS G10.

### **GUIDE SIGN SUPPORTS**

*Guide Sign Supports must be one of the following:*

(1) **Tubular post Mounted**

*Guide signs shall be installed on either single or multiple galvanised tubular steel posts..*

(2) **Modular Mounted (Steel Rectangular Hollow Section)**

*Unless otherwise specified, posts for modular support systems shall be galvanised steel complying with the relevant Standards.*

*Unless otherwise specified, frangible supports are to be used for all modular installations.*

*Where details of the support and sign face stiffening are not provided in the Contract Documentation, drawings and calculations shall be prepared by an approved Chartered Professional Engineer specialising in Structural Engineering on your behalf prior to manufacture. Drawings shall be fully detailed and shall show the proposed means of strengthening the sign face and achieving post frangibility.*

*The cost of these drawings, calculations and submission shall be borne by you.*

*All supports shall be attached to the concrete footing by securing with suitable strength galvanised bolts cast into the concrete foundation. Where a frangible support cannot be provided, details for a proposed alternative arrangement are to be submitted for approval.*

*The granting of any approval by the Principal shall not remove the liability for the performance of the support system from you.*

(3) **Overhead Gantry Mounted**

*Support posts for overhead gantry mounted guide signs shall be galvanised steel complying with the relevant Standards.*

*Where details of the support and sign face stiffening are not provided in the Contract, drawings and calculations shall be prepared by a Chartered Professional Engineer specialising in Structural Engineering for the Contractor and submitted for approval prior to manufacture. Drawings shall be fully detailed and shall show the proposed means of strengthening the sign face and providing protection of the posts against impact by errant vehicles.*



*All supports shall be attached to the concrete footing by securing with suitable strength galvanised bolts cast into the concrete foundation. Materials used in the footings shall comply with RITS 02.*

*The granting of any approval by the Principal shall not remove the liability for the performance of the support system from you.*

**(4) Overhead Cantilever Mounted**

*Posts for overhead cantilever mounted guide signs shall be galvanised steel complying with the relevant Standards.*

*Where details of the support and sign face stiffening are not provided in the Contract, drawings and calculations shall be prepared by a Chartered Professional Engineer specialising in Structural Engineering for the Contractor and submitted for approval prior to manufacture. Drawings shall be fully detailed and shall show the proposed means of strengthening the sign face and achieving post frangibility.*

*All supports shall be attached to the concrete footing by securing with suitable strength galvanised bolts cast into the concrete foundation. Where a frangible support cannot be provided, details for a proposed alternative arrangement are to be submitted for approval.*

*Any detailed design drawings and calculations for signs, such as urban arterial / freeway signs or others as required below or in special circumstances, require the submission of detailed design calculations and drawings. The preparation and submission of these details shall be the responsibility of the Contractor.*

**LOW MAINTENANCE TELESCOPIC POST MOUNTING SYSTEM**

*Low maintenance telescopic (LMT) post mounting system allowing removal and replacement of damaged posts without excavation shall be used in accordance with Standard Drawing DS9-11 where tubular posts are surrounded by concrete paving, and in locations identified as high risk areas. For example zones within 50 metres of urban arterial intersections including intersections with distributor roads, traffic islands, roundabouts, the verge adjacent to the outside edge of small radius curves, traffic calming devices such as slow points and raised platforms, pedestrian crossings, parking areas, town centres and group centres).*

*In high risk areas, a LMT post mounting system shall be used for all posts sizes up to and including 60.3mm diameter. Alternative mounting systems proposed for use will be required to have demonstrated their suitability for use in high risk areas over a minimum period of six (6) months.*

*In pedestrian zones, a low maintenance telescopic (LMT) post mounting system or approved equal.*

*Post sizes above 60.3mm diameter in high risk areas are to be:*

- taper threaded to enable coupling with a threaded anchor socket, or;*
- cast directly into concrete footings, or;*
- be of an approved frangible design with re-useable socket or flanged base, or;*
- Incorporate an approved socket system equivalent to a LMT.*

### **3 MANUFACTURE AND DELIVERY OF SIGN PANELS**

Manufacture, transport, handle and store the sign panels in accordance with RMS 3400.

## 4 MANUFACTURE OF SIGN SUPPORT STRUCTURES

### 4.1 FABRICATION

Signs support structures must be *Grade 250 or 350* standard round galvanised posts of ~~50, 65 or 80 mm~~ nominal bore *according to DS9-15* or purpose-designed steel structures as shown on the Drawings and *Purpose built signs shall be compliant with the wall thicknesses as shown in DS9-15. Posts must be* manufactured in accordance with the requirements of AS 4100, *AS 1074 and AS 1163.*

Restrict splices in members to a maximum of one splice per member. Splices must be full penetration butt welds.

All welding must be as shown on the Drawings and comply with the requirements of AS 1554.1, Category SP.

### 4.2 PROTECTIVE TREATMENT

Except for standard galvanised posts, protect all steel components including brackets by hot-dip galvanising after all fabrication processes are completed.

Prior to galvanising, treat the surface in accordance with AS 1627.1 and AS 1627.4 (Class 2½ Blast).

Finish the steel components by the hot-dip galvanising process in accordance with AS/NZS 4680 to provide a bright finished surface free from white rust and stains.

For standard galvanised posts, treat any field splices using a zinc-rich paint in accordance with Clause 8 of AS 4680.

Renovate scratched and slightly damaged surfaces of galvanised coatings using a zinc-rich paint in accordance with Clause 8 of AS/NZS 4680 to provide a zinc-rich coating at least equal to the thickness specified for the galvanised layer. This method of renovation is restricted to areas not exceeding 2500 mm<sup>2</sup>. Re-galvanise any structure with total damaged coating areas exceeding 2500 mm<sup>2</sup> at your own cost.

Galvanise bolts, nuts, washers and brackets in accordance with AS 1214.

*All posts shall finish 50mm below the top of the sign blade and be fitted with approved galvanised steel caps.*

### 4.3 ATTACHMENT OF SIGNS

Provide posts and other components with the required sign attachment holes or fittings to suit the typical attachment systems as shown on the Drawings. Attach sign panels to each supporting member at each extrusion section or bolt hole in the sign panel.

Submit details of your proposed attachment systems to the Principal for approval.

### 4.4 TRANSPORT AND STORAGE OF GALVANISED SIGN SUPPORT STRUCTURES

Transport and store galvanised sign support structures in accordance with Appendix F of AS/NZS 4680.

## 5 ERECTION OF NEW SIGNS

### **MOUNTING HEIGHT**

*The mounting height for each sign must be in accordance with details shown on Standard Drawing DS9-11 and in accordance with AS 1742.2 for the appropriate sign.*

*Street name signs, regulatory signs, warning signs and hazard markers shall be installed on either single or multiple tubular steel posts of diameters and grades as specified, fixed as specified or directed. Unless otherwise directed, street names shall always be located above information fingerboards in accordance with Standard Drawing DS9-14.*

### 5.1 SETTING OUT

Set out the work to ensure that all signs and support structures are located in accordance with the Drawings, or as directed by the Principal.

*Lateral signage location must be according to Standard Drawing DS9-11. Signs which are deemed by the Principal to be incorrectly located shall be relocated at your cost.*

Align signs approximately 5 degrees away from a right angle to the direction of the traffic they are intended to serve. On curved alignments, determine the angle of placement by the course of approaching traffic rather than the orientation of the road at the point where the sign is located.

*The Contractor shall submit details of and set out, for the Superintendent's inspection and approval, the proposed location and alignment of each sign support structure.*

### **HOLD POINT**

Process Held: Work on sign foundations.

Submission Details: ~~Proposed arrangement and alignment of each sign support structure.~~

*At least one (1) working day before proposed excavation work for sign foundations is to commence provide notice that sign locations showing sign alignment and arrangement has been pegged in the field for each sign support structure.*

Release of Hold Point: The Principal will inspect the proposed sign locations, prior to authorising the release of the Hold Point.

### 5.2 CLEARING

Clear and remove any trees and undergrowth within three (3) metres of the sign support structure and along a motorist's line of sight to the front of the sign.

### 5.3 SIGN STRUCTURE FOUNDATIONS

Construct the foundations for sign support structures as shown on the Drawings.

*Footing diameters and depths must be according to standard drawing DS9-15 at a minimum.*

You are deemed to be conversant with any Streets Opening Agreement covering the area of the works and must take due account of the requirements of the Agreement while carrying out the work. Where the sign footing will encroach upon a space allocation, confer with the utilities concerned to ensure that the proposed footing will not constitute an obstruction to existing services.

Excavate for the foundation footings to the depth and width shown on the Drawings. Spread out and compact the material from the foundation excavation neatly within the road reserve as directed by the Principal.

If the base or the sides of the excavation are composed of material which is not suitable for supporting the proposed structure, excavate and remove the unsuitable material to the extent directed by the Principal. Replace the excavated material with materials from cuttings or other material acceptable to the Principal, and compact to at least the same relative compaction as the surrounding material.

*Unless otherwise specified, in locations identified as low risk areas (for example rural roads and residential streets), posts shall be cast directly into concrete footings.*

Holding down bolts, washers and nuts for major sign structures must comply with specification RMS B240.

Accurately align the holding down bolts in the concrete footing to suit the sign support structure baseplate. Set the bolts in the concrete such that at least two threads will project above the top of the nut after installation of the support structure.

Place any steel reinforcement required as shown on the Drawings.

Concrete for the foundation footings of standard sign structures must comply with Specification RMS R53. Concrete for the foundation footings of purpose-designed sign structures must comply with Specification RMS B80.

## **5.4 SIGN SUPPORT STRUCTURES ERECTION**

Accurately position and support all components of the structure during erection.

Provide levelling nuts under the sign structure baseplates to allow adjustment of the structure after installation.

Do not enlarge the baseplate holes or crank the bolts to correct any mis-alignment of the holding down bolts.

Tighten bolts using either a calibrated torque wrench or the part turn method.

Where signs are to be attached directly to posts, the top of each post must extend sufficiently beyond either the topmost stiffener rail or bolt holes on the sign panels as applicable, to enable attachment of the signs. The level of the top of each post must however be below the top edge of the sign panel.

In multi-post installations, the top of each post must be at the same level.

Where signs are to be attached to a horizontal arm, or to vertical members of the support structure, the positioning of these members must comply with the Drawings.

Renovate galvanised coatings which are scratched or slightly damaged during erection by using a zinc-rich paint in accordance with Appendix E of AS/NZS 4680 to provide a zinc-rich coating at least equal to the thickness specified for the galvanised layer. Re-galvanise any component of a structure

with damaged coating areas exceeding the limits specified in Appendix E of AS/NZS 4680, at your cost.

Submit to the Principal for approval details of your proposed method of filling the resulting void between the underside of the base plate and the top of the concrete foundation in the erection of the structure.

## **5.5 ATTACHMENT OF SIGN PANELS**

During erection, support and brace the sign panels and protect the sign face from damage.

Attach the sign panels to the supporting structure at each extrusion section or bolt hole provided on the sign panel using the mounting hardware shown on the Drawings.

Repair or replace at your own cost any signs damaged during erection to a standard equivalent to the original sign.

## **6 MODIFICATION TO EXISTING SIGNS AND SUPPORT STRUCTURES**

Where shown on the Drawings and where directed by the Principal, modify existing sign panels and sign support structures.

Separate pay items are provided for each modification required to signs and sign support structures and must cover all work required.

## **7 PROVISION FOR TRAFFIC**

Provide for traffic in accordance with the requirements of RMS G10 while undertaking the work and organise the work to avoid or minimise delays and inconvenience to traffic.

Where a sign is erected prior to its intended use by traffic and is visible to traffic, completely and securely wrap the face of the sign in hessian until it is used. Do not use black plastic sheeting.

**ANNEXURE R143/A – PROJECT SPECIFIC REQUIREMENTS****ANNEXURE R143/B – MEASUREMENT AND PAYMENT**

Payment will be made for all activities associated with completing the work detailed in this Specification (RMS R143) in accordance with the following Pay Items.

A lump sum price for any of these items will not be accepted.

If any item for which a quantity of work is listed in the Schedule of Rates has not been priced by you, it will be deemed that due allowance has been made in the prices of other items for the cost of the activity which has not been priced.

The cost of any provision for traffic including the covering of signs prior to use is to be included in the payment for work under the RMS G10. The cost of covering and uncovering permanent signs will be deemed to be included in the various pay items for signposting included in this Specification.

**Pay Items R143P1 (a) to (n)      Manufacture of Sign Panels**

A cost per square metre must be provided for each of the following combinations of background and legend materials:

	<b>BACKGROUND</b>	<b>LEGEND</b>
<b>a.</b>	Non-Reflective Sheet	Screenprinting Ink
<b>b.</b>	"	Non-Reflective Sheet
<b>c.</b>	Class 1 Reflective Sheet	Screenprinting Ink
<b>d.</b>	"	Transparent EC Film
<b>e.</b>	"	Class 1 Reflective Sheet
<b>f.</b>	Class 2 Reflective Sheet	Screenprinting Ink
<b>g.</b>	"	Transparent EC Film
<b>h.</b>	"	Class 2 Reflective Sheet
<b>i.</b>	Class 1X Reflective Sheet	Class 1X Reflective sheet
<b>j.</b>	"	Transparent EC Film
<b>k.</b>	"	Screenprinting Ink
<b>l.</b>	Class 1X Fluorescent Yellow Green	Black Screenprinting Ink
<b>m.</b>	Class 1X Fluorescent Yellow	Blank Screenprinting Ink
<b>n.</b>	Class 1X Fluorescent Orange	Black Screenprinting Ink

The unit of measurement must be the area in square metre of signs manufactured.

The schedule rate must be inclusive of mounting extrusions, labelling, packaging and delivery.

**Pay Item R143P2 -      Manufacture and Delivery of Sign Support Structures**

The unit of measurement must be the tonne of sign support structure manufacture.

The schedule rate must be inclusive of hot-dip galvanising, fittings, packaging and delivery.

**Pay Item R143P3 - Erection of Sign Structures (Standard Round Galvanised Posts)**

The unit of measurement must be per "each" post erected.

The schedule rate must include the costs of clearing, excavation, erection, bracing and casting of concrete footings.

**Pay Item R143P4 - Erection of Sign Structures (Standard Modular)**

The unit of measurement must be per "each" post erected.

The schedule rate must include the costs of clearing, excavation, erection, bracing and casting of concrete footings with hold down bolt assemblies.

**Pay Item R143P5 - Erection of Sign Structures (Special)**

The unit of measurement must be the tonne of sign support structure erected.

The schedule rate must include the costs of clearing, excavation, erection, bracing and casting of concrete footings with hold down bolt assemblies.

**Pay Item R143P6 - Erection of Sign Panels**

The unit of measurement must be the area in square metre of signs erected.

The schedule rate must include the costs of erection and attachment costs and any necessary temporary covering of signs with hessian.

**Pay Item R143P7 - Modification to Existing Sign Panels and Support Structures**

The unit of measurement must be the area in square metre of signs modified

Separate pay items must be included for each modification required to existing signs and sign support structure.

The schedule rate must include the costs of dismantling of sign panels and sign structures, demolition of existing footings, relocation, modification or replacement of sign structures, clearing, excavation and construction of new footings and erection or re-erection of sign panels including all fittings.

## **ANNEXURE R143/C – SCHEDULES OF HOLD POINTS AND IDENTIFIED RECORDS**

Refer to Clause 1.2.3

### **C1 SCHEDULE OF HOLD POINTS**

<b>Clause</b>	<b>Description</b>
5.1	Setting Out

### **C2 SCHEDULE OF IDENTIFIED RECORDS**

The records listed below are Identified Records for the purposes of RMS Q Annexure Q/E.

<b>Clause</b>	<b>Description of the Identified Record</b>
4.3	Details of proposed sign panel attachment systems
5.1	Proposed arrangement and alignment of each sign support structure.



## **ANNEXURES R143/D TO R143/L – (NOT USED)**

### **ANNEXURE R143/M – REFERENCE DOCUMENTS**

Refer to Clause 1.2.4.

#### **RMS Specifications**

RMS G10	Traffic Management
RMS Q	Quality Management System
RMS R53	Concrete (for general use), Mortar and Grout
RMS B80	Concrete Work for Bridges
RMS B240	Supply of Bolts, Nuts, Screws and Washers
RMS 3400	Manufacture and Delivery of Road Signs

#### **Australian Standards**

AS 1214	Hot-dip galvanised coatings on threaded fasteners
AS 4100	Steel structures
AS 1379	The specification and manufacture of concrete
AS 1554.1	Welding of steel structures
AS 1627.1	Cleaning using liquid solvents and alkaline solutions
AS 1627.4	Abrasive blast cleaning
AS/NZS 4680	Hot-dip galvanised (zinc) coatings on fabricated ferrous articles