ROADS AND MARITIME SERVICES (RMS)

QA SPECIFICATION 3400

MANUFACTURE AND DELIVERY OF ROAD SIGNS

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.

REVISION REGISTER

Edition Number	Clause Number	Description of Revision	Authorised By	Date
Ed 1	New Document	First Issued	GM, CEC	Aug 93
Ed 2		Converted to MS Word 6.0c. Annexure incorporated into 1 electronic file.	GM, RNIC (J Woodward)	10.04.97
Ed 3		Major revision for new Sign Contract No. 791/0005. Reformatted for inclusion on TOPIC as RTA 3400. Minor amendments Clause 6.3 Hinged Signs added. Reference to RTA Traffic Engineering Manual removed. Clause 3.1 reworded. Annexure 3400/2 revised. Class 1W and Class 1A sign materials added.	GM, RNIC	25.02.99
Ed 4	Annex D - 3.8 & 4.2 Annexure 3400/2	Sign material legends changed. Add Nikkalite Super Engineering Grade Class 1, Standard Green	GM, RNIC	22.07.99
Ed 5	Annexure 3400/2	Omit Nikkalite Super Engineering Grade Class 1, Standard Green	GM, RNIC	25.2.2000
Ed 6	All	Major revision. Most sections revised. Specification reformatted. “Contractor” replaced by “you”. “Superintendent” replaced by “Principal”. Text revised to direct imperative style.	GM, RNIC	12.4.2007
Ed 6/Rev 1	“Notice” Spec Ref No	RTA PO Box and Fax numbers updated Revision No added; previous version deemed Rev 0	GM, IC	22.04.09

Edition Number	Clause Number	Description of Revision	Authorised By	Date
Ed 6/Rev 1 (cont'd)	Global	Clauses rearranged and renumbered. Minor reformatting		
Ed 7/Rev 0	5.1.1 5.3 8 9 Annexures Annex I (previously F) Annex J (previously E) Annex H (previously G) previous Annex J Annex M	Permitted use of plywood as sign substrate for temporary signs revoked Retroreflective Class 1W replaced by Class 1X Values in Table for minimum CIL/m^2 changed to that for Class 1X Reference to TDT technical direction changed Class 1W replaced by Class 1X Hyperlink to RTA Signs Register on RTA website added Class 1W replaced by Class 1X Annexures rearranged. Schedule expanded to include details for other signs Class 1X inserted for some signs Guide changed from a chart to a table "Temporary Sign Plywood Substrate – List of Approved Materials" deleted References updated	GM, IC (M Andrew)	11.09.09
Ed 7/Rev 1	8	Title clarified. Details for class of retroreflective material clarified	GM, IC (M Andrew)	21.10.09
Ed 7/Rev 2	Global 5.1.3, 5.1.4 5.4, 5.5.1 6.2 7 7.3 7.3.3 (b) & (d)	Minor editorial changes to improve clarity. Previous clause 5.1.3 "Road Signs (G, W and R Series)" split into two clauses – clause 5.1.3 using the previous title and clause 5.1.4 titled "Surface and Edge Finish". Aust Std reference for AS 2700 corrected for missing suffix "S". New sub-heading inserted, subsequent clauses renumbered. Sub-heading for clause 7.1 inserted, subsequent sub-headings renumbered. New sub-headings 7.3.1, 7.3.2, 7.3.3 inserted. Previous option "c" mentioned deleted, as it does not exist.	GM, IC	16.08.10

Edition Number	Clause Number	Description of Revision	Authorised By	Date
Ed 7/Rev 2 (cont'd)	7.9.2, 7.9.3	Previous sub-clause split into 2 sub-clauses, sub-heading added, some content rearranged.		
	9, 10	Sequence of previous clauses 9 and 10 reversed.		
	Annex J	Sign register code for Chevron Alignment Markers (CAM) updated. Background requirements for CAM and Marker (Slash) signs amended.		
	Annex M	Referenced documents updated.		

QA SPECIFICATION 3400

MANUFACTURE AND DELIVERY OF ROAD SIGNS

VERSION FOR:
DATE:

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CLAUSE **PAGE**

FOREWORD

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REVISIONS TO PREVIOUS VERSION

This document has been revised from RMS Specification 3400 Edition 7 Revision 0.

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 3400

MANUFACTURE AND DELIVERY OF ROAD SIGNS

1 SCOPE

This Specification sets out the requirements for the manufacture, handling, transportation, storage and delivery of regulatory, warning, guide and road works signs. This specification does not cover temporary special use signage, electronic signage or support structures.

2 STRUCTURE OF THE SPECIFICATION

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

2.1 (NOT USED)

2.2 SCHEDULE OF IDENTIFIED RECORDS

The records listed in Annexure 3400/C are Identified Records for the purposes of Specification RMS Q Annexure Q/E.

2.3 (NOT USED)

2.4 REFERENCED DOCUMENTS AND DEFINITIONS

Unless otherwise specified or is specifically supplied by the Principal, the applicable issue of a referenced document is 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. AS2439.1). For convenience, the full titles are given in Annexure 3400/M.

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

3 (NOT USED)

4 QUALITY MANAGEMENT SYSTEM

Establish and maintain a Quality Management System in conformity with ISO 9001 as a means of ensuring that the product conforms to the Specification requirements. Where materials required in the manufacture are imported, you must demonstrate that a substantially equivalent Quality Management System is in operation at the overseas manufacturing source. The Principal reserves the right to

conduct audits and inspections of the Suppliers' procedures and processes during or on completion of manufacture (including third party manufacturer).

5 MATERIAL REQUIREMENTS

5.1 SIGN BLANKS

5.1.1 Road Works (T-Series) Signs

Where road works signs are specified as temporary, you may manufacture blanks from either:

(a) **Boxed Edge Steel.** The steel must be 0.8 mm hot-dipped zinc/aluminium alloy coated structural steel, with a regular spangled surface, conforming to AS 1397 and AS 1365. The steel must have a minimum yield strength of 300 MPa, good ductility, and be suitable for roll forming,

or

(b) **Aluminium** (refer to clause 5.1.3)

5.1.2 Other Temporary Signs

This Specification does not cover signs intended for special events or short term applications.

5.1.3 Road Signs (G, W and R Series)

Manufacture all road sign blanks from an aluminium alloy with a thickness of 1.6 mm. The aluminium alloy must be type 5251 or 5052, temper H38 as specified in AS/NZS 1734.

Sign blanks for fingerboards and street name signs shall be manufactured from an approved "I" Section or similar shape, with the following properties:

	150MM OVERALL DEPTH BLANK	***200MM OVERALL DEPTH BLANK***
Web thickness	***2.5mm***	***2.5mm***
Moments of inertia (Minimum values)	***$Ixx = 1.8 \times 10^6$ mm^4*** ***$Iyy = 5.4 \times 10^3$ mm^4***	***$Ixx = 3.6 \times 10^6$ mm^4*** ***$Iyy = 5.45 \times 10^3$ mm^4***

Unless otherwise specified or approved by the Superintendent, blanks shall be sized to suit the requirements of AS 1743 for G5 series signs. The overall length of 150mm deep blanks shall not be less than 450mm nor more than 850mm. The overall length of 200mm deep blanks shall not be less than 600mm nor more than 850mm. Length increments must be in multiples of 50mm.

5.1.4 Surface and Edge Finish

Sign blanks delivered must be free of cracks, tears and other surface blemishes and with edges true and smooth.

5.2 ALUMINIUM EXTRUSION BACKING

Where shown on the Drawings, signs must include extruded aluminium sections for mounting purposes. The extrusion must be to the design shown in Annexure 3400/G (Drawing CW5411 Sheet 1 of 4) and aluminium must be Type 6060 - T5 in accordance with AS/NZS 1866.

5.3 RETROREFLECTIVE MATERIAL FOR BACKGROUND AND LEGEND

Retroreflective materials used in the background and legend of signs must conform in colour and grade to AS/NZS 1906.1 for Class 1 and Class 2 materials.

The Principal specifies a new class (Class 1X) for optimum wide angle retroreflective sheeting to be used for certain signage. The minimum coefficients of luminous intensity per unit area for this class of sheeting are as shown in the following table. This new class (Class 1X) must meet all other requirements of AS/NZS 1906.1 for a Class 1W sheeting. ***All material must be pre-coated with pressure sensitive adhesive in accordance with AS 1906.***

E.A. (°)	**O.A.** (°)	**Minimum CIL/m^2 Values* for Class 1X** (cd/lx.m^2)								
		White	**Yellow**	**Red**	**Std Green**	**Blue**	**Brown**	**Fluro Y/Grn**	**Fluro Yellow**	**Fluro Orange**
4	0.2	500	390	90	50	20	20	400	260	175
	0.33	350	320	75	40	17	17	310	200	100
	0.5	300	210	60	30	15	15	240	180	90
	1.0	80	60	16	8.0	3.6	3.6	64	48	24
15	0.2	380	265	75	38	19	19	305	190	150
	0.33	350	240	70	35	17	17	280	175	85
	0.5	250	170	50	24	12	12	195	140	70
	1.0	60	45	12	6	3	3	50	30	18
30	0.2	215	162	43	22	10	10	170	130	65
	0.33	175	120	35	17	9	9	140	105	52
	0.5	135	100	27	14	6	6	110	81	41
	1.0	45	34	9.0	4.5	2.0	2.0	36	27	14

* Values specified in the above table are the average of CIL/m^2 values for 0° and 90° rotation angles, for each Entrance Angle (E.A.) / Observation Angle (O.A.) combination

The materials approved for use by the Principal for retroreflective sheeting are listed in RMS Technical Direction TDT 2009/08, as amended. This technical direction is available from the RMS website.

The costs for the testing for compliance with AS/NZS 1906.1 and the maintenance of any retroreflective sheeting to be approved by the Principal will be borne by the material supplier. Perform all testing in accordance with the requirements of AS/NZS1906.1 and/or as specified in RMS Technical Direction TDT 2009/08.

FLUORESCENT MATERIAL
Fluorescent material may be used for sign faces intended for day-time use only.

Fluorescent material used for sign faces shall be Red-Orange vinyl sheeting or approved equivalent in accordance with the relevant Australian or British Standard specification and as shown in Appendix D of AS 1743.

Red-Orange sheeting for both day and night use shall be Class 1 or 2 retro-reflective material.

5.4 NON-REFLECTIVE SIGN MATERIAL

The colour of all non-reflective sign material must closely approximate the colours defined in AS 1743 Section 10.1 (and reference AS 2700S). Where a colour is specified as matt, the specular gloss measured in accordance with AS/NZS 1580 - Method 602.2, must have a value of between 12 and 20 when measured with an 85 degree head, and a value of between 8 and 12 when measured with a 60 degree head.

Additionally, material for parking signs must conform in colour to AS 2700S as follows:

Colour	AS 2700S Designation
WHITE	N14 WHITE
RED	R13 SIGNAL RED
BLUE	B11 RICH BLUE
GREEN	~~G27 HOMEBUSH GREEN OR, G13 EMERALD~~ ***G12 STANDARD GREEN***

Colours for tourist route signs shall be equal to the "3M Scotchcal" colours as follows.

SHEETING COLOUR	*COLOUR NUMBER*
Black	***12***
Satin Gold	***131***
Burgundy	***58***
Peacock Blue	***77***
Royal Purple	***38***
Bright Orange	***14***
Satin Aluminium	***120***

Where white is specified for tourist route signs, it shall be White Class 1 retro-reflective material as shown in Appendix C of AS 1743.

5.4.1 Background Paint

Background paint must be a long life industrial quality paint which is compatible with the legend material used, both in application and durability. Examples are: two component polyurethane paint, enamel paint, and powder coating.

5.4.2 Background Sheeting

Adhesive cast vinyl sheet material ***pre-coated with pressure sensitive adhesive in accordance with AS 1906, and equal to "3M Scotchcal"*** ~~or other equivalent approved by the Principal may be used~~. The material must be of uniform density and compatible with the material used for the legend both in application and durability.

5.4.3 Non-reflective Legend

Non-reflective material specified for figures, letters, symbols and borders must be of uniform density and compatible with the background material, both in application and durability.

5.5 RIVETS

Where aluminium extrusion backing rails are attached to the sign, these must be secured using rivets. The riveting method must be either pop rivets or self-piercing rivets. A combination of riveting methods is not permitted on any one sign during the course of its manufacture.

5.5.1 Pop Rivets

The rivets must be aluminium alloy with a steel stem and domed head. The sizes required and the strengths must conform to the requirements set out in the following table.

Diameter (mm)	**Material Thickness** (mm)	**Minimum Shear Load** (N)	**Minimum Tensile Load** (N)
4.0	5.2	1320	1910
4.8 *	8.0	2010	2800

* for depth and kilometre post signs.

Apply a paint coating to the domed head so that when the rivet is in position, it will show the same colour as the material to which it is attached.

The paint used must be an alkyd enamel, which must be applied after an appropriate treatment of the rivet to ensure long lasting adhesion.

Colours required are listed below, with full gloss level required:

Blue	AS 2700S B11	Yellow	AS 2700S Y14	Red	AS 2700S R13
Black	BS 5252 00E53	Orange	AS 2700S X15	White	BS 5252 00E55
Brown	AS 2700S X65	Silver	AS 2700S N24	Green	AS 2700S G23

5.5.2 Self-Piercing Rivets

The system must use stainless steel self-piercing rivets. The aluminium extrusion backing rails must be riveted to the sign blank before the application of the sign face material. The riveting process must not result in protrusions above the surface of the sign blank, which will result in damage of the sign face material during application or handling.

Rivet sizes and strengths must conform to the requirements as set out in the table for pop rivets. A smaller rivet diameter is permitted provided that the minimum shear and tensile requirements are achieved. The manufacturer must submit to the Principal for approval documented test evidence to confirm compliance with this requirement.

6 DESIGN

6.1 SIGN FACES AND REINFORCEMENT

Designs for the signs and reinforcement, to be provided under the Contract, are shown in the Drawings.

The dimensions, legend and background for each sign must be in accordance with this Specification, AS 1742 to AS 1744 inclusive, and the Drawings.

The individual sign face design layouts must either be provided by the Principal or based on Australian Standard as appropriate.

6.2 RMS SIGN REGISTER

Current applicable sign details and drawings are available on the RMS website at http://www.rta.nsw.gov.au/cgi-bin/index.cgi?action=searchtrafficsigns.form

6.3 WIND LOADING

Signs must be designed and manufactured to withstand the wind forces calculated in accordance with AS/NZS 1170.2.

Signs must withstand the wind forces of Region A (normal) for Terrain Category 2 unless otherwise specified.

Signs designated for High Wind Areas must withstand the wind forces of Region B (intermediate) Terrain Category 2.

7 MANUFACTURE OF SIGNS

7.1 COMMENCEMENT OF SIGN MANUFACTURE

HOLD POINT

Process Held:	Commencement of sign manufacture for the Contract.
Submission Details:	At least seven days prior to production, a statement signed by you advising the brand of retroreflective sheeting and details of the non-reflective background and legend material to be used.
Release of Hold Point:	The Principal will consider the submitted documents prior to authorising the release of the Hold Point.

If you should, during the course of the Contract, change the supply of the retroreflective sheeting, non-reflective background or legend material, this Hold Point will also apply.

7.2 SIGN BLANKS

7.2.1 Preparation

Roadworks (T-Series) signs must be one-piece aluminium or boxed edge steel.

All other signs ***(including but not limited to regulator, warning and guide signs)*** must be manufactured from aluminium only, and the sign blanks must be one-piece. Where the sign is of such a size as to require more than one full sheet of aluminium, a multi-piece sign will be allowed.

Guide signs specified with overall dimensions of 2400mm x 1200mm or less shall also be constructed from a single piece of aluminium.

Guide signs larger than 2400mm x 1200mm overall dimensions shall be constructed utilising a minimum number of panels of aluminium sheet consistent with a maximum panel size of 1800 x 1200mm. The individual sizes of panels of aluminium sheet used in the construction of a multi panel sign shall be such that the horizontal or vertical dimension of the smallest panel shall not be less than half the corresponding horizontal or vertical dimension of the largest panel.

The face of each sign blank must be chemically cleaned and etched or mechanically abraded in accordance with AS1627. The back of each sign blank must be rendered dull and non-reflective either by mechanical or chemical means and must be free of scratches and blemishes.

7.2.2 Dimensions and Tolerances

Sign blanks must be free of cracks, tears and other surface blemishes and the edges true and smooth. The dimensions of the sign blank must be within ± 1.5 mm of those specified and the finished sign must be flat within a maximum allowable bow of .005(D) in any direction, where (D) is the maximum dimension of the sign blank in any direction.

If sizes are not detailed, dimensions shall be determined from details given in AS 1743.

7.3 MULTI-PIECE SIGNS

7.3.1 Use Minimum Number of Sheets

A multi-piece sign must be made up with the minimum number of sheets practicable, as shown in Annexure 3400/F. Signs with more sheets than necessary will not be accepted. Sheets of the multi-piece sign must be butt~~ed~~ ***jointed*** together with a minimum gap of 0.5 mm and a maximum gap of 1 mm at any point along the joint.

Vertical butt joints are preferred, but horizontal butt joints shall be acceptable if the full strength of the aluminium sheet can be transferred through the joint. Horizontal joints may only be located between lines of legend unless otherwise approved by the Principal in writing.

Vertical butt joints shall not be made through the vertical stroke of letters, symbols or borders.

7.3.2 Backing Strip

Cover all sheet joints with a backing strip. Fix the backing strip to the sign using a Very High Bond (VHB) joining strip or rivet it to each sheet with rivets correctly coloured to match the background material on the face of the sign. Refer Annexure 3400/G (Drawing CW5411 Sheet 3 of 4, Vertical Panel Joint) for further details.

When riveted, secure the ends of the backing strip by rivets at a maximum distance of 25 mm from each end. Rivet spacing must not exceed 200 mm and at least two rivets must be installed on each side of the joint.

When using a VHB backing strip, follow the manufacturer's recommended application procedure. You are responsible for making good any failures of the VHB backing strip that may occur.

Where High Wind signs are specified on the Drawings, the rivet spacing must not exceed 150 mm and at least three rivets must be installed on each side of the joint. Refer Annexure 3400/G (Drawing CW5411 Sheet 1 of 4) for further details.

Backing strips must be of the same material and colour as used for the sign blank and have a minimum width of 50 mm over the full length of the joint. Do not use backing strips under an extrusion. Vertical backing strips must stop at each horizontal extrusion and butt against it with a gap not exceeding 2 mm.

7.3.3 Assembly After Delivery

Two-piece Direction, Service, Tourist and General Information signs less than 2.4 metres in height and 3.0 metres in length may be delivered disassembled in more than one piece.

Two-piece Regulatory, Warning and standard size Guide signs less than 2.4 metres in height and 2.0 metres in length must be delivered assembled in one piece.

Signs exceeding 2.4 metres in height must be made and delivered in three or more sections of up to 1.2 metres in height. The following requirements apply:

(a) Assemble horizontal sections of the sign as one piece unless noted otherwise on the Drawings or where approved by the Principal. Where a section is required in more than one piece, align the vertically joined pieces prior to delivery, with either staggered extrusions with backing strips attached to one sheet and the other drilled ready for riveting on site or in accordance with Annexure 3400/G (Drawing CW5411 Sheet 3 of 4) using either option "A" or option "B". Number each piece and provide a sketch to enable correct assembly.

(b) Joining of two or more horizontal sections of a sign must be carried out in accordance with Annexure 3400/G (Drawing CW5411 Sheet 3 of 4) using either option "A" or option "B".

(c) Clearly mark each section of the sign on the back of the section with the sign number and section number for storage and erection purposes.

(d) Bolt the sign sections together on site using galvanised hexagon head bolts, nuts and washers (option "A" or option "B"), as supplied by the manufacturer.

7.4 HINGED SIGNS

This type of sign must be manufactured in accordance with the requirements of this Specification and the Drawings and must be hinged either horizontally or vertically, as specified on the relevant RMS Drawing.

Use a continuous aluminium piano type hinge which runs the full length or width of the sign. The hinge must be 40 mm to 50 mm wide when in the opened position and have a 1 mm to 2 mm blade thickness with a 3 mm to 4 mm diameter stainless steel hinge pin.

Set or fold the hinge approximately 12 degrees along both sides of the hinge as near as possible to the pin. This is to provide for clearance of the rivet heads when the sign is in the closed position. Stagger the rivets on each side of the hinge. Rivet the hinge to the back of the sign so that when the sign is in the open position, only the pin roll is visible from the front of the sign.

Position the holes on the top and bottom or both sides of the sign to accommodate a 38 mm wide padlock (supplied by others) when the sign is in the closed position.

7.5 PROVISION FOR MOUNTING OF SIGNS

SIGN BLADE ATTACHEMENT

- ***Fingerboards and street name signs***

  Fingerboards and street name sign blades shall be fixed to posts with 10mm diameter galvanised hexagon head bolts, either directly in the case of centrally mounted signs, or with ACT Government approved proprietary post mounting clamps.

  Where sign blades are required to be attached to lighting columns or similar column structures which cannot be drilled for through bolting, they must be fixed to the columns with 12mm wide by 0.75nun thick Grade 201 stainless steel banding, secured with approved mechanical locking devices. One strap shall be provided at each sign bolt location, and shall be fitted with a stainless steel stand-off bracket to accept the sign bolt or where necessary, the blade mounting bracket. The stand-off brackets shall be fixed to the banding in such a way as to prevent removal. Where necessary to facilitate tightening of the banding around octagonal columns and the like, stainless steel packing pieces shall be fitted between the column and the banding, and the whole assembly made secure. Loose or otherwise poorly constructed banding assemblies will be rejected.

- ***Regulatory and warning signs***

  Regulatory and warning signs shall be fixed to posts with 10mm diameter galvanised cup head bolts. Nuts shall be fitted and tightened within a cup washer of a size which will not allow the entry of a standard 10mm. socket.

  Mounting of blades on lighting or similar columns shall follow the fingerboard mounting method.

- ***Guide Signs***

  Guide signs shall be attached to posts by the use of approved proprietary sand-cast aluminium adjustable brackets or galvanised steel saddle brackets, both complete with 10mm diameter galvanised cuphead square necked bolts. One bracket shall be provided at each available connecting point between posts and lateral supports. Each bracket shall be a snug fit over the sign post. Oversize and undersize brackets will be rejected and each sign shall have only one type of fixing bracket. Care shall be taken to avoid distortion of the blade stiffeners by over-tightening of fixing bolts.

  Fixing brackets shall be painted to match the back of signs.

7.5.1 Non-reinforced Signs

Manufacture non-reinforced signs with square holes for mounting purposes. The holes must be cleanly punched 11 mm square to accept a 10 mm diameter cup head square neck bolt. Except where

specified otherwise, place two holes at 520 mm centres on the nominal vertical centreline so that the bolt heads do not obscure the legend.

7.5.2 Reinforced Signs

For normal use, all signs greater than 750 mm in width or with a width to height ratio of 2.5 or greater must have aluminium reinforcement extrusions fixed to the rear of the sign.

For High Wind use, reinforce all signs greater than 600 mm in width. Use the closer rivet spacing specified in Annexure 3400/G for High Wind areas.

Spacing must be in accordance with the extrusion centre guide in Annexure 3400/H, or as detailed in Annexure 3400/I. The tolerance for spacing is ± 0.5 mm.

Fixing is by rivets as shown in Annexure 3400/G and as described in Clause 5.5, with the head of the rivet matching the colour of the surrounding material.

7.5.3 Road Works (T-Series) Signs

No provision for attachment is required for road works signs.

7.6 FORMS OF LETTERS AND NUMERALS

AS 1744 gives the requirements for letter styles, shapes and letter heights. Word and letter spacing must be as specified on individual RMS Drawings. Stroke width of letters and numerals must comply with AS 1744 and all individual letters must have neat clearly defined edges with smooth curves on round letters.

Abbreviations acceptable for legends on fingerboards and street name signs are as per AS1742.

<u>Fingerboards and Street Name Signs</u>
Letters and numerals for fingerboards and street name signs shall have series D dimensions. Where D letters and numerals would result in a sign in excess of 850mm long, letters and numerals shall be the widest of series C, B, or A, which will result in a sign less than 850mm long.

7.7 SIGN MATERIALS – LEGENDS AND BACKGROUNDS

The type, grade or class of sign material to be used for legend and background must be in accordance with Annexure 3400/J.

7.7.1 Retroreflective Sheet Material for Background and Legend

Apply retroreflective sheeting (incorporating pressure sensitive adhesive) in accordance with the sheeting manufacturer's instructions, by a method such that it is securely fixed to the sign substrate, and the sign surface is free of any bubbles, wrinkles and blemishes.

All retroreflective sheeting must be integrally coloured sheeting or white retroreflective sheeting with matched component coloured transparent electronic cuttable overlay film applied over the top.

7.7.1.1 Screening Ink

Apply transparent screening ink over the retroreflective sheeting by the off contact silk screening process, using matched component inks and techniques recommended by the

retroreflective sheeting manufacturer. The ink must be compatible with the background material, both in application and durability.

7.7.1.2 Electronic Cuttable Transparent Overlay Film

Where electronic cuttable transparent overlay film is used for the fabrication of sign background and/or legend, it must be film manufactured as a matched component by the supplier of the retroreflective sheeting. It must be applied in accordance with the retro-reflective sheeting manufacturer's instructions. The resulting sign face must be free of bubbles, wrinkles and blemishes.

7.7.1.3 Graffiti Protection Film

It is recognised that retroreflective sheeting manufacturers supply graffiti protective overlay films. These are clear films that are designed to be applied over the retroreflective sign face during sign manufacture and act as a barrier layer between graffiti and the underlying sign face material. The use of such film over a screen printed face allows graffiti to be removed without removing the screened ink as well, allowing reasonable sign reclamation without needing to replace it with a new sign.

Where signs are requested and ordered with a protective graffiti overlay film on the sign face, the film used must be a matched component film recommended and warranted by the retroreflective sheeting manufacturer of the underlying retroreflective material, and must be applied during sign manufacture in the manufacturing facility.

7.7.2 Non-reflective Background and Legend

7.7.2.1 Background Paint

Where paint is used, it must be applied with a minimum dry film thickness of 38 microns. Touching up of small areas by brush to fully match the spray painted surface is permissible using the colour base and hardener mixture without reducer.

7.7.2.2 Background Sheet Material

Apply the non-reflective sheeting in accordance with the manufacturer's instructions with pressure sensitive adhesive and by a method such that it is securely fixed to the sign and the surface is free of bubbles, wrinkles and blemishes.

7.7.2.3 Screening Ink

Apply the legend by the screen-printing process, using the materials and techniques recommended by the ink manufacturer. The legend must be compatible with the background material, both in application and durability.

7.8 REFERENCE MARKINGS

Mark all signs covered by this Specification clearly and permanently with an identification coding.

Provide the identification coding on the sign in one of the following ways:

(a) Stamped directly onto the substrate.

(b) Engraved onto a cover plate which is permanently fixed to the substrate.

(c) A durable label (approved by the Principal) permanently fixed to the substrate.

The coding must appear in ciphers 6 mm to 10 mm high on the rear of the sign and carried out in such a manner that the front face of the sign is not damaged.

For rectangular signs, the coding must appear as near as practicable to the bottom rear left hand corner. For other shaped signs, the coding must be positioned as near to the bottom left hand rear edge as practicable. The identification coding must be clearly legible on the rear of the finished sign, and must not be obscured by rivets, bolts, extrusions, brackets and posts.

Sign manufacturers must include information in the following format:

(a) Sign manufacturer's name. Where a sign manufacturer has more than one manufacturing facility location, the location of primary manufacture must also be indicated. The abbreviated name coding must be as approved by the Principal.

(b) Month and year of sign manufacture ***and delivery***. The month and year of delivery shall be separated by a stroke.

(c) Manufacturer of sign materials, and class of retroreflective sheeting used.

(d) High Wind designation, if applicable.

For example:

XYZ	11 – 06	3M1	HIGH WIND
Abbreviated to signify Sign Manufacturer	Month of Manufacture – Year of Manufacture	Abbreviated to signify Sign Materials Manufacturer and Grade of Reflective Sheeting	If built to withstand high wind

In addition, Directional, Tourist and Service Signs must have the Drawing Number displayed on an aluminium or non-reflective sheeting label stuck to the back of the sign to the right of the identification coding.

<u>Fingerboards and Street Name Signs</u>
For single sided signs, the markings shall be located on the rear of the sign blade between the bolt holes. For double sided signs, the markings shall be located between the bolt holes on the side of the sign blade which has the initial letter of the legend on the left end and the bolt holes on the right end.

7.9 PACKAGING, HANDLING, TRANSPORT AND STORAGE

All signs must be packaged, handled, transported and stored in accordance with the retroreflective sheeting manufacturer's recommendations and requirements.

All large signs are to be packed, transported and stored vertically on their edges. For a large multi-panel sign, pack and transport all component panels together.

If required by the Principal, you shall submit samples of the signs proposed to supply, which shall be similar in every respect to the signs which will be supplied under the Contract. The Principal shall have the right to undertake any tests of the sample signs to assess performance and durability.

7.9.1 Packaging

The minimum packaging requirement for signs is a slip sheet (as recommended by the retroreflective sheeting manufacturer) against the sign face and an overlying sheet of protective material covering the entire sign face and securely fastened to the sign at its edges or completely surrounding the sign.

Where there is more than one sign per package, pack the signs in pairs face to face with slip sheets between faces. Use an additional layer of protective material to separate signs incorporating Class 1 and Class 1X retroreflective materials.

Where packages contain an odd number of signs, place the odd sign face out at the outside of the package with the face protected as for a single sign. When being transported, large signs must be braced by attaching vertical pieces of wood or other appropriate material such as aluminium extrusion to the back of the sign, extending beyond the sign bottom edges (Refer Clause 7.8.2).

The outer face of each package must show information as follows:

(a) Signs with standard, non site specific legends (for example, regulatory, warning signs) - the standard sign number and quantity of each type of sign in the package, plus delivery instructions as given on the order or otherwise advised, must be legibly marked.

(b) Signs with site-specific legends (for example, direction signs, regulatory signs with special time information) - the reference number of the sign drawing, if shown, or other identification agreed to by the Principal must be legibly marked, or a copy of the sign drawing must be securely attached to it in a clear weatherproof envelope.

(c) Attach a notice to each package warning of damage that may result from improper storage and handling, and setting out the requirements for storage and handling generally as described in Clause 7.8.2.

7.9.2 Handling and Transport

Each package of sign blades shall have a manufacturers notice fixed to the outside giving clear instructions of the particular transportation and storage requirements.

Handle, transport and store all finished signs in a vertical position wherever possible, so as to prevent damage to the sign face or other components.

Avoid transporting any signs in a flat position or “flat-pack” wherever possible. Avoid transporting signs flat in a large bundle, as resulting high pressure on each sign face will result in damage to the retro-reflective sheeting, reducing night time sign performance.

Always transport large/multi-panel signs in a vertical position.

On receipt of a shipment of signs, inspect each sign promptly for any evidence of damage during transport.

The Principal may reject any or all signs found to be damaged through the actions of the Contractor or his agents. The Contractor shall raise a non-conformance report for any damaged signs as soon as practicable after discovery of such damage.

7.9.2 Storage

Store signs indoors wherever possible.

Store signs vertically with their edges clear of the ground and in such a manner that the sign faces are not scuffed or marked, making use of protruding vertical bracing members attached to the rear of the sign (supplied by the sign manufacturer).

Vertical bracing members must be square or rectangular in section, either steel tube, aluminium tube or hardwood timber with minimum dimensions 50 mm x 25 mm x sign height plus 50mm top and bottom and must be attached to the sign extrusion. Attach a minimum of two vertical bracing members to any large/multi-panel sign.

Back to back storage of signs is permitted, but pressure must not be exerted against the sign face by any other sign or support.

Signs required to be stored outdoors must have the packaging removed and be stored so as to permit free air circulation and normal moisture evaporation. At all times, prevent moisture from remaining in contact with the face of the sign. Immediately remove packaging that becomes wet and allow the signs to dry completely.

Take precautions to ensure that high temperature and/or high humidity conditions do not occur in either indoor or outdoor storage.

8 CATEGORIES OF SIGNS – CLASS OF RETROREFLECTIVE MATERIALS

	Background	**Legend**
(a)	Non-Reflective	Class 1
(b)	Class 2	Class 2
(c)	Class 2	Non-Reflective
(d)	Class 1	Class 1
(e)	Class 1	Non-Reflective
(f)	Class 1X	Non-Reflective
(g)	Class 1X	Class 1X
(h)	Class 1X Fluorescent Reflective	Non-Reflective
(i)	Non-Reflective	Non-Reflective

All material must be retroreflective unless stated otherwise above.

The class of retroreflective material required will be shown on the sign drawings supplied or for standard signs, as detailed in the RMS Signs Register available at.:

http://www.rta.nsw.gov.au/cgi-bin/index.cgi?action=searchtrafficsigns.form

9 QUALITY RECORDS

Records of all sign materials used must be kept by the sign manufacturer and be made available to the Principal when requested. Sign material records include the following:

(a) Aluminium, plywood or other sign substrate.

(b) Retroreflective sheeting, matched component overlay film and transparent ink.

(c) Non-reflective sheeting, film and ink.

(d) Background paint and powder coating.

(e) Rivets, extrusion, VHB backing strip.

Records of each of the above materials comprise:

(i) Manufacturer's name

(ii) Batch number

(iii) Manufacturer's certificate of conformity with this Specification

(iv) Material grade

(v) Date of delivery

(vi) Date of use

(vii) Material Data Sheet or Specification

When requested by the Principal, provide reports of the most recent technical sign audit conducted by the retroreflective sheeting manufacturer for the intended sign manufacturing facility. Where no technical audit report is available, provide records or evidence of the most recent training conducted by the retroreflective sheeting manufacturer to its staff.

When requested by the Principal, provide evidence of an extended performance warranty from the respective retroreflective sheeting manufacturer for signs manufactured and supplied.

10 WARRANTY PERIOD

You must guarantee all signs to be free of any defect in materials, workmanship, structure and sign face performance for the warranty period specified below:

Sign Face Material	**Sign Warranty Period** (No of years, from date of manufacture)	**Sign Face Photometric Value** (% of new value retained #)
Class 1X	10	80
Class 1X (White with EC Overlay Film)	12	80
Class 1X Screen Printed	10	80
Class 1X Fluorescent Reflective Orange	3	80
Class 1X Fluorescent Reflective Yellow and Yellow Green	10	80
Class 1	12	80

Class 1 (White with EC Overlay Film)	12	80
Class 1 Screen Printed	10	80
Class 2	7	50
Class 2 Screen Printed or White with EC Overlay Film	7	50
Non-Reflective * (sheeting or coating)	7	Not applicable
VHB joining strip	12 - 15	Not applicable

* Includes non-reflective parking signs # In accordance with AS 1906.1

Retroreflective materials must retain a photometric performance of at least the percentage shown above throughout the warranty period and, for non-reflective material, must retain integrity and effective colour and appearance.

In the event of defects, you must undertake any replacement or repair of signs, including all labour and material involved at the time of replacement, at a pro-rata cost related to the length of service of the sign.

- ***Failure within 1 year of stamped date***
  Total cost of supply, delivery and erection of a new sign to be borne by the Contractor.

- ***Failure after more than 1 year from the stamped date***
  The Contractor to bear the total cost of supply and delivery of a new sign less an allowance equal to that cost multiplied by the ratio of the expired life to the total warranty life.

The repairs must be guaranteed for the remainder of the warranty period nominated above.

This warranty does not apply to damage by vandalism or vehicle accidents.

Keep the records as detailed in Clause 9 for inspection by the Principal on request throughout the warranty period.

The Contractor shall be solely responsible for meeting all claims under these provisions, and shall not reassign any such responsibility to any other organisation, excepting that in the case of sign face material, the Principal will accept a performance warranty complying with the requirements from the manufacturer of the material.

ANNEXURE 3400/A – (NOT USED)

ANNEXURE 3400/B – (NOT USED)

ANNEXURE 3400/C – SCHEDULE OF IDENTIFIED RECORDS

Refer to Clause 2.2.

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

Clause	Description of the Identified Record
9	Quality Records listed in Clause 9

ANNEXURES 3400/D TO 3400/E – (NOT USED)

ANNEXURE 3400/F – SIGN BLANK CUTTING CHART

Height of Sign in metres						
7.9						
7.4	7-8 sheets					
6.8	6-7 sheets					
5.7	5-6 sheets					
4.6	4-5 sheets					
3.5	3-4 sheets					
2.4	2-3 sheets					
1.2	1-2 sheets					
	1 sheet	1-2 sheets	2-3 sheets	3-4 sheets	4-5 sheets	
0	2.40	4.80	7.20	9.60	12.00	

Length of Sign in metres

Notes

(1) Dimensions stated in the Cutting Chart are based on RMS sign installation and transport requirements.

(2) Intermediate dimensions to be as nominated on the Chart. Where a sign is made from more than one sheet, the joints must be symmetrical about the sign centre line (vertical and horizontal).

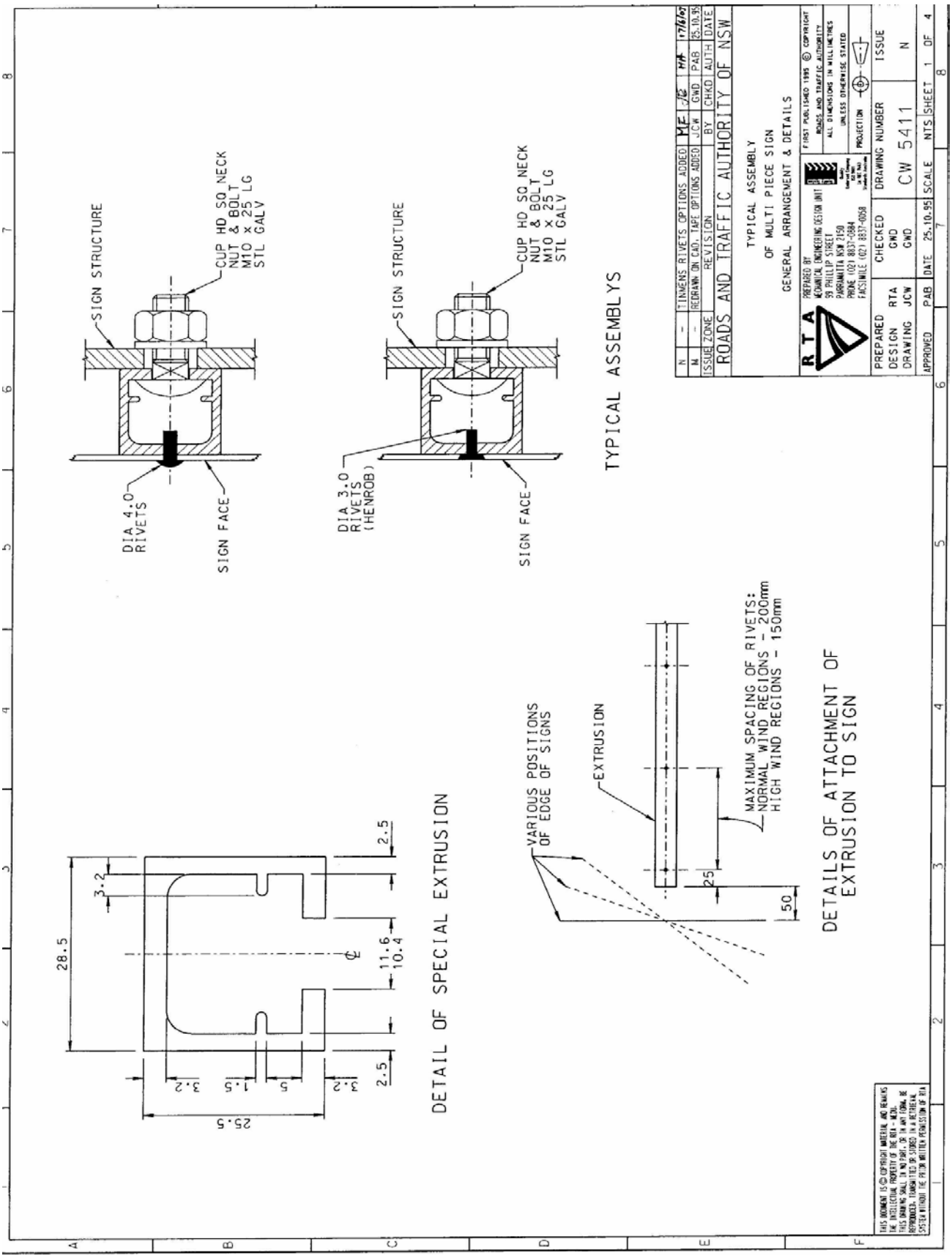
(3) Where a sign exceeds 2.4 metres in height, the sign is to be manufactured in sections.

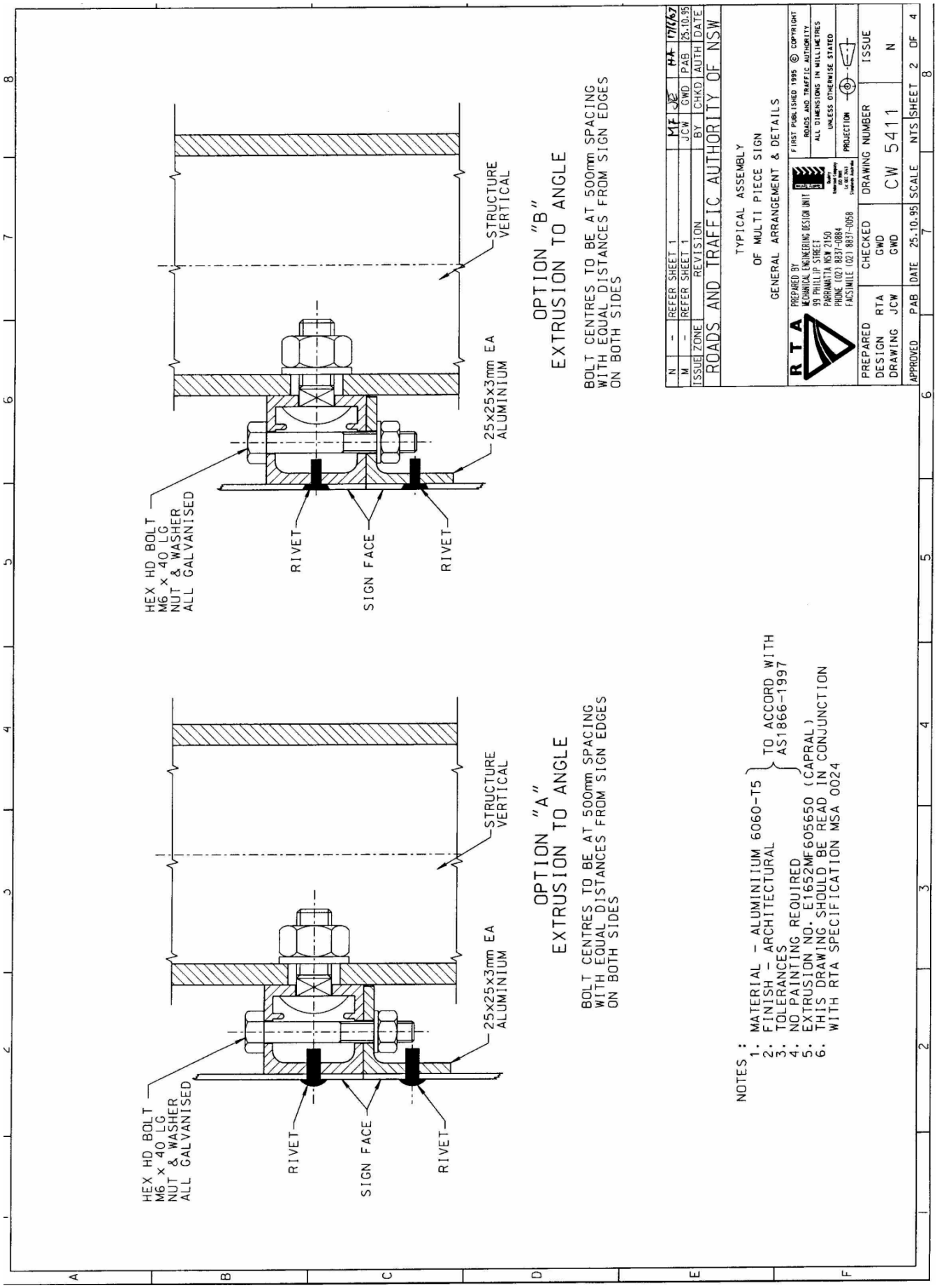
(4) Height dimension of a sign greater than 2.4 metres is permissible providing the length dimension does not exceed 2.4 metres.

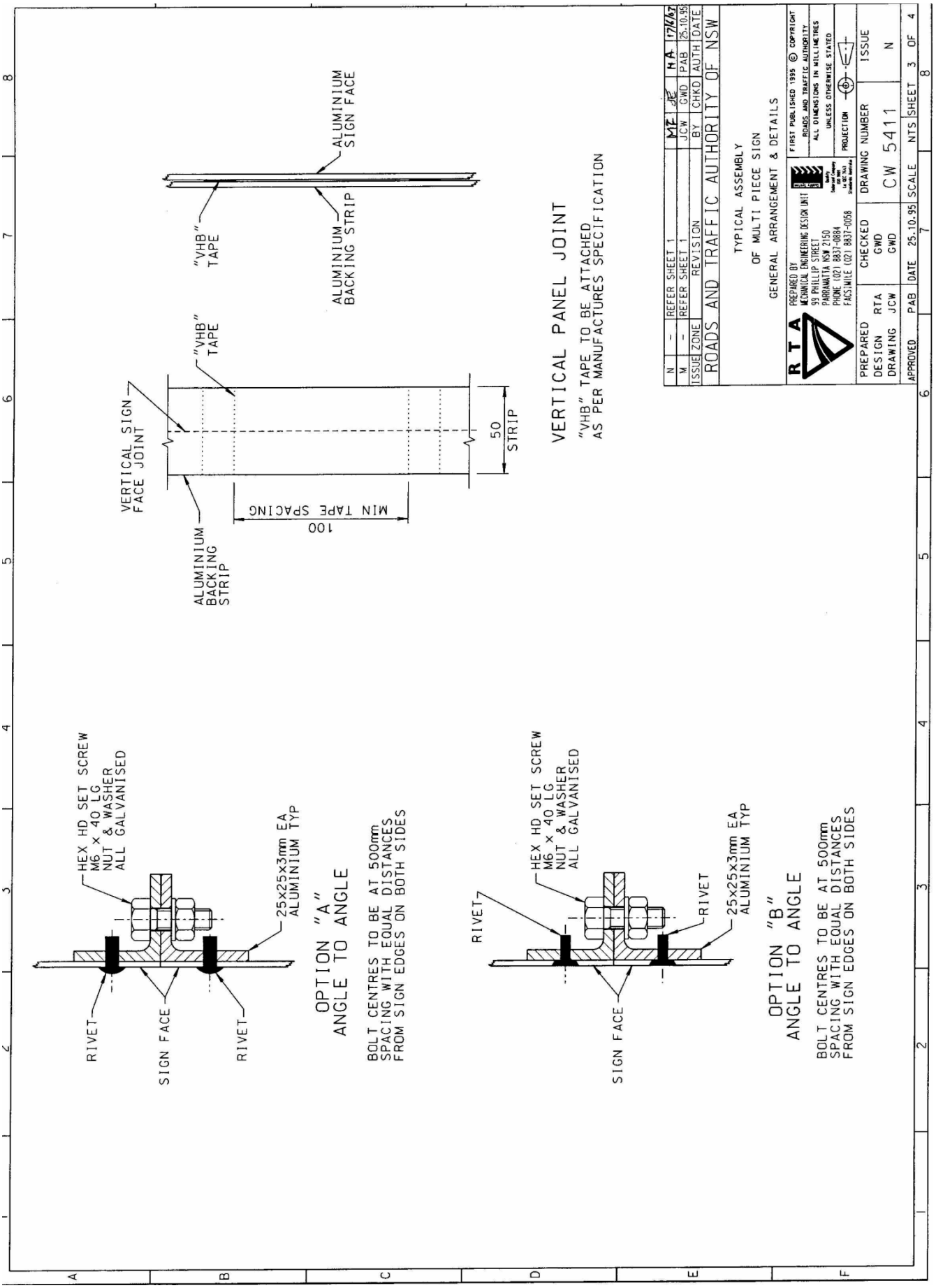
(5) The height of any section must not exceed 2.4 metres.

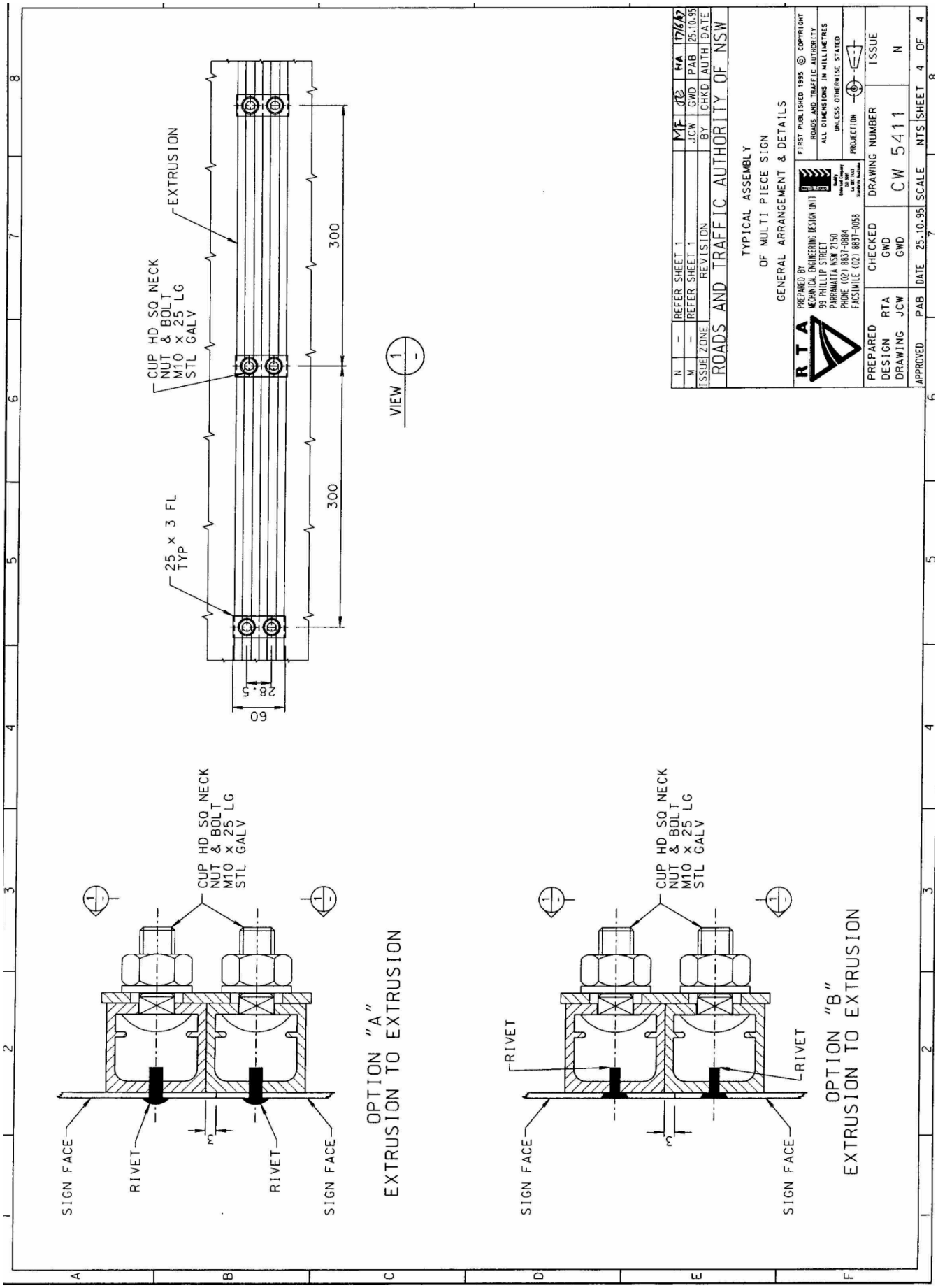
Example: A sign 3.2 metres in height and 5.6 metres in width would be manufactured using a maximum of 9 sheets.

ANNEXURE 3400/G – DETAILS OF ALUMINIUM EXTRUSION AND ATTACHMENT TO SIGNS




HEX HD BOLT
M6 x 40 LG
NUT & WASHER
ALL GALVANISED
RIVET
SIGN FACE
RIVET
25x25x3mm EA
ALUMINIUM
STRUCTURE
VERTICAL
OPTION "B"
EXTRUSION TO ANGLE
BOLT CENTRES TO BE AT 500mm SPACING
WITH EQUAL DISTANCES FROM SIGN EDGES
ON BOTH SIDES
HEX HD BOLT
M6 x 40 LG
NUT & WASHER
ALL GALVANISED
RIVET
SIGN FACE
RIVET
25x25x3mm EA
ALUMINIUM
STRUCTURE
VERTICAL
OPTION "A"
EXTRUSION TO ANGLE
BOLT CENTRES TO BE AT 500mm SPACING
WITH EQUAL DISTANCES FROM SIGN EDGES
ON BOTH SIDES
NOTES :
1. MATERIAL - ALUMINIUM 6060-T5
2. FINISH - ARCHITECTURAL
3. TOLERANCES
4. NO PAINTING REQUIRED
5. EXTRUSION NO. E1652MF605650 (CAPRAL)
6. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH RTA SPECIFICATION MSA 0024
TO ACCORD WITH AS1866-1997
N - REFER SHEET 1 MF JE HA 17/6/97
M - REFER SHEET 1 JCW GWD PAB 25.10.95
ISSUE ZONE REVISION BY CHKD AUTH DATE
ROADS AND TRAFFIC AUTHORITY OF NSW
TYPICAL ASSEMBLY
OF MULTI PIECE SIGN
GENERAL ARRANGEMENT & DETAILS
RTA
PREPARED BY
MECHANICAL ENGINEERING DESIGN UNIT
99 PHILLIP STREET
PARRAMATTA NSW 2150
PHONE (02) 8837-0884
FACSIMILE (02) 8837-0058
FIRST PUBLISHED 1995 © COPYRIGHT
ROADS AND TRAFFIC AUTHORITY
ALL DIMENSIONS IN MILLIMETRES
UNLESS OTHERWISE STATED
PROJECTION
PREPARED RTA
DESIGN GWD
DRAWING JCW
CHECKED GWD
DRAWING NUMBER CW 5411
ISSUE N
APPROVED PAB
DATE 25.10.95
SCALE NTS
SHEET 2 OF 4


ALUMINIUM SIGN FACE
"VHB" TAPE
ALUMINIUM BACKING STRIP
"VHB" TAPE
VERTICAL SIGN FACE JOINT
ALUMINIUM BACKING STRIP
MIN TAPE SPACING
100
50
STRIP
VERTICAL PANEL JOINT
"VHB" TAPE TO BE ATTACHED AS PER MANUFACTURES SPECIFICATION
HEX HD SET SCREW M6 x 40 LG NUT & WASHER ALL GALVANISED
25x25x3mm EA ALUMINIUM TYP
RIVET
SIGN FACE
RIVET
OPTION "A" ANGLE TO ANGLE
BOLT CENTRES TO BE AT 500mm SPACING WITH EQUAL DISTANCES FROM SIGN EDGES ON BOTH SIDES
HEX HD SET SCREW M6 x 40 LG NUT & WASHER ALL GALVANISED
RIVET
RIVET
25x25x3mm EA ALUMINIUM TYP
SIGN FACE
OPTION "B" ANGLE TO ANGLE
BOLT CENTRES TO BE AT 500mm SPACING WITH EQUAL DISTANCES FROM SIGN EDGES ON BOTH SIDES
N - REFER SHEET 1
M - REFER SHEET 1
ISSUE ZONE REVISION BY CHKD AUTH DATE
JCW GWD PAB 25.10.95
ROADS AND TRAFFIC AUTHORITY OF NSW
TYPICAL ASSEMBLY OF MULTI PIECE SIGN
GENERAL ARRANGEMENT & DETAILS
PREPARED BY MECHANICAL ENGINEERING DESIGN UNIT 99 PHILLIP STREET PARRAMATTA NSW 2150 PHONE (02) 8837-0884 FACSIMILE (02) 8837-0058
FIRST PUBLISHED 1995 © COPYRIGHT ROADS AND TRAFFIC AUTHORITY
ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED
PROJECTION
PREPARED RTA
DESIGN GWD
DRAWING JCW
CHECKED GWD
DRAWING NUMBER CW 5411
ISSUE N
APPROVED PAB DATE 25.10.95 SCALE NTS SHEET 3 OF 4


EXTRUSION
CUP HD SQ NECK
NUT & BOLT
M10 x 25 LG
STL GALV
25 x 3 FL
TYP
300
300
60
28.5
VIEW 1
SIGN FACE
RIVET
RIVET
SIGN FACE
OPTION "A"
EXTRUSION TO EXTRUSION
CUP HD SQ NECK
NUT & BOLT
M10 x 25 LG
STL GALV
RIVET
RIVET
SIGN FACE
SIGN FACE
OPTION "B"
EXTRUSION TO EXTRUSION
N – REFER SHEET 1 JCW 17/6/97
M – REFER SHEET 1 GWD PAB 25.10.95
ISSUE ZONE REVISION BY CHKD AUTH DATE
ROADS AND TRAFFIC AUTHORITY OF NSW
TYPICAL ASSEMBLY
OF MULTI PIECE SIGN
GENERAL ARRANGEMENT & DETAILS
RTA
PREPARED BY
MECHANICAL ENGINEERING DESIGN UNIT
99 PHILLIP STREET
PARRAMATTA NSW 2150
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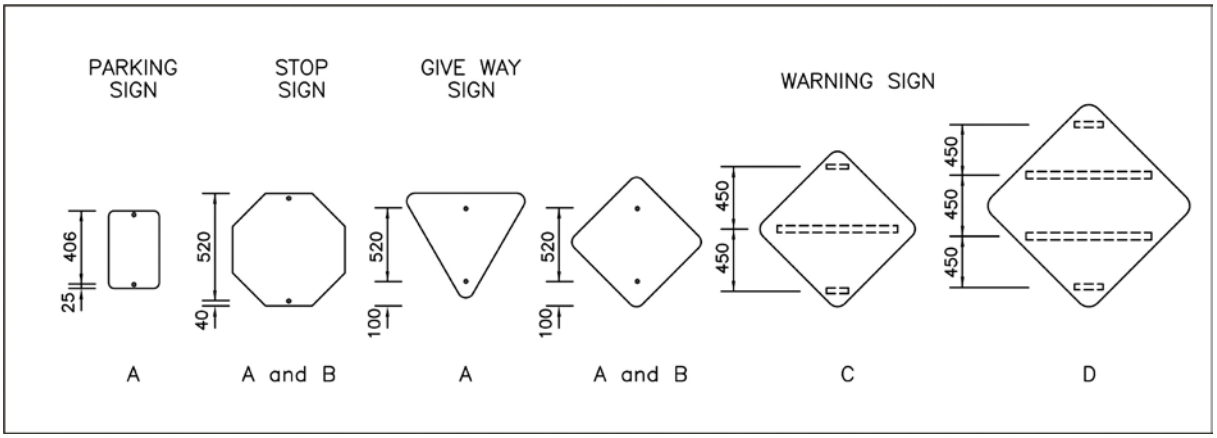
FIRST PUBLISHED 1995 © COPYRIGHT
ROADS AND TRAFFIC AUTHORITY
ALL DIMENSIONS IN MILLIMETRES
UNLESS OTHERWISE STATED
PROJECTION
PREPARED RTA
DESIGN JCW
DRAWING JCW
CHECKED GWD
GWD
DRAWING NUMBER CW 5411
ISSUE N
APPROVED PAB DATE 25.10.95 SCALE NTS SHEET 4 OF 4

ANNEXURE 3400/H – EXTRUSION CENTRE GUIDE



SIGN EXTRUSION CENTRE GUIDE			
Sign Height (mm)	**Number of Extrusions**	**Spacing (mm)**	**Distance from Top & Bottom of Sign**
100 - 287	1	Centre line	Equal
288 - 362	2	150	Equal
363 - 437	2	225	Equal
438 - 512	2	300	Equal
513 - 587	2	375	Equal
588 - 862	2	450	Equal
863 - 1037	3	375	Equal
1038 - 1312	3	450	Equal
1313 - 1487	4	375	Equal
1488 - 1512	4	450	Equal
1513 - 1637	5	2 @ 300 3 @ 375	Equal
1638 - 1937	5	375	Equal
1938 - 2262	5	450	Equal
2263 - 2387	7	2 @ 300 5 @ 375	Equal
2388 - 2587	7	375	Equal
2588 - 2687	7	2 @ 300 5 @ 450	Equal
2688 - 2837	7	2 @ 375 5 @ 450	Equal
2838 - 3199	7	450	Equal
3200 - 3499	10	2 @ 225 8 @ 375	Equal
3500 - 3699	10	375	Equal
3700 - 3899	11	2 @ 225 9 @ 375	Equal
3900 - 3999	11	375	Equal
4000 - 4199	12	2 @ 225 10 @ 375	Equal

SIGN EXTRUSION CENTRE GUIDE			
Sign Height (mm)	**Number of Extrusions**	**Spacing (mm)**	**Distance from Top & Bottom of Sign**
4200 - 4399	12	375	Equal
4400 - 4599	13	2 @ 225 11 @ 375	Equal
4600 - 4799	13	375	Equal
4800 - 4999	14	2 @ 225 12 @ 375	Equal
5000 - 5199	14	375	Equal
5200 - 5399	15	2 @ 225 13 @ 375	Equal
5400 - 5499	15	375	Equal
5500 - 5799	16	2 @ 225 14 @ 375	Equal
5800 - 5999	16	375	Equal
6000 - 6099	17	2 @ 225 15 @ 375	Equal
6100 - 6399	17	375	Equal
6400 - 6499	18	2 @ 225 16 @ 375	Equal
6500 - 6599	18	375	Equal
6600 - 6899	19	2 @ 225 17 @ 375	Equal
6900 - 6999	19	375	Equal
7000 - 7199	20	2 @ 225 18 @ 375	Equal
7200 - 7399	20	375	Equal
7400 - 7599	21	2 @ 225 19 @ 375	Equal
7600 - 7799	21	375	Equal
7800 - 7999	22	2 @ 300 20 @ 375	Equal
8000 - 8199	22	375	Equal
8200 - 8399	23	2 @ 300 21 @ 375	Equal
8400 - 8599	23	375	Equal
8600 - 8799	24	2 @ 300 22 @ 375	Equal
8800 - 8999	24	375	Equal
9000 - 9199	25	2 @ 300 23 @ 375	Equal
9200 - 9399	25	375	Equal
9400 - 9599	26	2 @ 300 24 @ 375	Equal
9600 - 9799	27	2 @ 225 25 @ 375	Equal
9800 - 9999	27	2 @ 300 25 @ 375	Equal

NOTE: Sign extrusion centres for signs 6900 mm and larger may differ from previous versions of this chart. If replacing old signs on existing structures, refer to appropriate Structure drawings for correct extrusion centre dimensions

ANNEXURE 3400/I – SCHEDULE OF HOLE LOCATIONS AND EXTRUSION CENTRES FOR SIGNS NOT INDICATED ON EXTRUSION GUIDE IN ANNEXURE 3400/F

Note: Where aluminium extrusion is used, the extrusion must be attached parallel to the horizontal axis and spaced equally about the horizontal centre line at the distances nominated, unless stated otherwise.

I1 REGULATORY SIGNS – "R" SERIES

Sign Code Number	Holes - 2 Off - 11 mm square		Aluminium Extrusion	
	Distance from Bottom of Sign	Hole Centres	Number of Extrusions	Extrusion Centres
R1-1A	40	520	-	-
B	40	520	-	-
C	-	-	2	450
R1-2A	100	520	-	-
B	100	520	-	-
C	-	-	*3	375
	*Centre line of top extrusion to be 150 mm down from top edge			
R1-3A	100	520	-	-
B	100	520	-	-
R1-201A	100	520	-	-
B	100	520	-	-
R2-2A	40	520	-	-
B	40	520	-	-
R2-3A	40	520	-	-
B	40	520	-	-
R2-4A	40	520	-	-
B	40	520	-	-
C	-	-	3	450
R2-5A	40	520	-	-
B	40	520	-	-
R2-6A	40	520	-	-
B	40	2 @ 520	-	-
R2-7A	40	520	-	-
B	40	520	-	-
R2-8A	40	520	-	-
B	40	520	-	-
R2-9A	40	520	-	-
B	40	520	-	-
R2-10A	40	520	-	-
R2-11A	40	520	-	-
B	40	520	-	-
R3-1A	40	520	-	-
B	115	520	-	-
C	190	520	-	-
R3-202A	25	230	-	-

Sign Code Number	Holes - 2 Off - 11 mm square		Aluminium Extrusion	
	Distance from Bottom of Sign	Hole Centres	Number of Extrusions	Extrusion Centres
R4-1A	40	520	-	-
B	40	520	-	-
C	-	-	3	450
D	-	-	4	450
R4-2A	40	520	-	-
B	-	-	3	450
R4-201B	60	230	-	-
C	-	-	2	375
R4-202B	60	130	-	-
C	-	-	2	150
R4-203B	60	230	-	-
C	-	-	2	375
R4-204B	60	230	-	-
C	-	-	2	375
R4-205B	40	520	-	-
C	-	-	4	450
R4-208	-	-	2	300
R4-209	-	-	2	300
R4-211	30	130	-	-
R5-1A	22	406	-	-
R5-2A	22	406	-	-
R5-3A	22	406	-	-
R5-5A	-	-	3	450
R5-51A	-	-	3	375
R5-202A	40	520	-	-
B	-	-	3	450
R5-203A	40	520	-	-
R5-204A	-	-	3	375
R5-207A	-	-	3	450
R6-1A	-	-	3	375
B	-	-	4	450
R6-2A	-	-	3	375
B	-	-	4	450
R6-3A	40	520	-	-
B	-	-	4	375
R6-4A	40	520	-	-
B	-	-	4	375
R6-5A				
B				
R6-6A	40	520	-	-
B	-	-	3	450
R6-202A	40	520	-	-
R6-204A	-	-	2	375
R6-205A	-	-	2	450
R6-206A	40	520	-	-
B	-	-	3	450

I2 REGULATORY SIGNS – "W" SERIES

Sign Code Number	Holes - 2 Off - 11 mm square		Aluminium Extrusion	
	Distance from Bottom of Sign	Hole Centres	Number of Extrusions	Extrusion Centres
W1-1A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W1-2A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W1-3A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W1-4A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W1-5A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W1-6A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W1-7A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W2-1A	100	520	-	-
B	100	520	3	450
C	-	-	3	450
D	-	-	4	450
W2-3A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W2-4A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W2-7A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W2-8A	100	520	-	-
B	100	520	-	-
C	-	-	3	450

Sign Code Number	Holes - 2 Off - 11 mm square		Aluminium Extrusion	
	Distance from Bottom of Sign	Hole Centres	Number of Extrusions	Extrusion Centres
W2-9A	100	520	-	-
B	100	520	-	-
C	-	-	3	
				450
W3-1A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W3-2A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W3-3A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W3-4A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W4-1A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W4-2A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W4-3A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W4-4A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W4-5A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W4-6A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W4-8B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W4-9B	100	520	-	-
C	-	-	3	450
D	-	-	4	450

Sign Code Number	Holes - 2 Off - 11 mm square		Aluminium Extrusion	
	Distance from Bottom of Sign	Hole Centres	Number of Extrusions	Extrusion Centres
W4-10B	100	520	-	-
C	-	-	3	450
D	-	-	3	450
W4-11A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W4-201B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W4-202B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W5-1A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W5-2A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W5-3B	100	520	-	-
C	-	-	3	450
W5-4A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W5-5B	100	100	-	-
C	-	-	3	450
W5-6A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W5-7A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W5-8A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W5-9A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W5-10A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W5-11A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W5-12A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450

Sign Code Number	Holes - 2 Off - 11 mm square		Aluminium Extrusion	
	Distance from Bottom of Sign	Hole Centres	Number of Extrusions	Extrusion Centres
W5-13A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W5-14A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W5-15A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W5-16A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W5-17A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W5-18A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W5-19A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W5-20A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W5-21A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W5-22A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W5-24A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W5-25A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W5-26C	-	-	3	450
D	-	-	4	450
W5-27A	100	520	-	-
B	100	520	-	-
C	-	-	3	450

Sign Code Number	Holes - 2 Off - 11 mm square		Aluminium Extrusion	
	Distance from Bottom of Sign	Hole Centres	Number of Extrusions	Extrusion Centres
W5-28A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W5-29A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W5-30A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W5-31C	-	-	3	450
D	-	-	4	450
W5-32A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W5-204B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W5-205B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W5-206B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W5-207B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W5-209A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W5-210A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W5-213B	100	520	-	-
C	-	-	3	450
W5-214A	100	520	-	-
B	-	-	3	450
C	-	-	4	450
W5-230A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W6-1B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W6-2B	100	520	-	-
C	-	-	3	450
D	-	-	4	450

Sign Code Number	Holes - 2 Off - 11 mm square		Aluminium Extrusion	
	Distance from Bottom of Sign	Hole Centres	Number of Extrusions	Extrusion Centres
W6-3A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
W6-6A	100	520	-	-
B	100	520	-	-
W7-3B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W7-4A	100	520	-	-
B	100	520	-	-
C	-	-	3	450
D	-	-	4	450
W8-1A	60	400	-	-
B	110	400	-	-
C	-	-	2	450
D	-	-	3	450
W8-2A	40	370	-	300
B	-	-	2	300
C	-	-	2	450
D	-	-	3	375
W8-3A	50	300	-	-
B	-	-	2	300
C	-	-	2	450
W8-4B	-	-	1	C/L *
C	-	-	2	150
W8-5A	35	130	-	-
B	-	-	1	C/L *
C	-	-	2	150
W8-6A	35	130	-	-
B	-	-	1	C/L *
C	-	-	2	150
W8-7A	50	300	-	-
B	-	-	2	300
C	-	-	2	450
W8-8A	50	300	-	-
B	-	-	2	300
C	-	-	2	450
W8-9A	50	300	-	-
B	-	-	2	300
C	-	-	2	450
W8-13A	50	300	-	-
B	-	-	2	300
C	-	-	2	450
W8-14A	-	-	1	C/L *
B	-	-	2	150
C	-	-	2	150
W8-15B	-	-	2	375
C	-	-	2	450
D	-	-	3	375

Sign Code Number	Holes - 2 Off - 11 mm square		Aluminium Extrusion	
	Distance from Bottom of Sign	Hole Centres	Number of Extrusions	Extrusion Centres
W8-17B	-	-	2	300
W8-24A	50	300	-	-
B	-	-	2	300
C	-	-	2	450
W8-201B	-	-	2	450
C	-	-	2	450
D	-	-	3	375
W8-202B	-	-	2	375
C	-	-	2	450
D	-	-	2	450
W8-203A	50	300	-	-
B	-	-	2	300
C	-	-	2	450
D	-	-	2	450
W8-204B	-	-	2	300
C	-	-	2	450
W8-205B	-	-	2	375
C	-	-	2	450
W8-206B	-	-	2	300
C	-	-	2	450
D	-	-	2	450
W8-207B	-	-	2	375
C	-	-	2	450
D	-	-	2	450
W8-208C	-	-	2	150

* C/L: centre line

I3 REGULATORY SIGNS - "G" SERIES

Sign Code Number	Holes - 2 Off - 11 mm square		Aluminium Extrusion	
	Distance from Bottom of Sign	Hole Centres	Number of Extrusions	Extrusion Centres
G6-202	-	-	4	375
G6-203	50	300	-	-
G6-205	60	130	-	-
G6-206	35	130	-	-
G6-210	-	-	3	450
G6-211	-	-	3	450
G6-213	-	-	2	300
G6-214	-	-	2	300
G6-215	-	-	2	300
G6-216	50	300	-	-
G6-217	50	300	-	-
G6-218	-	-	2	375
G6-219	-	-	2	375
G6-220	50	300	-	-
G6-221	-	-	2	375
G6-223	40	520	-	-
G7-1	-	-	2	450
G7-2	-	-	2	450
G7-3	-	-	2	225
G7-4	-	-	2	375
G7-5	-	-	2	150
G7-214	-	-	2	450
G7-218	-	-	2	450
G7-219	-	-	2	450
G7-220	-	-	3	375
G7-221	-	-	2	450
G7-222	-	-	2	450
G7-223	-	-	2	450
G7-224	-	-	2	450
G7-226/1 2	- -	- -	2 2	225 225
G9-1	-	-	2	450
G9-2	-	-	2	450
G9-3	-	-	3	375
G9-4	-	-	3	375
G9-5/1 2	- -	- -	2 2	150 150
G9-9A B	- -	- -	2 3	450 375
G9-10	-	-	3	375
G9-11	-	-	3	450
G9-12	-	-	3	450
G9-14	-	-	2	450

Sign Code Number	Holes - 2 Off - 11 mm square		Aluminium Extrusion	
	Distance from Bottom of Sign	Hole Centres	Number of Extrusions	Extrusion Centres
G9-15A	40	520	-	-
B	-	-	3	450
C	-	-	3 2	375 300
G9-16A	40	520	-	-
B	-	-	3	450
C	-	-	3 2	375 300
G9-17	-	-	2	225
G9-18	-	-	2	450
G9-19	-	-	2	150
G9-20	-	-	2	375
G9-21	-	-	2	450
G9-22A	-	-	1	Vertical on centre line
B	-	-	1	
C	-	-	1	
D	-	-	1	
G9-24A	-	-	2	450
B	-	-	5	375
G9-25A	-	-	2	450
B	-	-	5	375
G9-26	-	-	3	450
G9-27A	-	-	2	450
B	-	-	3	450
G9-28A	-	-	2	450
B	-	-	3	450
G9-29	-	-	2	300
G9-32	-	-	2	300
G9-33	-	-	2	300
G9-35	-	-	3	450
G9-36A	-	-	2	450
B	-	-	3	450
G9-37	-	-	3	450
G9-38	-	-	3	450
G9-203	40	520	-	-
G9-204	-	-	3	375
G9-205	22	406	-	-
G9-206	22	406	-	-
G9-207	40	3 @ 520	-	-
G9-208	-	-	2	225
G9-209A	-	-	2	225
B	-	-	2	450
G9-210	-	-	2	300
G9-211A	50	2 @ 300	-	-
B	-	-	5	450
G9-214	-	-	2	450
G9-219	-	-	2	225
G9-220A	-	-	2	450
B	-	-	3	375

Sign Code Number	Holes - 2 Off - 11 mm square		Aluminium Extrusion	
	Distance from Bottom of Sign	Hole Centres	Number of Extrusions	Extrusion Centres
G9-221	-	-	2	450
G9-222	-	-	4	450
G9-223	-	-	4	450
G9-229	-	-	3	375
G9-230	-	-	2	150
G9-237	-	-	3	375
G9-238	-	-	4	450
G9-239	-	-	4	450
G9-242	-	-	2	450
G9-243A	-	-	2	300
B	-	-	2	450
C	-	-	2	450
D	-	-	3	375
E	-	-	3	450
G10-3A	40	300	-	-

ANNEXURE 3400/J – SIGN MATERIALS – LEGENDS AND BACKGROUNDS

Sign Type		Sign Material	
		Legend	**Background**
1.	**Guide Signs (including AD, ID, RD, Service and Freeway Signs)**		
	Left side mounted	Class 1 sheet or black non-reflective	Class 1 sheet
	Overhead, Cantilevered & Right side mounted	Class 1X sheet or black non-reflective	Class 1X sheet
2.	**Warning Signs**		
	Standard Warning Signs	Class 1 sheet or black non-reflective	Class 1 sheet
	Standard Warning Signs W6-1, W6-2, W6-3, W6-4, W6-9, W8-13, W8-14, W8-18, W8-19, W8-20, W8-22, W8-24 & W8-25	Class 1 sheet or black non-reflective	Class 1X Fluorescent Yellow Green Reflective Sheet
3.	**Regulatory Signs**		
	Standard Regulatory Signs (except R1-1, R1-2, R1-3, R2-3A(L), R2-4, R3-1)	Class 1 sheet or black non-reflective	Class 1 sheet or screen print
	Standard Regulatory Signs R1-1, R1-2, R1-3,R2-3A(L), R2-4	Class 1X sheet or black non-reflective	Class 1X sheet
	Standard Regulatory Sign R3-1	Class 1 sheet or black non-reflective	Class 1X Fluorescent Yellow Green Reflective Sheet
	Reflective Parking Signs	Class 2 sheet or black non-reflective	Class 2 sheet or screen print
	Non-Reflective Parking Signs	Non-reflective sheeting or coating	Non-reflective sheeting or coating
4.	**Temporary Road Works Signs**		
	Standard Temporary Road Works Signs	Class 1 sheet or black non-reflective	Class 1 Sheet or Class 1X Fluorescent Yellow Reflective Sheet
	Special signs for night work T1-200-3, T1-223, T1-224, & T1-225	Class 1 sheet	Black
5.	**Hazard Markers**		
	Chevron Alignment Marker D4-6, Marker (Slash) G9-257	Black non-reflective	Class 1 Yellow Reflective Sheet or Class 1X Fluorescent Yellow Green Reflective Sheet by special approval
	Others	Black non-reflective	Class 1 sheet

ANNEXURES 3400/K TO 3400/L – (NOT USED)

ANNEXURE 3400/M – REFERENCED DOCUMENTS

RMS Specification

RMS Q	Quality Management System

RMS Traffic Technical Directions

TDT 2009/08	Approved Retro-reflective Sheeting Materials for Road Signs

Australian Standards

AS/NZS 1170.2	Structural design actions part 2: Wind actions
AS 1365	Tolerances for flat-rolled steel products
AS 1397	Steel sheet and strip – Hot-dipped zinc-coated or aluminium/zinc-coated
AS/NZS 1580	Paints and related materials – Methods of test
AS 1627	Metal finishing – Preparation and pretreatment of surfaces
AS 1627.1	Part 1: Removal of oil, grease and related contaminants
AS 1627.2	Part 2: Power tool cleaning
AS 1627.4	Part 4: Abrasive blast cleaning
AS/NZS 1734	Aluminium and aluminium alloys - Flat sheet, coiled sheet and plate
AS 1742.1 to 13	Manual of uniform traffic control devices *(multiple parts)*
AS 1743	Road signs - Specifications
AS 1744	Forms of letters and numerals for road signs
AS/NZS 1866	Aluminium and aluminium alloys - Extruded rod, bar, solid and hollow shapes
AS/NZS 1906.1	Retroreflective materials and devices for road traffic control purposes – Retroreflective sheeting
AS 2700S	Colour standards for general purposes
ISO 9001	Quality management systems – Requirements

British Standards

BS 5252	Framework for Colour Coordination for Building Purposes