
SECTION 860 - MANUFACTURE OF ROAD SIGNS

860.01 DESCRIPTION OF SIGNS TYPES

This section covers the requirements for the manufacture and packaging of all road signs, both permanent and temporary, which are made with steel or aluminium substrates. The sign types to which this section applies are categorised and defined as follows:

Category A - Flat Sheet Permanent or Temporary Signs - Unbraced

This category comprises small signs up to the following maximum dimensions:

- (a) rectangular signs up to 600 mm nominal horizontal width;
- (b) triangular signs up to 900 mm side;
- (c) diamond signs up to 750 mm side;
- (d) signs of other shapes including circular, octagonal, trapezoidal, up to 750 mm nominal width;
- (e) rectangular temporary signs up to 900 mm width, and up to 600 mm depth;

but excludes any sign whose width to height ratio exceeds 2.5 to 1. Such signs are braced as in Category B below.

This category also comprises overlay panels intended to be fitted to the face of a Category B sign.

Category B - Flat Sheet Permanent or Temporary Signs - Braced

This category comprises all flat sheet signs larger than those described in Category A above.

Category C - Folded Box Edge Temporary Signs

Category D - Extruded Aluminium Section Signs

This category comprises fingerboards, road/street name signs and the like made from extruded aluminium sections.

860.02 SUBSTRATE MATERIALS

Unless otherwise specified on the drawings, or approved by the Superintendent, each sign blank shall be manufactured from a material selected from Table 860.021 according to the corresponding category for that sign. The manufacturer shall supply a certificate of compliance in respect of metal grades, alloys and tempers if requested.

Table 860.021

Material Description	Material to comply with:	Appropriate Sign Categories (refer Clause 860.01)								
Aluminium sheet, 1.6 mm thick	AS 1734 in the following grades and tempers: <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;"><u>Alloy</u></td> <td style="text-align: center;"><u>Temper</u></td> </tr> <tr> <td style="text-align: center;">5052</td> <td style="text-align: center;">H36 or H38</td> </tr> <tr> <td style="text-align: center;">5251</td> <td style="text-align: center;">H36 or H38</td> </tr> </table>	<u>Alloy</u>	<u>Temper</u>	5052	H36 or H38	5251	H36 or H38	A, B		
<u>Alloy</u>	<u>Temper</u>									
5052	H36 or H38									
5251	H36 or H38									
Zinc/Aluminium coated steel sheet, 1 mm thick	AS 1397	C								
Extruded aluminium section	AS 1734 in the following grades and tempers: <table style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;"><u>Alloy</u></td> <td style="text-align: center;"><u>Temper</u></td> </tr> <tr> <td style="text-align: center;">6063</td> <td style="text-align: center;">T5</td> </tr> <tr> <td style="text-align: center;">6061</td> <td style="text-align: center;">T6</td> </tr> <tr> <td style="text-align: center;">6351</td> <td style="text-align: center;">T5</td> </tr> </table>	<u>Alloy</u>	<u>Temper</u>	6063	T5	6061	T6	6351	T5	D
<u>Alloy</u>	<u>Temper</u>									
6063	T5									
6061	T6									
6351	T5									

860.03 BLANK MANUFACTURE

(a) General Requirements

(i) Manufacturing Tolerances

Unless otherwise specified dimensional tolerances shall be as follows:

(1) Overall dimensions of blank:

±5 mm or 0.5 percent of dimension, whichever is the greater.

(2) Holes:

Size, tolerance -0, +1 mm

Hole centre dimension (geometric position):

mating hole centres, tolerance ±1 mm

non-mating hole centres, tolerance ±3 mm

(3) Maximum allowable warp, twist or departure from flatness:

5 mm/metre

Blanks shall be free from undulations or ripples which may result in noticeable ripples or distortions on the sign face.

(4) Blank squareness:

In the case of a single panel sign, no corner of the panel shall be more than 2 mm from its theoretical position relative to other corners.

In the case of multi-panel signs, adjacent panels shall fit together so that any gap between panels is not more than 1.5 mm wide and parallel to within 1.0 mm over the length of the panel.

(5) General fabricating dimensions unless otherwise specified:

±5 mm or 2 percent of dimension, whichever is the greater.

(ii) Fixings

(1) Rivets

Rivets shall be monel or stainless steel and shall have a shank diameter of 4.8 to 5 mm and a head diameter of 8.5 to 9.5 mm. Where the rivet head bears on a cellular type retro-reflective sheeting a nylon washer of 11 mm OD shall be placed under the rivet head. Rivets placed on coloured sign face material shall have the rivet heads coloured to match the sign face material. All rivets shall be installed after sheeting and legend have been applied to the blank.

(2) Adhesive Fixings

Adhesive fixings intended by the manufacturer for the purpose of fixing cover strips or stiffening sections and used in accordance with the current manufacturers specification, may be used for making a horizontal or vertical joint pursuant to Clause 860.03(b)(ii)(2) and for fixing stiffening sections pursuant to Clause 860.03(b)(iii).

(3) Other Fixings

Acceptance of fixings other than as specified in sub-paragraph (1) and (2) above, may be by type approved methods or techniques of individual contractors or as otherwise approved by the Superintendent.

(iii) Preparation

Sign components shall be prepared prior to painting and/or the application of sheeting backgrounds and/or legends and/or adhesive fixings as follows:

- (1) All burrs shall be removed. All rough edges shall be dressed. Blanks shall be smooth and free from fabrication defects.
- (2) All unpainted sign components shall be prepared to satisfy the current requirements of the sheeting manufacturer and/or paint manufacturer and/or adhesive fixing manufacturer.

(b) Specific Requirements - Signs in Category B

(i) Panel Size and Joint Limitations

- (1) The number of joints, both horizontal and vertical shall be minimised on the basis of a sheet size of 2400 x 1200 mm except that for signs specified as overlay panels a sheet size of 1200 x 900 mm shall apply.
- (2) The width and height of any one panel shall not be less than 30% of the width and height of any other panel.

(ii) Panel Joints

(1) Location

Horizontal panel joints shall not occur through any internal border, or through any word or numeral legend of character height 180 mm or less other than the descenders of any lower case legend, or any numeral and borders on route marker shields. **Vertical** joints shall be so located as to minimise the amount of legend directly over the joint.

(2) Making Joints

Each panel shall be painted or covered with sheeting, as appropriate, before the joints are made. Sheeting on either side of a joint shall be colour matched in accordance with the requirements of Clause 860.04(a)(ii)(8).

Horizontal Joints

Horizontal joints made with rivets shall coincide with the location of a stiffening section required by sub-paragraph (iii) below.

Horizontal joints made with adhesive fixings shall not coincide with the location of a stiffening section required by sub-paragraph (iii) below and shall be backed by a cover strip of the same material as the blank 60 ± 5 mm wide, terminating 10 ± 5 mm short of the edge of the sign.

Vertical Joints

Vertical joints shall be backed by a cover strip of the same material as the blank 60 ± 5 mm wide, terminating 10 ± 5 mm short of the edge of the sign and discontinued at each horizontal stiffening section with a gap not exceeding 5 mm. A cover strip may be omitted if the length of the cover strip would be less than 120 mm.

The cover strip shall be attached to each blank sheet, either by a single row of rivets evenly spaced across the sign at a spacing not exceeding 200 mm, with an edge distance not exceeding 30 mm from the end of the cover strip, by adhesive fixing or other approved method of fixing. Short cover strips attached by rivets shall be provided with a minimum of two rivets on each side of the panel joint.

(3) Incomplete Joints

For large signs the Superintendent may consent to an incomplete joint with provision for field assembly in a manner which ensures structural integrity of the sign pursuant to Clause 860.03(a). The sign panels shall be numbered, and the manufacturer shall provide assembly details and all rivets or other fixings for field assembly.

(iii) Stiffening Sections

- (1) Unless otherwise specified in the drawings or approved by the Superintendent all sign blanks shall be stiffened by the attachment on the rear face of one or more continuous horizontal lengths of galvanized cold rolled steel channel with 41.3 x 21.0 mm cross-sectional dimensions or aluminium extruded section with 28.5 x 25.5 mm cross-sectional dimensions having a profile acceptable to the Superintendent with internal clamping ridges. Joining of stiffening sections shall only be permitted when the length of the sign exceeds the longest available stiffening section. Where joints are permitted they shall be staggered and made so as to ensure the structural integrity of the sign.

- (2) The number of such stiffening sections shall be as given in Table 860.031.

Table 860.031

Vertical Dimension (mm)	Number of Sections (41.3 x 21.0 mm or 28.5 x 25.5 mm)
Up to 200	1 *
201 to 900	2 **
901 to 1200	3
1201 to 1600	4
1601 to 2000	5
2001 to 2400	6
2401 to 2800	7
2801 to 3200	8
above 3200	one extra section for each extra 400 mm of height
<p>* signs between 600 and 900 mm horizontal dimension shall have two sections with the lower section 150 mm in length and centrally place horizontally.</p> <p>** the lower of the two sections on signs greater than 600 mm horizontal dimension need only be 150 mm in length and centrally placed horizontally.</p>	

- (3) The location of the stiffening sections shall be as follows:

One section - centred vertically.

Two sections - located symmetrically on the blank at a spacing of 0.6 times the height of the blank \pm 50 mm. The maximum spacing shall be 500 mm.

Three or more sections - outer sections to be located between 50 and 200 mm measured from the edge of the blank to the centre line of the section, and both outer and intermediate section(s) located such that no space between any two adjacent section varies by more than 100 mm from any other space. The maximum spacing shall be 500 mm.

The ends of each stiffening section shall terminate 20 mm \pm 5 mm short of the edge of the sign.

- (4) Stiffening sections fixed with rivets shall be attached to the blank, or each blank in the case of a horizontal joint by a single row of evenly spaced rivets at a spacing not exceeding 200 mm with a distance not exceeding 30 mm from the end of the stiffening section or any vertical joint.
- (5) The bearing surface of each stiffening section shall be flat or concave over a substantial part of its width.

- (6) Blanks having a dimension measured at right angles to the stiffening sections in excess of 600 mm shall be fitted with additional transport bracing at right angles to the main stiffening sections as given in Table 860.032.

Table 860.032

Dimension Parallel to Stiffening Sections	No. of Bracings Required	Cross-Sectional Dimensions *
up to 600 mm	0	
601 to 2000 mm	2	41.3 x 21.0 mm
2001 to 2500 mm	3	41.3 x 21.0 mm
2501 to 4000 mm	3	41.3 x 41.3 mm
greater than 4000 mm	4	41.3 x 41.3 mm
* Cross section dimensions refer to galvanized cold roll steel channel. 28.5 x 25.5 mm aluminium extruded section may be substituted for 41.3 x 21.0 mm for galvanized cold roll steel channel.		

Sections or numbers of sections alternative to those specified in Table 860.032 may be used as transport bracing provided they are galvanized steel or aluminium extruded section and at least as strong in bending as the prescribed sections.

The transport bracing sections shall be securely bolted to the stiffening sections at every intersection point in such a way that they may be readily removed after installation of the sign on its supporting posts or structure. Each bracing shall extend 50 ± 5 mm beyond the upper and lower edge of the blank to provide edge protection for the finished sign during handling and installation.

(c) Specific Requirements - Signs in Category C

All blanks shall be made from a single sheet of steel, except signs with a smaller overall finished dimension greater than 1050 mm, which may have one joint.

Blanks shall be manufactured in accordance with the drawings.

(d) Specific Requirements - Signs in Category D

- (i) Sign blanks shall be either a single section of nominal vertical dimension 150 mm or 200 mm, or shall be of composite construction comprising separate web and flanges securely attached to one another to provide a nominal vertical dimension in excess of 200 mm but not more than 350 mm.
- (ii) Acceptance of extruded aluminium sections shall be by type approval in individual cases. The current list of approved sections is given in Table 860.033.

Table 860.033

Manufacturers	Manufacturer's Designation or Description and Alloy	Overall Vertical Dimension (mm) (min)	Area Cross Section (mm ²) (min)	Web Thickness (mm) (min)	Weight (kg/m) (min)	Sample Date
Artcraft P/L	ES6, 6063-T5 ⁽¹⁾	150	496	2.28	1.34	13.6.86
	ES8, 6063-T5 ⁽¹⁾	200	696	2.28	1.89	13.6.86
	DES6, 6061-T6 ⁽²⁾	150	623	2.67	1.69	13.6.86
	DES8, 6061-T6 ⁽²⁾	200	747	2.30	2.02	13.6.86
	SB8, 6063-T5	200	723	2.20	1.96	1.1.87
	Extruded flanges for composite sign, 6063-T5 ⁽³⁾	-	-	-	-	13.6.86
De Neeffe Signs Pty Ltd	"Double flange De Neeffe Aluminium Section", 6063-T5	150	630	2.20	1.71	13.6.86
		200	723	2.20	1.96	13.6.86
	"Composite Aluminium Street Name Sign with Extruded Angle Section Flanges", 6063-T5	350	-	-	-	13.6.86
NOTES:	⁽¹⁾ Limited to signs not more than 1000 mm in length, flange to be to lower edge of sign. ⁽²⁾ Wider flange to be lower edge of sign. ⁽³⁾ Overall vertical dimension of composite sign to be 350 mm maximum unless otherwise approved by the Superintendent.					

860.04 APPLICATION OF SIGN BACKGROUNDS AND LEGENDS

(a) General Requirements

(i) Painted Background, Backs, Edges, etc.

Unless otherwise specified or approved by the Superintendent, painted sign face backgrounds, back and edges, where specified by the drawings shall be achieved either:

- (1) by application of a stoving primer to a dry thickness of 0.008 to 0.012 mm, followed by a stoving enamel in the final specified colour to a dry thickness of 0.035 to 0.045 mm; or,
- (2) by application of a yellow oxide/zinc chromate primer to a dry thickness of 0.008 to 0.012 mm, followed by a low gloss polyurethane paint conforming with AS 2709 in the final specified colour, applied in accordance with the manufacturer's instructions; or
- (3) by use of pre-painted coil stock in the specified colour comprising galvanized sheet steel factory primed and painted with a weather resistant finish not less than 0.025 mm total paint thickness on one or both sides.

Standard paint colours for traffic signs shall be as specified in AS 1743, Road Signs, for non-reflective colours. Where grey edges or backs are specified on a sign the colour shall be:

AS 2700, Colour No. N52, Mid Grey

Any required colour not specified above shall be subject to agreement between the Superintendent and the Contractor. The Contractor shall, prior to the commencement of manufacture, supply a painted reference panel in the required colour, and such panel may be used in determining compliance.

(ii) Sheeting Backgrounds

Sheeting of a colour or grade which is not covered by the relevant Australian Standard or this paragraph shall be subject to the approval of the Superintendent.

- (1) Retro-reflective sheeting shall conform with all of the relevant requirements of AS 1906.1 for the class and colour of the sheeting specified on the drawings. The sheeting shall be a brand or make in the relevant class and colour shown in Table 860.041.

Table 860.041

Material Supplier and Class ^{(1) (2) (3)}	Approved Colours ⁽⁴⁾	Code
Scotchlite (3M Australia Pty Ltd) Class 1A (Cellular) Class 1 (Cellular) Class 2 (Engineering Grade)	all colours all colours all colours	SC1A SC1 SC2
Nikkalite Pty Ltd Class 1 (Cellular) Class 2A (SEG) Class 2 (Engineering Grade)	all colours "standard" green all colours	NI1 NI2A NI2
Kiwalite (Hardman Australia Pty Ltd) Class 1 (Cellular) Class 2A (SEG) Class 2 (Engineering Grade)	all colours all colours except brown all colours	KI1 KI2A KI2
NOTES: ⁽¹⁾ Materials will continue to be used according to the type and colour called up in relevant specifications, drawings or other agreements. ⁽²⁾ Pressure Sensitive Materials only. ⁽³⁾ 3M Class 2 "Standard Green" is accepted for all uses to which Class 2A is presently put. ⁽⁴⁾ "all colours" are white, yellow, standard green, brown and blue as defined in AS/NZS 1906.1.		

- (2) Non-reflective sheeting used as a sign background shall be of a material and finish agreed between the Superintendent and the Contractor. The Contractor shall prior to commencement of manufacture supply a suitable sample of the material and such sample may be used in determining compliance. Colour of non-reflective sheeting shall conform with AS 1743.
- (3) Sheeting shall be applied in accordance with current manufacturer's specifications and instructions.
- (4) Sheeting splices may be provided parallel to one edge only.
- (5) The number of sheeting splices shall be minimised on the basis of the widest available sheeting roll. The minimum width of any sheeting strip shall be 100 mm.

- (6) Sheeting splices where permitted shall overlap by 5 to 10 mm unless Class 1A material is used where joints shall be butted in accordance with the manufacturers instructions.
- (7) Background sheeting need not be brought to the edge of a sign provided that it can be overlapped by a border made of sheeting by at least 5 mm.
- (8) Separate pieces of any sheeting abutting a splice or abutting a panel joint shall be colour matched when viewed in daylight. Separate pieces of retro-reflective sheeting abutting a splice or abutting a panel joint shall be further matched for retro-reflected colour.
- (9) Any sheeting laid unbroken over a panel joint shall be cut through on the line of the joint using a sharp knife.
- (10) Sheeting shall not be applied over any raised protuberance including bolt and rivet heads.

(iii) Application of Legends, Borders, etc.

- (1) Borders, legends, numerals, internal dividing lines and symbols shall be applied to the sign in accordance with the drawing by either:
 - * for reflectorised legends, application of adhesive sheeting or silk screening with an approved transparent ink over a retro-reflective background material or, an approved pressure sensitive coloured overlay film over a retro-reflective background material;
 - * for non-reflective legends, application of adhesive sheeting, or by silk screening with an approved opaque ink or process paint.
- (2) Sheeting used for the above purpose shall comply with the same requirements as sheeting background, and shall be of the type and colour indicated on the drawings.
- (3) Where silk screened transparent ink or pressure sensitive coloured overlay film is used in the application of a legend, border etc., inks or film shall be applied only as recommended by the ink or film manufacturer and background sheeting manufacturer. The colour and retro-reflective performance of any portion of the sign which is screened using transparent inks or overlay film shall be indistinguishable when viewed from the same perspective as a motorist.
- (4) All letters, numerals, and inter-letter and inter-word spacings shall conform with the size and series indicated on the drawings.
- (5) Tolerances on legends shall be as follows:
 - * Tolerance on shape, size and alignment of legend elements, including letters, numerals, arrows, symbols, etc., the spacing between letters in a word, and the width of borders, edge strips and dividing lines shall be ± 2 mm or 1 percent of dimension, whichever is the greater.
 - * Legend Position - Tolerance on legend position shall be as above, except that horizontal location of line of words may vary by up to one half the letter stroke width if necessary to avoid placing a vertical letter stroke over a panel joint.
 - * Legend Alignment - Each legend (word or line of words) shall be parallel with other legend, border and sign edge within 3 mm/metre.
 - * Other dimensions including length of a line of legend, the horizontal spacing between words or groups of legend elements, and the vertical spacing between lines of legend or groups of legend elements shall have a tolerance of ± 5 mm or 2 percent of dimension, whichever is the greater.
 - * Legends which do not meet the tolerance on spacing between letters in a word but meet the tolerance on overall line length and are judged to be acceptably spaced by visual inspection may be accepted.
- (6) Sheeting splices are permitted on sign borders and internal dividing lines. All other legend elements shall be a single piece of sheeting.

(iv) Finish

The whole of the sign shall be free from any significant defect repaired or otherwise, to the satisfaction of the Superintendent.

(b) Specific Requirements - Signs in Categories A and B

- (i) Backs and edges of signs shall be left unpainted unless otherwise shown on the drawings.
- (ii) For multiple panel signs, adjoining panels shall be butted together while the border and legend are applied, following which any of the border and legend crossing a joint shall be cut through on the line of the joint using a sharp knife. The panels shall then be jointed in accordance with the requirements of Clause 860.03(b)(ii).
- (iii) For unbraced signs in Category A with a cellular reflective sheeting background, a circle 21 ± 1 mm diameter shall be cut from the sheeting concentrically around each mounting hole.

(c) Specific Requirements - Signs in Category C

Unless otherwise shown on the drawings:

- (i) Yellow faced signs shall be painted as follows:
 - (1) Front face of folded box section - black.
Note: Adhesive sheeting is not acceptable for this purpose.
 - (2) Recessed face of sign, non-reflective background - yellow.
 - (3) Recessed face of sign, reflectorised background - yellow or black.
 - (4) Outer edge of sign - yellow or black.
 - (5) Inner box section return - black.
 - (6) Back of sign - yellow.
- (ii) Red faced signs shall be painted as follows:
 - (1) Edges, front face of folded box section, inner box section return, recessed face of sign - red.
 - (2) Back of sign - yellow or red.
 - (3) Colour red for above purposes to be as follows:
 - Reflectorised or non-reflective red sign background - AS 2700 Paint Colour No. R13
 - Fluorescent red sign background - AS 2700 Paint Colour No. R12.
- (iii) Reflective or fluorescent sheeting applied to the recessed face as a sign background shall be not less than the overall nominal dimensions of the signboard in size less 70 mm in both width and height, and shall be placed centrally on the recessed face.

(d) Specific Requirements - Signs in Category D

- (i) Sheeting strips, reflective or non-reflective shall extend to within 12 mm of the top and bottom edge of the sign. The material shall be applied so that it adheres firmly and securely to the web over its full width.
- (ii) Unless otherwise specified, uncovered parts of the web and flanges of the sign shall be left unpainted.

860.05 LABELLING

- (a) The following information shall appear on the rear face of signs in Clause 860.01, Categories A to C, and on sign in Clause 860.01, Category D, on any part of the web not covered by sheeting:
- (i) Designation of the Manufacturer, limited to 3 letters.
 - (ii) Four numerals indicating the month and year of manufacture, e.g. as follows 01-86, or 05/87.
 - (iii) For guide signs and other signs with site specific legend, the sign reference number shown on the drawing, which will generally be the drawing number.
 - (iv) Code designation of the brand and class of the retro-reflective sheeting used as shown in Table 860.041, and the brand of the non-reflective or fluorescent sheeting used.
- (b) Information to be stamped into the rear face of the sign shall be stamped prior to application of any sheeting, or be embossed into a separate piece of metal which will be subsequently attached to the sign rear face by the use of an adhesive fixing.
- (c) Letters and numerals used for labelling on the rear of signs shall be a minimum of 7 mm high and shall be capable of being readily discerned after painting with a coat of paint up to 0.15 mm thick. For Category D signs, 4 mm letters minimum shall be used.
- (d) On signboards with both dimensions larger than 750 mm the information shall be located within a 400 mm radius of the lower left hand corner of the rear face of the sign such that it can be read from below the sign.

860.06 PACKAGING HANDLING AND STORAGE**(a) Packaging**

If the Contractor is responsible for sign unloading, the packaging of signs in terms of size and mass shall be consistent with the resources provided by the Contractor.

If VicRoads is responsible for sign delivery and/or unloading, the maximum size and mass of packaged signs shall be in accordance with the Superintendent's requirements.

Packaging shall protect the signs from damage during handling and transport, taking into account the recommendations of the sheeting manufacturer, if any.

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

- (i) signs with standard, non site-specific legends (e.g. 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, shall be legibly marked;
- (ii) guide signs and other signs with site specific information - a copy of the sign drawing or drawings included in each package shall be securely attached to it in a clear weatherproof envelope to the outer face of the package in such a way so as to be readable without opening the envelope;
- (iii) a notice shall be attached 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 860.06(b).

(b) Handling and Storage

Signs shall be handled and transported so as to prevent damage to the sign face or other components.

Unless otherwise approved by the Superintendent signs shall be stored vertically in such a manner to prevent damage to the sign face, edges or components, taking into account any recommendations of the sheeting manufacturer.

860.07 WARRANTY**(a) Sign Face Material**

The Contractor shall give to VicRoads a warranty for the periods given in Table 860.071 that all retro-reflective, fluorescent and non-reflective materials used in the manufacture of signs to this Specification shall remain in good condition in the following respects:

- (i) no evidence of cracking, crazing, peeling or lifting from the substrate, delamination, blistering, chalking, wrinkling or edge shrinkage greater than 2 mm, excepting accidental damage; and,
- (ii) no evidence of fading or gross colour change, except that loss of fluorescence in a fluorescent material will be accepted, provided that the colour change is not significant in comparison with the samples provided in AS 1743 Appendix D; and,
- (iii) in the case of retro-reflective materials, retention of a photometric performance not less than percentage values given in Table 860.071 below at the warranted period based on relevant photometric performance tables in Section 2 of AS 1906, Part 1, when tested at an entrance angle of 4 degrees and an observation angle of 0.2 degrees in accordance with Appendix A. Where a particular colour is not given in those tables, maintenance of an agreed set of photometric performance values which are to be not less than half the values obtained from tests of that material when new:

Table 860.071

Material Class (1)	Warranted Outdoor Durability (2)	Warranted Retained CIL Values
Class 1A retro-reflective material	seven years	50%
Class 1 retro-reflective material	twelve years	80%
Class 1 retro-reflective material (screen printed)	ten years	80%
Class 2A retro-reflective material	ten years	60%
Class 2 retro-reflective material	seven years	50%
Fluorescent material	18 months	N/A
Non-reflective material	seven years	N/A
NOTES: (1) as specified on the drawings (2) from the date of manufacture as indicated on the sign by stamping in accordance with Clause 860.05(a)(ii)		

(b) Signboard and Components

The Contractor shall give to VicRoads a warranty that the signboard and components shall remain in good condition in all respects other than those covered in paragraph (a) above, accidental damage or vandalism excepted, for an equivalent period to sign background material class specified in Table 860.071.

(c) Giving of Warranty

The execution of a formal instrument of Contract or the submission of a quotation by a Contractor for goods to be supplied in accordance with this Specification shall constitute the giving of the warranties specified herein by the Contractor to VicRoads.

(d) Warranty Claims

If any sign or retro-reflective material, fluorescent or non-reflective materials used on a sign deteriorates to a condition poorer than those indicated in sub-paragraphs (a) and (b) above within the time limits therein specified, either the Contractor shall replace the sign or shall pay to VicRoads a sum sufficient for VicRoads to obtain a replacement sign on a pro rata basis as follows:

- (i) Failure within 1 year of stamped date - total cost of supply, delivery and erection of a new sign to be borne by the Contractor.
- (ii) 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 Contractor shall be solely responsible for meeting all claims under these provisions and shall not re-assign any such responsibility to any other organisation.

860.08 INSPECTION AND TESTING

- (a) The Superintendent reserves the right to inspect any phase of the manufacturing process.
- (b) On request at any time during the currency of the Contract, the Contractor shall provide a test panel 200 mm square, typical of any stage of production including unapplied retro-reflective, fluorescent or non-reflective material. For testing silk screened work the Contractor shall supply a testing screen which will print his trade mark or other identification on portion of the panel together with a strip at least 70 mm wide across the panel. The Superintendent may require proofs to be taken from any silk screen before production commences.
- (c) All tests shall be conducted in accordance with the current test methods used by VicRoads.

860.09 APPROVAL BY THE SUPERINTENDENT

In considering any request for an approval required by this Section, the Superintendent will take into account:

- (a) evidence of use in maintenance of similar signs;
- (b) performance under similar service conditions;
- (c) manufacturers specifications and other product details;
- (d) conformance with relevant Australian Standard requirements;

The Superintendent's approval may be conditional and require the Contractor to use materials in a specified manner.