

AS 1743:2023



Road signs — Specifications



AS 1743:2023

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Road signs — Specifications

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Preface

This Standard was prepared by the Standards Australia Committee MS-012, Road Signs and Traffic Signals, to supersede AS 1743:2018.

The objective of this document is to provide users and providers of road signs with either standard designs or design rules for the shape and graphic content of signs together with requirements for and guidance on materials and manufacturing quality.

This document also provides principles and procedures for determining the need, and the selection, testing and design of graphic symbols and symbolic signs. It includes the fonts as detailed in AS 1744.

In this document, contextual information is found in < angled brackets > before the definition. Explanatory notes, examples or comments are found after the definition as “Note to entry”. Terms are written in lower case letters when expressed in full, while abbreviations are written using capital letters. “See” directs the user to the term that provides the definition, while “see also” directs to related terms. For non-preferred terms, the preferred term is stated in a note to entry. “e.g.” is written in full as “for example”.

This document is complementary to and is intended to be read in conjunction with the relevant parts of the AS 1742 series of Standards. A list of all parts in the series can be found in the Standards Australia online catalogue.

The major changes in this edition involve the addition of new signs and alterations to or deletion of existing signs resulting from revision of the AS 1742 series.

This document is accompanied by additional data in a ZIP file. The ZIP file contains drawings files in DWG and PDF formats. The ZIP file may be obtained on purchase of this document in any format.

The technical drawings materials in the accompanying product are only to be used, reproduced or modified by an authorized user in a way that meets the requirements of this document. They are not to be used for any other purposes.

The terms “normative” and “informative” are used in Standards to define the application of the appendices to which they apply. A “normative” appendix is an integral part of a Standard, whereas an “informative” appendix is only for information and guidance.

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Road signs — Specifications

Section 1 Scope and general

1.1 Scope

This document specifies graphics, fonts, layout and size requirements together with an abridged materials and manufacturing specification for the manufacture of the standard road signs provided for in the AS 1742 series.

This document also specifies principles and procedures for determining the need, and the selection, testing and design of graphic symbols and symbolic signs. It includes fonts for signs as detailed in AS 1744.

NOTE 1 Authorities responsible for the provision of signs are not encouraged to develop signs for their own use. If there is no suitable standard sign, contact the relevant state road authority to determine whether such a sign is already in use. If a new sign is to be developed, check that it conforms to the design requirements specified in this document for the particular sign classification. If the sign could also be required by other authorities, advise Standards Australia so that, during the course of its regular review of road signs, it can take all new developments into account with a view to possible inclusion in the relevant Standards. It is important that the proliferation of signs with differing designs of legend, symbol or background, essentially for the same purpose, is minimized.

NOTE 2 Basic elements for the design, shape and colour coding of signs are specified in AS 1742.1.

1.2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document.

NOTE Documents referenced for informative purposes are listed in the Bibliography.

AS 1397, *Continuous hot-dip metallic coated steel sheet and strip — Coatings of zinc and zinc alloyed with aluminium and magnesium*

AS 1742.15, *Manual of uniform traffic control devices, Part 15: Direction signs, information signs and route numbering*

AS 1744, *Standard alphabets for road signs*

AS 2700, *Colour standards for general purposes*

AS/NZS 1734, *Aluminium and aluminium alloys—Flat sheet, coiled sheet and plate*

AS/NZS 1906.1, *Retroreflective materials and devices for road traffic control purposes, Part 1: Retroreflective materials*

1.3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

1.3.1

colour code

<road sign specifications> one or more colours used symbolically to represent a particular function

1.3.2

composite sign

sign that carries more than one symbol on a signboard, or a sign which comprises any combination of symbols, words, numerals and arrows on the one signboard

1.3.3**conspicuity of a sign**

extent to which a sign is more easily noticed than anything else in the visual field

1.3.4**direction sign**

sign to direct traffic along a route or towards a destination

1.3.5**enclosure**

<road sign specifications> coloured band or outline forming part of the symbolic representation of the sign function

1.3.6**field of application**

<road sign specifications> context in which the use of a particular symbol is appropriate

1.3.7**function**

<road sign specifications> purpose of a symbolic sign, which may include to regulate, warn or inform

1.3.8**ground**

<road sign specifications> that part of a sign immediately behind a symbol or word

1.3.9**guide sign**

sign that is erected to inform and advise road users of directions, distances, destinations, routes and location of services for road users, and points of interest

1.3.10**image content**

<road sign specifications> elements of the symbol and their configuration

1.3.11**information sign**

<direction signs> sign for the purpose of giving information, not being a warning or regulatory sign, such as a town, river, stream, forest names and other matters

<road sign specifications> sign that supplies information about the availability or location of road user facilities and when and where activities are permitted

1.3.12**irradiation**

<road sign specifications> visual effect occurring in a brightly illuminated sign whereby light appears to spread beyond the edges of the bright elements of the legend

1.3.13**legibility**

<road sign specifications> extent to which the sign details, including any symbol, are sufficiently discernible to enable the meaning of the sign to be determined

1.3.14**limitation or restriction sign**

<road sign specifications> regulatory sign that indicates the degree to which an activity or use of a facility is limited or restricted

1.3.15**may**

indicates the existence of an option

See also *shall* ([1.3.19](#)), *should* ([1.3.20](#))

1.3.16
referent

<road sign specifications> precise statement of what the symbol signifies

1.3.17
regulatory sign

sign that regulates traffic actions

Note 1 to entry: There are two types of regulatory signs as follows:

- (a) Prohibition signs that restrict or prohibit certain actions.
- (b) Mandatory signs that require certain actions.

Refer also to the *regulatory traffic control device* definition in AS 1742.0.

1.3.18
safe condition sign

<road sign specifications> sign that indicates that it is safe to proceed or that an activity can be undertaken with safety

1.3.19
shall

indicates that a statement is mandatory

See also *may* ([1.3.15](#)), *should* ([1.3.20](#))

1.3.20
should

indicates a recommendation

See also *may* ([1.3.15](#)), *shall* ([1.3.19](#))

1.3.21
sign

<road sign specifications> inscribed board, plaque or other delineated space on which text or symbols or both are used to convey a message

1.3.22
significant detail

<road sign specifications> detail in the image content that is critical to the comprehension of the symbol

1.3.23
standard symbol

symbol adopted as an Australian Standard symbol for use on road signs and published in the AS 1742 series or in this document

1.3.24
structural elements

<road sign specifications> individual components that together make up a symbolic sign

1.3.25
symbol

<road sign specifications> graphic or pictorial device used to represent objects or concepts but, for the purposes of this document, excluding letters, numerals and punctuation marks

Note 1 to entry: Directional arrows, although normally classed as symbols, are dealt with in this document as though they were a separate sign element.

1.3.26**symbol set**

<road sign specifications> integrated range or series of graphic symbols for use in a defined field of application

1.3.27**symbolic shape**

<road sign specifications> shape that is used systematically to indicate a particular class of sign

1.3.28**symbolic sign**

<road sign specifications> sign comprising the combination of a graphic symbol, a symbolic shape and a colour code, which may either stand alone, or may form an element of a composite sign containing text, other symbols, symbolic signs or a combination of these

1.3.29**variants**

<road sign specifications> alternative symbol designs for a given referent

1.3.30**warning sign**

sign used to indicate actual or potential hazards to road users

Note 1 to entry: Refer also to the *permanent hazard warning signs* and *temporary hazard warning signs* definitions in AS 1742.0.

1.4 Numbering systems**1.4.1 General**

Two numbering systems are used in this document; one is for identifying individual signs and the other for identifying individual symbols and route marker emblems which are used as components within a sign.

1.4.2 Signs

The numbering system for signs is as follows:

(a) A letter prefix, as follows, denoting class of sign:

R — Regulatory signs

W — Warning signs

G — Guide signs

GE — Guide signs for expressway-type roads

T — Temporary signs

D — Hazard markers and delineators

TM — Multi-message signs

NOTE 1 If the letter prefix is followed by the letter M, this signifies that it is a multi-message sign panel for temporary traffic management use.

- (b) A number denoting the series, or group of signs.
- (c) One or two numbers identifying the sign in the series or group.

NOTE 2 Two-number designations are used for some collections of closely related signs within a series or group.
- (d) A letter denoting the size of the sign where more than one size is specified, e.g. AA, A, B, C, D and E, where A or AA is the smallest sign.
- (e) The letters (L), (R) or (S), when the sign has directional significance.

EXAMPLE R2-6A(L) denotes a regulatory sign in the Direction Series — R2. The sign is the sixth in the series, is the smallest available, and is the left-hand version.

1.4.3 Tourist route marker emblems

The numbering system for tourist route marker emblems or shields used on signs is as follows:

- (a) A letter prefix TRA for tourist drive route marker without numeral or TRB for tourist drive route marker with numeral.
- (b) A number in brackets immediately following the prefix, e.g. (2) or (3), indicating the number of numerals in the route number.
- (c) A number, following a dash, indicating the size of an emblem, e.g. -1 -2 -3, where 1 is the smallest emblem.

NOTE Free-standing route markers are numbered as guide signs in the G8 series.

Section 2 Graphic design general requirements

2.1 Graphic design

Standard road signs fall into two broad categories, those for which a complete graphic design is preset or substantially preset, and those where varying information content within a standardized style of sign requires each sign to be “made to measure”. This document is intended to be used for the design and manufacture of both categories as indicated in [Clauses 2.2](#) and [2.3](#).

2.2 Signs with preset graphics

These signs shall conform to the graphic designs shown in the drawings. Each drawing comprises a dimensioned illustration of one commonly used standard size for each sign. A complete list of standard sizes and size designations is tabulated for each sign. Each of the alternative sizes is in exact proportion in all respects (except corner radii, borders and edge strips, see [Clause 4.3](#)) to the sign illustrated. The absence of a tabulation indicates that there is only the one size as illustrated, for the sign concerned.

NOTE 1 Some signs in the “preset graphics” category have variable elements such as distances or other numerical values. These require to be inserted into the graphics independently, in the relative size and format specified on the drawing.

NOTE 2 Exceptions to the above are certain signs in the T series where sign sizes other than the one shown need to be graphically constructed using the tabulated dimensions accompanying each sign. Due to the restricting of sign blanks to a limited number of sizes and shapes for signs in this series, the shapes of different sizes of the same sign will not be in proportion to one another.

2.3 “Made-to-measure” signs

“Made-to-measure” signs, e.g. direction and tourist signs, are separately designed in each case. Some examples of “made-to-measure” signs are shown in this document.

When designing a “made-to-measure sign”, the requirements of this document shall apply. The signs shown in the figures of this document may be used as a template. The following requirements and recommendations also apply:

- (a) The horizontal spacing between any two words in one line shall be equal to the recommended spacing between the last letter of the first word and the first letter of the second word, plus the width of the letter N. Where numerals are followed by a quantity unit, e.g. 1 km, 300 m, 4 t, the spacing between them shall be equal to half the numeral height.
- (b) The vertical spacing between lines of words shall be not less than 0.5 times the height of the larger lettering in adjacent lines. Where increased clarity or differentiation is required, or the upper line is a line of lower case letters, which includes descenders, the vertical spacing between lines should be increased to at least 0.75 times the height of the larger lettering in adjacent lines.
- (c) Where numerals are followed by a quantity unit, e.g. km, m or t, the unit shall be in the standard lower case Emod font. The font height of the quantity unit shall be approximately 85 % of the font height of numeral as shown in [Table 2.1](#).

Table 2.1 — Numeral height vs quantity unit height

Numeral height mm	Quantity unit height mm
100	85
120	105
140	120
160	140
180	155
200	170
220	190
240	210
260	220
280	240
300	260
320	280
340	290
360	310
380	330
400	340

The legend should be visually centred on the sign, unless some special effect, e.g. a directional bias, is intended.

NOTE 1 Guidance on the design and layout of made-to-measure signs is given in [Appendix A](#).

NOTE 2 Service signs and parking control signs are designed on a modular basis. Details of the layout of service signs are given in [Appendix B](#) and of parking control signs in AS 1742.11.

- (d) Spacing between the legend and the edges of a sign should be not less than the following, wherever practicable:
- (i) Signs without borders —
 - (A) top and bottom spaces — 25 % of adjacent letter height; and
 - (B) end spaces — 50 % of adjacent letter height.
 - (ii) Signs with borders (space measured to inside of border) —
 - (A) top and bottom spaces — not less than 40 % of adjacent letter height;
 - (B) if top or bottom space is between 40 % and 50 % of adjacent letter height, end spaces for that line should be at least 100 % of letter height; and
 - (C) end spaces where top or bottom space is 50 % or greater — 60 % of letter height.

Section 3 Graphic design symbols and symbolic signs

3.1 Introduction

3.1.1 Scope

This section specifies principles and procedures for determining the need for, and the selection, testing and design of, graphic symbols which may be used on signs in locations where people may travel, to give them information or instructions, such as prohibitions, warnings, rules, limits, or directional guidance.

This section also specifies principles and procedures for the design and use of signs using these symbols.

NOTE The standardization of letters, numerals, punctuation marks, mathematical signs and symbols, and symbols for quantities and units is excluded.

3.1.2 Purpose

The communication of information by means of graphic symbols or signs incorporating symbols has the potential to convey a message more quickly and efficiently than text. Such signs are potentially more legible at longer viewing distances for a given signboard size, and more readily understood by people who are poor readers of English. Although these are sound reasons for promoting communication by symbols, there is the concern that either the symbol designs will not be as comprehensible as the promoters might wish, or that attempts will be made to symbolize concepts which are simply not capable of being symbolized, often because the concept is too complex for this medium. There is also the likelihood that in some situations, the display of text rather than symbols will provide the more efficient form of communication.

The aims of this section are first to encourage communicators to determine objectively, by following a defined procedure, whether a symbol or symbolic sign is the best solution to a problem and, if so, to provide standardized symbol design criteria, and a standardized method of testing the comprehension of the symbol by the target population.

By promoting this process and by maintaining a register of standard symbols in other Australian Standards, the community's confidence in the use of symbols for communication can be retained, at the same time ensuring that there is no proliferation of untested and hence poorly understood symbols.

3.2 Determination of need

3.2.1 General

The need for a symbol or symbolic sign, as opposed to communication in another form, e.g. a worded sign, shall be rigorously and objectively researched. This is critical so that symbols are used only when they are appropriate and that they are not proliferated unnecessarily. The determination of need process is also an essential preliminary to the development of an effective symbol.

3.2.2 Preliminary considerations

At the beginning of the determination of need process, the following actions should be taken:

- (a) Every attempt should be made to establish whether any other method of communication currently in use is effective. If it is effective, definite reasons should be established as to why a symbol or symbolic sign is needed instead.
- (b) If a standard or non-standard method of communication in current use is ineffective, some attempt should be made to discover the reason. It may well be that use of a symbol is not the best way to change the behaviour of people in that context.

- (c) If the need is related to the safety of the general public, every effort should be made, in the first instance, to eliminate the hazard. Appropriate reaction to a sign, symbolic or otherwise, can never be totally relied on in a critical safety situation.

3.2.3 Establishment of need form

Unless the preliminary considerations in [Clause 3.2.2](#) indicate a course other than development of a symbol or symbolic sign, the Establishment of Need form in [Appendix C](#) shall be completed for each referent, as specified in [Clauses 3.2.4](#) to [3.2.7](#).

3.2.4 Message definition

The first step in the determination of need is to prepare a precise and unambiguous definition of the message to be communicated, in the following format:

- (a) *Referent* — This shall be a concise and clear description of what the symbol means, e.g. the tap and cup symbol means “drinking water, and is recorded at Item 1 on the Establishment of Need form in [Appendix C](#).
- (b) *Function* — Where the symbol is to be used on a sign, a precise description of the purpose of the symbolic sign shall be given at Item 2 on the Establishment of Need form in [Appendix C](#), e.g. the behaviour that the sign is intended to elicit from viewers. Where a symbolic sign is specifically not to be used for some functions, these shall be listed under the heading “Excluded functions”.

3.2.5 The need for a symbol

In addressing Items 3 and 4 of the Establishment of Need form in [Appendix C](#), an analysis of various aspects of the communication problem shall be undertaken as follows:

- (a) Identification of regional or cultural problems by completing Item 3 of the form.

NOTE 1 Problems associated with language difficulties should also be reported.

- (b) A summary of the factors confirming the need for a symbol or symbolic sign.

NOTE 2 Applicants should deal with the elements of Item 4 with great care, on the assumption that they could be called upon to defend any statement supporting the introduction of a symbol or symbolic sign.

3.2.6 Referent diversity

Item 5 on the Establishment of Need form in [Appendix C](#) requires the applicant to consider whether the original referent is likely to generate a need for additional referents, e.g. the division of “parking” into “truck parking”.

3.2.7 Test symbol recommendations

Item 6 on the Establishment of Need form in [Appendix C](#) requires the applicant to provide a number of symbols for subsequent testing. These will normally be symbols obtained from established sources but may include new symbols designed in accordance with this document. As the development process requires symbol design along specified lines, there is no guarantee that any symbol offered at this stage will become the accepted standard without some change.

3.3 Standardization procedure

When it has been established that a symbolic sign appears to be the best or only solution, approval for the use of the new sign or symbol shall be sought from the relevant state/territory road authority in the first instance. The new sign or symbol can then be considered for addition into the relevant Standard.

3.4 Design criteria

To check or modify the graphic design of recommended test symbols or signs, or to design appropriate new symbols or signs for testing, the following information shall be supplied to the graphic designer:

- (a) *Location/background* — Descriptions (possibly supported by photographs) of typical locations. The colour and shapes of background objects can greatly influence the legibility of symbols and there may be cases where strong contrasts are unacceptable either for practical or aesthetic reasons. Illumination may require specific attention.
- (b) *Legibility distance* — Factors that affect the distance at which a symbol needs to be legible, e.g. whether the users are motorists or pedestrians, the likely time that will be available to react to the symbol and any limitations on the distance from which it has to be readable.
- (c) *Communication* — Information on whether a symbol may have to compete with other graphic devices, or whether a symbol which is part of a family of symbols can be readily distinguished from the others by users. Information given under Item 5 of the Establishment of Need form in [Appendix C](#) can be of relevance.
- (d) *Appropriate sign classification* — Advice as to whether a symbol is to be used as an element in more than one class of sign, e.g. on an information sign, a prohibition sign and a mandatory sign.

3.5 Selection and testing

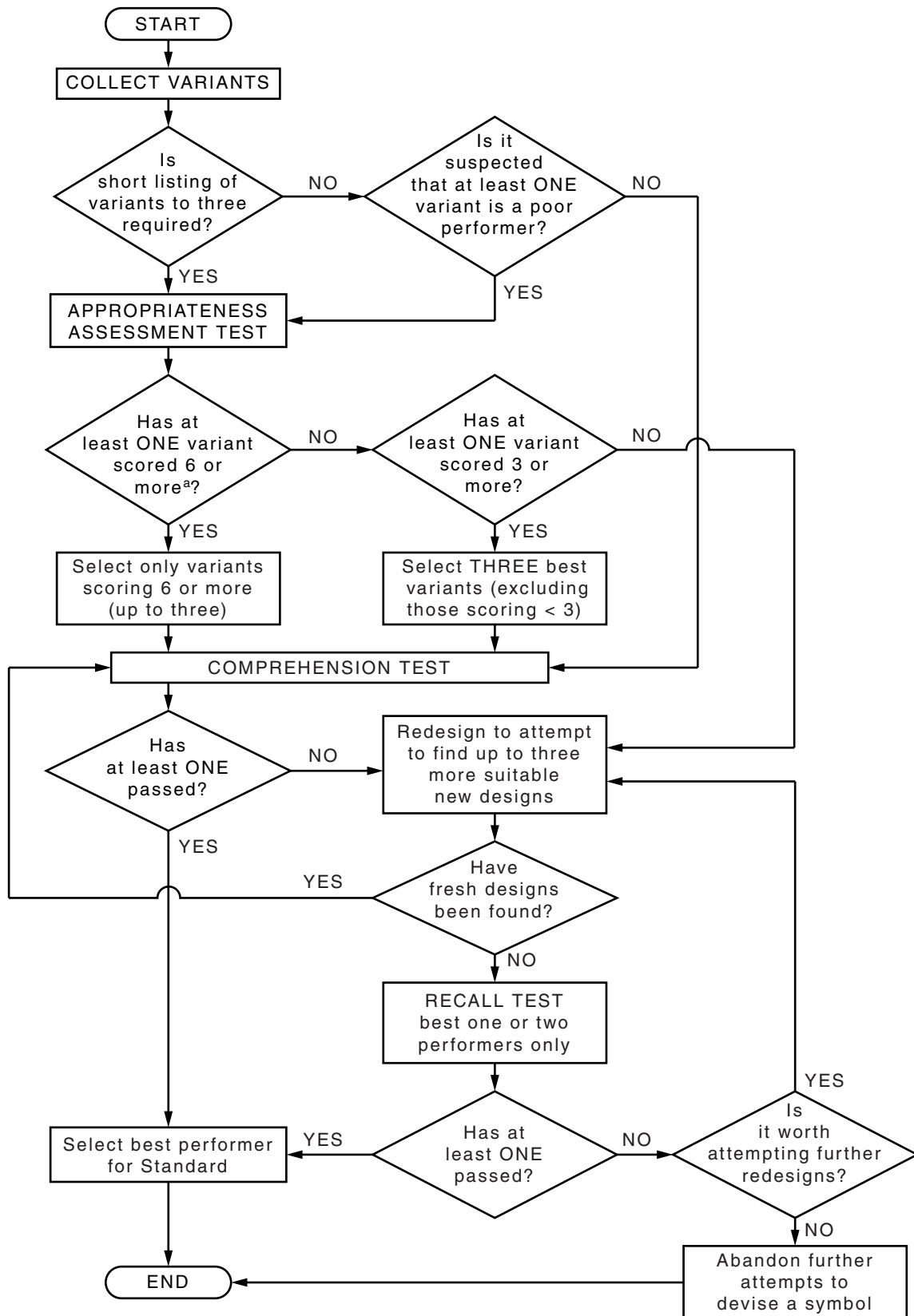
3.5.1 General

The following steps shall be followed in the selection and testing of graphic symbols and symbolic signs:

- (a) Collection of symbol variants (see [Clause 3.5.2](#)).
- (b) Appropriateness assessment test (see [Clause 3.5.3](#)).
- (c) Comprehension test (see [Clause 3.5.4](#)).
- (d) Recall test (if required, see [Clause 3.5.5](#)).

This procedure is illustrated in the flow chart in [Figure 3.1](#).

Some of these steps may be conducted by using computerized or online means.



^a This is an optional step (see [Clause 3.5.3](#)). If variants scoring less than 6 are included, proceed to the next (adjacent) question.

Figure 3.1 — Selection and testing procedure flow chart

Where symbols are to be used on a sign, the procedures described in this section are to be applied to the complete sign rather than to the symbols alone. Responses to various parts of the procedure shall demonstrate an understanding of the sign function as well as the meaning of the symbol before they can be accepted as correct.

Where the same symbol is used on two or more symbolic signs with different functions, e.g. an information sign permitting or encouraging an activity and a prohibition sign restricting the same activity, the signs shall be tested separately.

Users should be made aware of the potential for confusion between symbols under test and symbols already approved as standards. Steps should be taken when first collecting test variants to ensure that confusion will be unlikely to arise. Notice should also be taken of any responses made during the comprehension test that might indicate possible confusion.

3.5.2 Collection of symbol variants

Collection of variants shall be carried out in accordance with the procedures specified in [Clause D.2](#).

To increase as much as possible the chances of finding the optimum symbol or symbolic sign for a purpose, as many variants as possible should be selected in the first instance. If considered necessary, additional designs should be prepared.

3.5.3 Appropriateness assessment test

This test is a procedure whereby a group of variants is reduced to a short list of three for comprehension or recall testing when more than three have been collected in accordance with [Clause 3.5.2](#). It is also used to screen out symbols that are likely to perform very poorly during later tests, and may be used for this second purpose even when there are only three or less test symbols initially, if it is suspected that one or more may be a poor performer.

The test shall be carried out as specified in [Clause D.3](#) of [Appendix D](#). Except as indicated in the remainder of this clause, the short list for further testing shall comprise the three highest scoring variants from this test.

NOTE If the third and fourth places in the resultant ranking are very close, the fourth symbol may be included in the short list. On the other hand, if there is an excessive number of rejects from this test, the short list may be reduced to less than three.

The appropriateness assessment test is not normally required if only three or less variants have been collected. Regardless of the number originally collected, any symbol with a mean assessment score of less than three shall be rejected from further testing at this stage.

If only three or less variants were collected initially, and it is suspected that one or more are potentially very poor performers, this test may still be carried out.

If all variants score less than three, they shall all be rejected. This situation will indicate the need to attempt redesign of symbols, or if that is not successful, to consider whether attempts to devise a symbol or symbolic sign should be abandoned.

Any variants which score six or more in the appropriateness assessment test may be accepted at this point for comprehension testing to the exclusion of all others. If there are more than three in this category, the three highest scoring variants should be selected. This is an optional step, i.e. if there are less than three in this category it is acceptable either to further test only those scoring 6 or more, or to include any additional moderately good performers, e.g. scoring 5 or more, to make a total of up to three for further testing.

3.5.4 Comprehension test

This test seeks responses from a group of subjects under controlled conditions, as to the meaning of the symbol or sign. The responses are graded for assessment by placing them into one of the five categories listed in [Clause E.6.3](#).

When assessed in accordance with the comprehension test in [Appendix E](#), a symbol or symbolic sign which conforms to the following criteria shall be accepted:

- (a) At least 85 % correct or nearly correct responses (response Category 1).
- (b) Not more than 5 % opposite or potentially hazardous responses (response Category 4).
- (c) Not more than 10 % wrong responses in total (response Categories 3 and 4).

Where two or more symbols or signs meet the above criteria, the symbol with the highest score in Item (a) shall be accepted.

Notice should be taken of any responses made during this test that might indicate possible confusion with other symbols already approved as standards. If there is significant evidence that such confusion could occur, the symbol may need to be redesigned and the comprehension test repeated.

3.5.5 Recall test

Recall testing shall be applied only to a symbol or symbolic sign which has failed the comprehension test after all reasonable attempts to design a symbol that will pass the test have been made.

The recall test involves showing the candidate signs to a group of subjects as for comprehension testing, explaining their meaning, and then repeating the comprehension test using the same subjects at a later time (three days to two weeks later). The test is designed to determine how easily the meaning of the symbol or sign may be learnt.

When tested in accordance with the recall test in [Appendix E](#), a symbol or symbolic sign that conforms to the criteria set out in [Clause 3.5.4](#) shall be considered to have passed this test.

3.6 Principles for the design of graphic symbols

3.6.1 General

This clause sets out the principles to be followed in the design and development of a graphic symbol.

Before commencing the design and development of a symbol, its need shall be established in accordance with procedures specified in [Clause 3.2](#).

For a symbol that is to be used on a sign, check —

- (a) that it suits the shape of the particular class of sign on which it is to be used, e.g. circle, diamond, rectangle, square, including any enclosure used to reinforce the shape coding;
- (b) that if it is to be used on a regulatory sign, it can accommodate the negation slash without essential detail being obscured or confused; or
- (c) that fineness of detail does not reduce legibility to an unacceptable level on signs which need to be read from a long distance.

3.6.2 Design principles

3.6.2.1 Symbol proportions

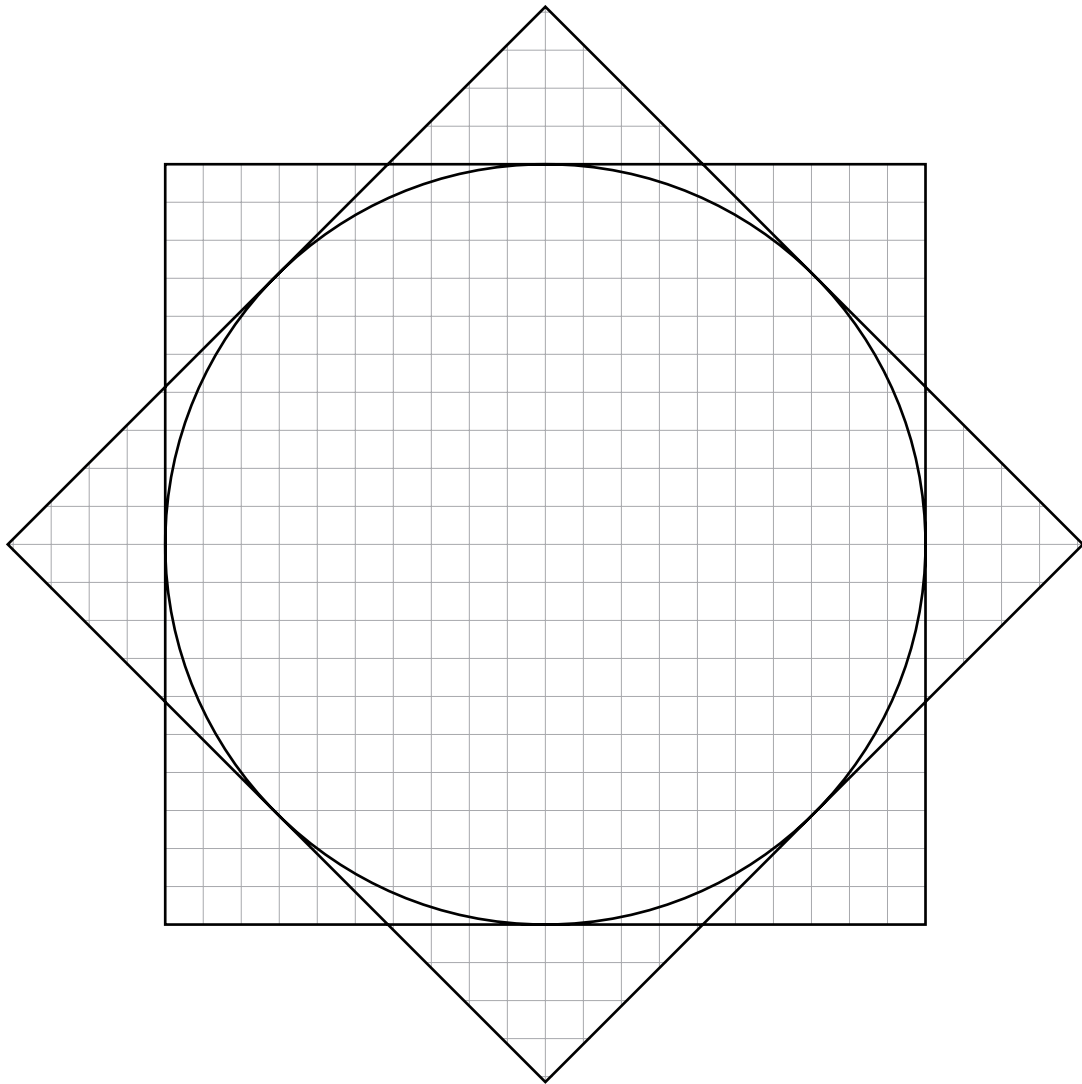
Symbols that are too narrow in any dimension should be avoided as this is likely to create problems of legibility and comprehension, particularly in combination with the negation slash. Symbols should be designed so that the ratio of the lengths of adjacent sides of a rectangle just enclosing the symbol does not exceed 2:1.

3.6.2.2 Significant detail

To ensure that symbols are legible when viewed at small subtended angles, no detail of the image content that is critical to the comprehension of the symbol should occupy an area of less than a square with a side of one unit, where the entire sign has the following dimensions —

- (a) for a square or diamond, a length of side of 20 units; and
- (b) for a circle, a diameter of 20 units, including any enclosure.

To facilitate the design of symbols, with particular reference to significant detail, the grid in [Figure 3.2\(A\)](#) may be used. If the grid is used, no part of the symbol shall be closer to the enclosure than one unit.



NOTE 1 The grid comprises the following:

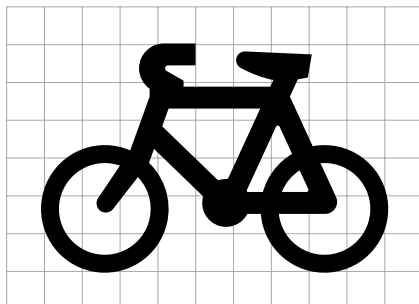
- (a) Square (with side or diagonal horizontal) —
 - (i) length of side = 20 units; and
 - (ii) area = 400 unit squares.
- (b) Circle —
 - (i) diameter = 20 units; and
 - (ii) area = 314 unit squares.

NOTE 2 For width of enclosure, see [Clause 3.7.3.2\(b\)](#).

NOTE 3 For minimum size of significant detail, see [Clause 3.6.2.2](#).

Figure 3.2(A) — Design grid for symbolic signs

Legibility distance is particularly important. As such, significant details of the symbol shall be made prominent (see [Clauses 3.7.5](#) and [3.7.6](#)). The bicycle symbol illustrated in [Figure 3.2\(B\)](#) is an example.



NOTE For the legibility provision for symbolic signs, see [Clause 3.7.3.3](#).

Figure 3.2(B) — Design grid for symbolic signs

3.6.2.3 Symbol form

Symbols should be of solid rather than outline form.

3.6.2.4 Directional characteristics

Where symbols having explicit or implicit directional characteristics, e.g. the aircraft symbol is combined with a directional arrow, directional conflict or confusion should be avoided by rotation of the symbol to align with the arrow. The design of such symbols should permit such rotation.

3.6.2.5 Contrast

The design of the symbol should take account of the fact that the symbol and background contrast may be reversed, e.g. from black symbol on white to white symbol on blue.

When the reversed contrast (light symbol on dark ground) is used, the effect of irradiation should not destroy the clarity of the form. For example, if white lines on a black ground are reversed to black lines on a white ground, their thickness should be increased, especially if the sign is trans-illuminated.

Irradiation will not generally be a problem if the width of lines, or the minimum dimension of other detail, is never less than 1 unit (see [Clause 3.6.2.2](#)).

3.6.2.6 Symbol sets

The need to form signs for a particular field into a symbol set by matching graphic style should also be taken into account.

3.7 Principles for the design of signs incorporating symbols

3.7.1 General

Signs incorporating symbols may be either —

- (a) symbolic signs comprising a single symbol on a colour-coded and shape-coded signboard; or
- (b) composite signs comprising either multiple symbols alone, or symbols used in conjunction with words or arrows or both.

In each case, the colour and shape coding specified in [Clause 3.7.2](#), where applicable to a sign or portion of a sign, shall be observed when designing the sign.

3.7.2 Symbolic colours and shapes

The symbolic colours and shapes assigned to each class of sign are specified in AS 1742.1.

The colorimetric and photometric properties of the materials of the signs shall be such that the signs retain the same colour coding under all relevant lighting conditions.

3.7.3 Design of symbolic signs

3.7.3.1 General

Symbolic signs referred to in this section comprise a single symbol on a signboard having a shape which conforms to one of the three shown in [Figure 3.2\(A\)](#). This figure also illustrates the grid square units referred to in [Clause 3.7.3.2](#), and the relationship of these units to each of the three basic sign shapes.

3.7.3.2 Structural elements

Each graphic symbolic sign shall be made up of two or more structural elements, depending on its class. These structural elements are the graphic symbol or image, the background, the enclosure, the surround and the diagonal slash, and shall be designed and incorporated in the sign as follows:

- (a) *Background colour* — The symbolic background colour for the sign type shall cover at least 50 % of the total surface of the sign.
- (b) *Enclosure* — The enclosure of limit or restriction signs is the symbolic red annulus. For emphasis of this colour coding, the enclosure shall always be 2 units wide.
- (c) *Symbol design and placement* — The symbol shall be designed in accordance with [Clause 3.6](#).

NOTE 1 As far as is practicable, the symbol should be compatible with the shapes of those classes of sign on which it will appear.

To ensure that the enclosure does not interfere with the outline of the symbol, the symbol shall be placed so that no part of its outline encroaches on an area bounded by the inner edge of the sign's enclosure and a line located 1 unit inside that edge, as illustrated in [Figure 3.3](#).



Figure 3.3 — Relation of structural elements

- (d) *Indication of prohibition* — Prohibition shall, unless otherwise specified, be indicated by means of a red diagonal slash. The slash shall be between 1 and 2 units in width.

It shall be designed so that the symbol is not obscured.

NOTE 2 The slash should normally be superimposed on the symbol at an angle, top left to bottom right, of 45 degrees to the horizontal as shown in [Figure 3.4](#), but if it would obscure the symbol at this angle, the angle may be varied provided that such variation is kept to a minimum.

NOTE 3 Where the shape of a symbol is such that it would be obscured by a top left to bottom right slash, the direction of either the slash or the symbol may be reversed as shown in [Figure 3.5](#).



Figure 3.4 — Example of regulatory sign



Figure 3.5 — Reversal of direction of slash

3.7.3.3 Sign size and legibility

To provide adequate legibility for symbolic signs at the maximum distances over which they would normally be viewed (see [Figure 3.2\(B\)](#)), the size of grid unit should be 0.3 mm per metre of viewing distance.

3.7.4 Design of composite signs

3.7.4.1 General

Composite signs may be signs that simply carry more than one symbol on a signboard, or they may be a combination of symbols, words and arrows on one sign. Where an element of a composite sign is a symbolic sign rather than just a symbol, the symbolic sign element shall be designed in accordance with [Clause 3.7.3](#).

3.7.4.2 Multiple symbolic signs

The number of symbols on a regulatory or warning sign should be no more than two. The use of more than two symbols on a common background is appropriate only for information signs. In such cases, the distance between the symbols shall be such that there is a clear segregation of the image content. This is usually achieved by allowing a distance between symbols equal to at least twice the separation between a symbol and its enclosure as described in [Clause 3.7.3.2\(c\)](#).

3.7.4.3 Signs incorporating words and symbols

There will be occasions when the use of a word or words will be necessary to convey a concept not fully conveyed by a symbol alone. In such cases, the word or words are an element of the image content, and the proximity of the symbol to its associated text will affect the extent to which the two elements are perceived as a single unit. Typical examples are shown in [Figure 3.6](#).

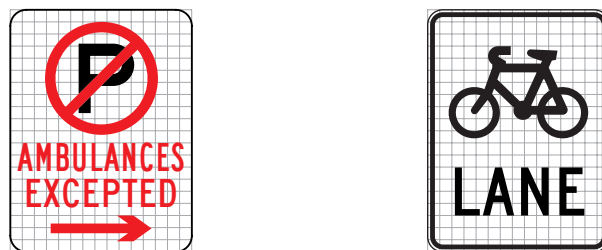


Figure 3.6 — Traffic signs with words and symbols

3.7.4.4 Use of arrows on composite signs

Where a directional arrow is associated with a symbol, it should be in close proximity to the symbol. Arrows pointing up and arrows pointing down should be placed at the top and bottom of the sign respectively. Arrows pointing to the left should precede the symbol and arrows pointing to the right should follow the symbol.

For arrows on direction signs, refer to AS 1742.15.

3.7.5 Conspicuity enhancement

To ensure that signs are conspicuous so that the desired visual impact is achieved and legibility maintained, one or more of the following steps may need to be taken:

- (a) *Size increase* — Conspicuity may be aided by increasing the size of the sign beyond that normally considered appropriate for legibility at the required viewing distance.
- (b) *Retroreflective material* — A higher grade of retroreflective material conforming to the requirements of AS/NZS 1906.1 may be used.
- (c) *Illuminated signs* — A high level of luminance in illuminated signs may improve conspicuity but could impair legibility due to irradiation. It may be necessary to compensate for irradiation by increasing the size of negative (darker) elements and reducing the size of the positive (lighter) elements within the sign, or alternatively, by partially illuminating the negative elements up to about 10 % of the luminance of the positive elements.

3.7.6 Sign size modification

The selection of sign or symbol sizes to satisfy minimum legibility requirements alone may not result in a satisfactory sign. The following additional factors may require an increase in the size of the sign:

- (a) The need to ensure that the sign is conspicuous against the background (see [Clause 3.7.5](#)).
- (b) The time required to read the sign. If a reader is approaching a sign at a speed such that there could be insufficient time to read and comprehend the whole of the message, the sign may need to be increased in size so as to extend the distance, and hence time, over which it is legible.
- (c) The need to emphasize a particularly important message, such as a sign warning of a hazard.
- (d) The need to improve either the legibility or conspicuity of a sign which suffers from an unavoidably complex symbol.

3.7.7 Viewing of signs under natural and artificial light

Where retroreflective or illuminated signs are to be viewed under both natural and artificial lighting conditions, legibility should be maintained under these different lighting conditions. Special attention should be given to signs subject to illumination from artificial light sources, such as uncorrected mercury or sodium vapour lamps, which can cause colour changes.

Section 4 Manufacturing and materials

4.1 Legend

The letters and numerals on standard road signs shall conform to AS 1744, and be as specified in the relevant drawing for the particular road sign.

The following abbreviations are used in the drawings:

B, C, D, E or F	=	Series B to F alphabets (both upper and lower cases).
Emod	=	Series E Modified alphabet (both upper and lower cases).
Example: 120 D	=	120 mm, Series D alphabet.

Letter heights intermediate to the standard heights specified in AS 1744 are specified for many standard signs. Intermediate letter heights shall be generated by exact proportional enlargement or reduction of one particular sign size.

For single line made-to-measure signs where signboard length is restricted for practical mounting reasons, e.g. street name signs, computer-generated intermediate letter series may be used for long words where necessary to fit them on the maximum length sign as agreed with the purchaser, and provided the following rules are observed:

- (a) Letter shapes specified in AS 1744 shall be used as the design base series.
- (b) The degree of horizontal expansion or contraction shall be uniform within any letter or numeral or within any set of characters.
- (c) Letter or numeral stroke width shall be uniform within any character or set of characters, and shall be reduced or increased in the same proportion as the horizontal reduction or expansion of the character.
- (d) Spacings between characters shall be altered in the same proportion as the horizontal character alteration.
- (e) No expansion or contraction shall exceed 15 % of the design base letter series used in a particular case, for either character width, stroke width or spacing between characters.

4.2 Signboard size

The sizes and shape proportions of signs in this document with preset graphics have been selected, as far as practicable, so as to achieve an economical cut from sign face and substrate material 1 200 mm wide. The same principles should be applied to made-to-measure signs.

4.3 Borders, edge strips and corners

4.3.1 Design elements of a road sign

The design elements of a road sign are shown in [Figure 4.1](#).

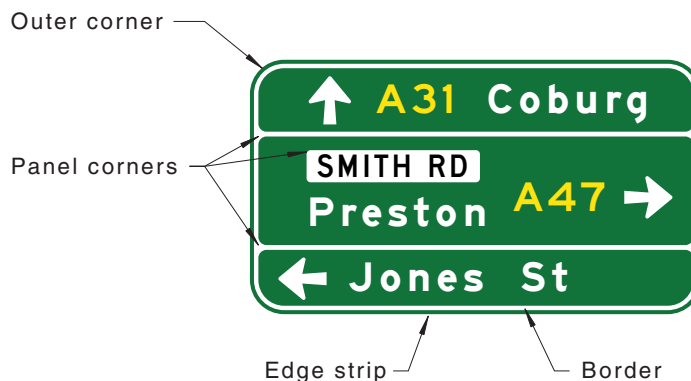


Figure 4.1 — Design elements of a road sign

4.3.2 Signs with dark coloured legends on light coloured backgrounds

Signs in this category which have borders shall have an edge strip outside the border equal to half the width of the border. Recommended border and edge strip widths and corner radii are given in [Table 4.1](#).

Table 4.1 — Dimensions for border width, edge strip width and corner radii — Signs with dark legend on light background^a

Shortest dimension of signboard mm	Dark border mm	Light edge strip mm	Outer corner radii mm
≤ 400	10	5	25
401 to 750	20	10	50
751 to 1 200	30	15	100
1 201 to 2 000	40	20	200
> 2 000	50	25	300

^a Excludes diamond warning signs, R1 series signs, supplementary plates and some temporary signs.

4.3.3 Signs with light coloured legends on dark coloured backgrounds

Signs in this category which have borders shall have an edge strip outside the border equal to the border width. Recommended border or edge strip widths and corner radii are based on the largest legend (height) on the sign and are given in [Table 4.2](#).

Table 4.2 — Dimensions for border, edge strip width and corner radii — Signs with light legend on dark background^a

Size of largest legend on sign ^b		Border and edge strip	Corner radii	
Upper case mm	Lower case mm		Outer corners mm	Panel corners mm
< 100	< 75	10	30	20
100 to 139	75 to 104	15	70	30
140 to 179	105 to 134	20	100	40
180 to 239	135 to 179	30	130	50
240 to 319	180 to 239	40	180	60
320 to 399	240 to 299	50	240	80
≥ 400	≥ 300	70	300	100

^a Excludes diamond warning signs, supplementary plates and some temporary signs.

^b If the largest legend on a sign is a single short word such as “NO”, the next largest legend may be more appropriate.

NOTE The corner radii and border edge strip width for legend height of > 400 may be used for signs that have the shortest dimension greater than 2 000.

4.3.4 Diamond warning signs

Recommended border and edge strip widths are given in [Table 4.3](#).

Table 4.3 — Dimensions for border widths and corner radii for diamond warning signs

Sign size mm	Border width mm	Edge strip width mm	Outer corner radius mm
300 × 300	10	5	20
450 × 450	15	8	30
600 × 600	20	10	40
750 × 750	20	10	50
900 × 900	30	15	60
1 200 × 1 200	30	15	80

4.3.5 Supplementary plates

Border and edge strip widths and corner radii on supplementary plates shall be the same as the sign with which they are used.

4.3.6 Road name panel

The design of the road name panel shall be in accordance with AS 1742.15 Clause B.3.

4.3.7 Temporary signs

Temporary signs shall have either a border and outside edge strip or a border extending to the outer edge of the sign. Width recommendations are as follows:

- (a) *Border and outside edge strip* — The border width should be the same as in [Clause 4.3.2](#), but the edge strip should be equal in width to the border.
- (b) *Border only, no edge strip* — The border should be not more than 1.5 times the stroke width of letters used on the sign.

Temporary signs may have square corners in lieu of the above requirements and recommendations. If rounded corners are required, dimensions in [Table 4.1](#) shall be applied.

4.3.8 Signs with preset graphics

For signs containing only a symbol and/or an arrow, the corner radii shall be determined by using [Table 4.2](#) with the symbol size converted into an equivalent legend height. The equivalent legend height of a symbol is determined by taking the grid module size (from [Table B.1](#)) and multiplying by two.

4.3.9 Signs with corners greater than 90 degrees

The requirements and recommendations in this section do not apply to corners on signs which are other than 90 degrees. Radii for these corners are shown in the drawings of the signs or sample sign types.

4.3.10 Gateway and pictorial signs

This document does not cover designs for gateway and pictorial signs. Refer to AS 1742.6 and individual state road authorities for guidance.

4.4 Manufacturing tolerances

The dimensions specified in the drawings are nominal and are given in millimetres. A sign shall be free of visually apparent defects in layout. Each dimension shall be subject to the following tolerances unless otherwise specified by the purchaser:

- (a) Shape, size and alignment of legend elements, including letters, numerals, arrows and symbols, the spacing between letters in a word, and the width of borders, edge strips and dividing lines shall be ± 2 mm or 1 % of dimension, whichever is the greater.
- (b) Overall dimensions of signboard shall be ± 5 mm or 0.5 % of dimension, whichever is the greater.
- (c) Other dimensions including the horizontal spacing between words or groups of legend elements and the vertical spacing between lines of legend or groups of legend elements shall be ± 5 mm or 0.5 % of dimension, whichever is the greater.

4.5 Colours

4.5.1 Non-reflective colours

The colours of non-reflectorized road signs shall closely approximate the colours defined in [Table 4.4](#).

Table 4.4 — Standard colours

Colour	Colour AS 2700	Pantone	RGB
Red	R13 Signal Red	1805C	170, 39, 47
Yellow	Y15 Sunflower	108C	238, 175, 48
Brown	X65 Dark Brown	4695C	82, 45, 36
Blue	B23 Bright Blue	647C	22, 87, 136
Standard Green	G12 Holly Green	3435C	2, 71, 49
Green	G13 Emerald	349C	0, 105, 60

4.5.2 Retroreflective colours

Retroreflective colours shall be as defined and shall fall within the relevant colour space specified in AS/NZS 1906.1.

4.5.3 Fluorescent colours

Fluorescent colours for traffic signs shall be defined and shall fall within the relevant colour space specified in AS/NZS 1906.1.

4.5.4 Backs of signs

The backs of signs shall be of neutral appearance. Light coloured, glossy or polished surfaces shall not be used.

NOTE Methods such as acid etching or mechanical finishing are acceptable for use to ensure the backs of signs are not glossy or polished.

4.6 Signboard construction

4.6.1 General

Signboards are normally constructed of metal, but plastic or composite material may be used where such materials are available in a suitable form and where suitable finishing and protective techniques have been established and applied. A signboard should —

- (a) be rigid enough to resist dead and wind loadings without undue deflection;

NOTE Large signs may require horizontal or vertical braces or both to be affixed to the back of the sign to achieve adequate rigidity.

- (b) be strong enough to minimize damage due to vandalism;
- (c) not be made of brittle material which will shatter when impacted by bullets, stones or other missiles;
- (d) provide a surface to which the sign face materials will adhere properly, and which will not produce an adverse chemical reaction with the sign face material in the short or long term;
- (e) be at least as weather and corrosion resistant as the sign face materials to be used on it; and
- (f) be made so that any horizontal supporting rail does not pose a spearing hazard where there is a potential for end-on vehicle impact.

Road signs shall be braced using a flush rivet system with no exposed rivet to reduce the risk of the sign sheeting being damaged.

4.6.2 Metal signs

4.6.2.1 Materials

The following signboard materials are recommended as conforming to the requirements of [Clause 4.6.1](#):

- (a) Galvanized sheet steel specified in [Table 4.5](#) conforming to the relevant requirements of AS 1397.

Table 4.5 — Galvanized sheet steel for use in signboard construction

Usage	Steel thickness mm	Steel grade	Coating designation	Finish ^a
Flat sheet signs, braced or unbraced for permanent or temporary use	1.2 min.	G500	Z 275 AZ 150	Chromate passivation
			ZF 100 ^b	Not required
Signs with folded or otherwise stiffened edges, for temporary use only	0.8 min.	G2 G3 G300 ^c	As above	As above
^a Requirement for further surface treatment, e.g. painting prior to application of reflective or non-reflective sheeting, may be indicated in manufacturer's instructions. ^b Annealed zinc coatings may be used only: (a) where the steel is to be painted on both sides and edges; (b) where the sign is unlikely to suffer in-service damage; and (c) where the sign is to be sufficiently well braced to counteract loss of strength due to the annealing process. ^c G300 grade may be used for folded edge signs provided cracking of base metal or coating does not occur at bends.				

- (b) Aluminium sheet, specified in [Table 4.6](#) conforming to the relevant requirements of AS/NZS 1734.

Table 4.6 — Aluminium for use in signboard construction

Usage	Thickness mm	Aluminium grade	Finish
Flat sheet signs, braced or unbraced	1.6 or 2.0 ^a	5 052	H36 or H38
	1.6 or 2.0 ^a	5 251	H36 or H38
Extruded sections	N/A	6 063	T5 or T6
		6 060	T5 or T6
^a Recommended for unbraced signs where vandalism by bending may be a problem.			

4.6.2.2 Manufacturing requirements

In the manufacture of metal signs, the following requirements apply:

- (a) Where corrosion protection is destroyed or damaged in the manufacturing or fixing process, action shall be taken to restore protection by appropriate after-treatment.
- (b) Where dissimilar metals are in contact, action shall be taken to prevent galvanic action and resultant corrosion.

NOTE For guidance on the use of dissimilar metals in contact, refer to AS 1562.1.

4.6.3 Plastic and composite materials

Plastic and composite material signs are not covered in this document. Refer to individual state road authorities specification for guidance.

4.7 Application of sign faces

4.7.1 General

Any materials used for the sign face, and not otherwise described in this specification, shall be in accordance with the relevant Australian Standard specifications.

4.7.2 Retroreflective material

Where reflectorization is specified, the retroreflective material, together with any process inks or films used shall meet the requirements of AS/NZS 1906.1.

4.7.3 Non-reflective material

Before use, non-reflective materials (including fluorescent materials), paints, films or other surface coatings should be suitably evaluated for function, durability and compatibility with other materials used in the sign manufacture.

4.7.4 Application of materials to signboards

Background materials shall be applied to the signboard in accordance with the manufacturer's instructions. Legends and borders may be applied either by cut-out sheeting, or by application of process inks or electronically cuttable transparent or opaque film. Where signs comprising a reflectorized legend on a reflectorized background are made either by the sheeting-on-sheeting method or by the application of transparent inks or films, materials and where applicable, ink application rates shall be selected such that the luminance contrast between the legend and background under retroreflected light is at least 7 to 1.

Section 5 Sign design specifications

Design specifications for signs are set out in the following appendices:

- (a) [Appendix G](#) — Design and layout of regulatory signs (R series).
- (b) [Appendix H](#) — Warning signs (W series).
- (c) [Appendix I](#) — Guide signs (G series).
- (d) [Appendix J](#) — Guide signs for expressway-type roads (GE series).
- (e) [Appendix K](#) — Temporary signs (T series).
- (f) [Appendix L](#) — Hazard markers and delineators (D series).
- (g) [Appendix M](#) — Multi-message signs (TM series).

Appendix A (informative)

Guidance on the design and layout of made-to-measure guide signs

A.1 Procedure

The following procedure is recommended:

- (a) By reference to AS 1742.15, determine the type, e.g. G1-1 Advance direction sign, and style, e.g. 2-panel, of sign required for the purpose.
- (b) Determine the number of lines of legend required for each component of the layout and whether route names or route numbers or both are to be included in any layout component.
- (c) Determine the letter size required for the main legend.
- (d) Select from the G series drawings in this document the style of sign which most nearly equates to the sign being designed.
- (e) Design the sign using the layout requirements of [Clause 2.3](#) and the positioning of elements and components in accordance with the selected example of the style of sign. If the selected legend size is smaller or larger than that in the example, all other layout dimensions except borders and corner radii should be altered in proportion. Border and corner radii are required to conform to [Clause 4.3](#).

To enable estimates of the size of sign to be obtained pending precise drafting of the layout, a means of estimating word lengths is given in [Clause A.3](#).

A.2 Determination of letter and other sign element sizes

A.2.1 Letter sizes

The following equation applies to the design of all *capital* letters including the initial capital for lower case legends:

$$H = 0.14 NV + 11.4S \quad \text{A.1}$$

where

- | | | |
|-----|---|--|
| H | = | capital letter height including the height of initial capitals used with lower case letters, in millimetres |
| N | = | number of words on the sign |
| V | = | approach speed in kilometres per hour |
| S | = | lateral offset of the sign measured from the centre of the sign to the centre of the traffic lane, in metres |

NOTE The derivation of [Equation A.1](#) is given in Austroads, *Guide to Traffic Management, Part 10: Traffic control and communications devices*.

[Equation A.1](#) applies to words made up of Series Emod. capitals and lower case letters, e.g. on direction signs, on side mounted signs in rural areas. For other conditions, the equation should be modified as follows:

- (a) Where other letter series are used, increase H by the following factors:
Series C — 50 %, Series D — 25 %, Series E — 7 %.
- (b) For signs in urban areas, increase H by 25 % (conspicuity adjustment for urban environments).
- (c) For overhead signs, S used in [Equation A.1](#) should be the vertical offset of centre of sign from the driver's eye height multiplied by 2.

Where an overhead sign is at the side of the road and more than 3 m from the edge of the pavement, it may be necessary to calculate the equivalent lateral distance S_{EL} from the following equation:

$$S_{EL} = \left(S_L^2 + 4 S_V^2 \right)^{1/2} \quad \text{A.2}$$

where

S_L = lateral offset of the sign in metres, as for [Equation A.1](#)

S_V = vertical distance of the centre of the sign above the driver's eye, in metres (distance above road surface, minus 1.2 m)

The value S_{EL} is then substituted for S in [Equation A.1](#).

To facilitate sign design and manufacture, the standard letter size given in AS 1744, nearest to the size calculated, should be adopted.

A.2.2 Directional arrows

Standard directional arrow shapes are shown in [Figure A.1](#). The long arrow is typically used where a single direction, multi-line panel requires a vertical or angled arrow. Instructions for sizing the arrow are shown on the figure. For extended shaft arrows, use the instructions to determine head size and shaft width.

A.2.3 Route markers

Standard route marker emblems for use on sign faces are shown in the drawings in the G8 series. The shield size is related to the letter height of associated legend. Where route numbers are to be shown without a shield or other enclosure, the letter or numeral height should be 0.75 to 1.0 times the associated legend capital letter height.

A.3 Estimation of word length

Word lengths can be estimated from the following equation:

$$L = N \times H \times f \quad \text{A.3}$$

where

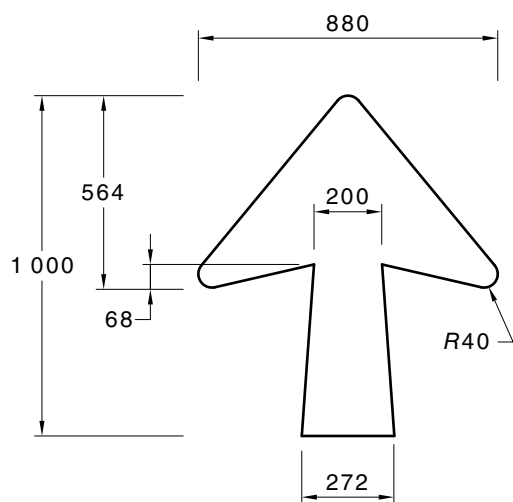
L = length of word or line of legend, in millimetres

N = number of letters in the word or line of legend, counting each space between words as one letter

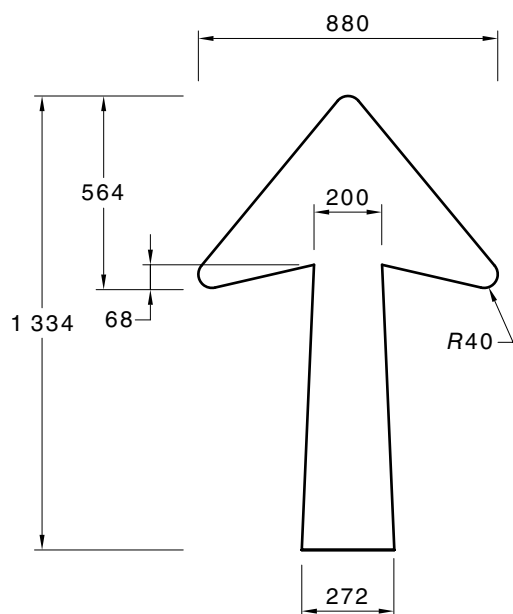
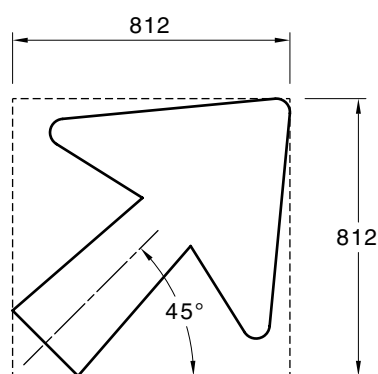
H = capital letter height, in millimetres

f = letter width factor given in AS 1744

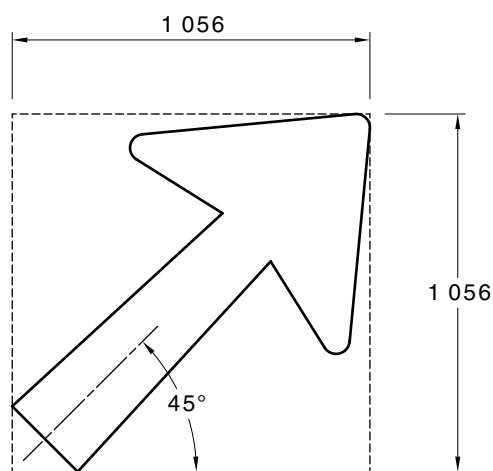
Dimensions in millimetres



(a) Short arrow



(b) Long arrow



NOTE 1 The arrows in this figure may be used on a sign whose principal legend is 640 mm Emod/480 mm LC or 480 mm Series B to F. For other legend heights, the arrow size should be altered in proportion.

NOTE 2 Horizontal arrows have the same dimensions as vertical arrows.

Figure A.1 — Detail of standard arrows

Appendix B (informative)

Design and layout of symbolic service signs

B.1 Scope

This appendix sets out a method of determining the size and layout of symbolic service signs in the G7 and GE7 series.

B.2 Service symbol rectangles

Each of the symbols is superimposed on a rectangular grid having a narrow, medium or wide configuration as follows:

- (a) Narrow — 4 modules wide × 5 modules high.
- (b) Medium — 5 modules wide × 5 modules high.
- (c) Wide — 6 modules wide × 5 modules high.

The symbols and their grid configurations are given in the drawings as S1 to S22. The location and size of the symbol within each rectangle is designed so that signs having various arrays of symbols may be made up by allowing a clearance of *one grid module* minimum between adjacent rectangles, between rows of rectangles, and between rectangles and other legends, borders, etc. on the sign.

The grid module sizes for manufacturing the G7 and GE7 signs illustrated in AS 1742.1 are set out in [Table B.1](#). The G7 series signs are also illustrated in [Appendix I](#) of this document.

Table B.1 — Grid module sizes for designing G7 and GE7 signs

Sign series	Sign size	Grid module size mm
G7	A	70 (90 mm) ^a
	B	105 (135 mm) ^a
GE7	One size only	160
^a Use alternative grid size if sign comprises a single symbol only, i.e. G7-6-1 (see Appendix I).		

B.3 Design procedure

The recommended procedure for designing a service sign is as follows:

- (a) Establish the sign size designation and, from [Table B.1](#), determine the grid module size to be used.
- (b) Determine the width of the sign and the layout as follows:
 - (i) Signs with a vertical layout similar to [Figure B.1](#):



Figure B.1 — Example of vertical layout

- (A) Determine dimension X_1 and X_2 (the length of the rows of symbols) by summing the number of horizontal grid modules in each symbol rectangle, adding one grid module for each space between symbols, and multiplying by the grid module size selected, e.g. if a Size A grid module were used, X_1 in [Figure B.1](#) would be $(5 + 1 + 4) \times 70 = 700$ mm.
- (B) Determine dimension W , the overall width of the sign, by adding whichever of dimensions X_1 or X_2 (the lengths of the symbol rows) or X_3 (the length of the legend below the symbols) is the greatest, and twice the edge distance Y , which is either —
- (1) one grid module, plus width of border and edge strip, if a row of symbols governs width; or
 - (2) 0.6 times letter height plus width of border and edge strip, if legend line governs width.
- (C) The vertical distance between rows of symbols is one grid module. The horizontal separation between symbols is always one grid module regardless of whether the row of symbols governs the width of the sign. Other sign dimensions are as given in the relevant drawings of signs in the G7 and GE7 series.

If the overall signboard is to be a size convenient for manufacturing, the clearances between symbols and the inside borders may be decreased to 0.5 times grid module minimum, or increased to 1.25 times grid module maximum. This measure has already been applied to the dimensions of Sign G7-1-2 in [Appendix I](#).

For any sign in the G7 series, all dimensions for the B size should be 1.5 times those for the A size except for border width or corner radius which may be altered to conform to the dimensions given in [Tables 4.1](#) and [4.2](#).

- (ii) Signs with a horizontal layout similar to [Figure B.2](#):

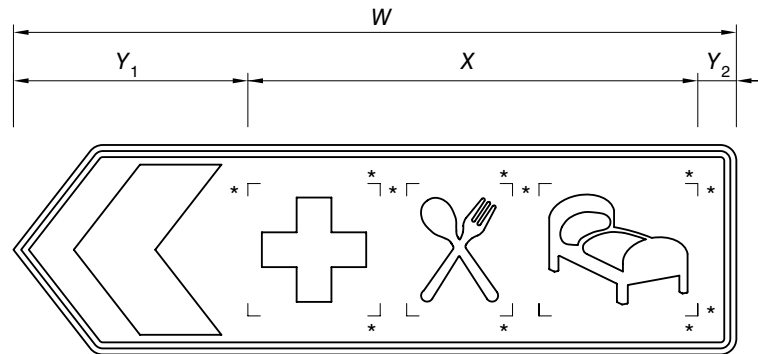


Figure B.2 — Example of horizontal layout

Determine dimension W (the overall width of the sign) by adding —

- (A) dimension X (the width of the row of symbols determined as in Item (i)(A)); and
- (B) dimensions Y_1 and Y_2 (the two edge distances as shown in the relevant illustration on Sign G7-4-3 in [Appendix I](#)). Y_2 will normally be equal to one grid module plus the border and edge strip width.

For any sign in the G7 series, all dimensions for the B size should be 1.5 times those for the A size except for border width or corner radius which may be altered to conform to the dimensions given in [Tables 4.1](#) and [4.2](#).

Appendix C

(normative)

Establishment of need for a graphic symbol or symbolic sign

C.1 Scope

This appendix specifies the form on which justification for the development and standardization of a graphic symbol or symbolic sign is to be provided.

C.2 Completion of form

The Establishment of Need form shall be completed in accordance with [Clause 3.2](#).

ESTABLISHMENT OF NEED FORM	
DETAILS REQUIRED FOR THE ESTABLISHMENT OF NEED FOR A SYMBOL	
1. Referent	
Give a concise, clear and unambiguous description of what the symbol means. Word the description in such a way as to eliminate, as far as possible, unintended meanings.	Referent description: _____ _____ _____ _____ _____
2. Function of the symbolic sign	
Where the symbol is to be used on a sign, indicate the function of the sign and give a precise description of the response to be expected from a person to whom the sign applies. List also any functions which need to be excluded to avoid ambiguity.	Function and response description: _____ _____ Excluded functions: _____ _____
3. Region and culture	
Indicate whether the existing or likely communication problem arises from factors involving region or culture or both.	The communication problem is: ☐ Unrelated to region and culture ☐ Related to region or culture
4. Use of symbol as a solution	
Examine carefully and rigorously why it is considered that a symbol is the best solution to the communication problem in this case. Mark whichever of the listed statements are the major factors in reaching this decision, amplifying the answers where necessary.	☐ The problem cannot be overcome by such means as the provision of barriers, safeguards, better maintenance or other non-communicational actions. ☐ The information requires a prompt reaction and must therefore be comprehensible at a glance. ☐ The need to convey this information by means of a symbol is growing steadily because (give details). ☐ Other factors (give details)

5. Subdivision of the referent		
Identify any subgroups into which the referent may need to be divided, and determine whether altered symbols are needed for any or all of the subgroups. If subgroups are necessary, itemize them, giving reasons for their necessity, and complete additional Establishment of Need forms for each referent requiring an altered symbol.		
6. Symbols		
Insert reproducible 28 mm × 28 mm copies of proposed symbols*, wherever possible quoting originator and source *A minimum of three symbols should be provided wherever possible. When the number of existing symbols exceeds three, use an additional sheet.		Originator: Source:
7. Designs of proposed symbols		
Symbol 1	Symbol 2	Symbol 3

8. Applicant Details	
Applicant: _____	
Address: _____	
State _____	Postcode _____
Email: _____	Phone: _____
Contact Name: _____	
Signature: _____	Date: ____ / ____ / ____

Appendix D (normative)

Collection, assessment and testing of symbolic signs

D.1 Scope

This appendix sets out methods for selecting suitable symbolic sign variants for a particular referent and, where necessary, ranking them in order so as to facilitate selection of an optimum number for comprehension or recall testing.

The methodology may be adapted to a computerized or online platform. In this case, computer screens or monitors of a suitable size shall be used and each card shall be replaced by a screen image, separately viewed.

D.2 Collection of symbol variants

All existing symbol variants shall be collected. Ensure that symbols already in widespread international use are included in the collection of symbol variants. Guidance on sources of suitable test symbols may be found in [Appendix F](#).

If the number of symbol variants collected appears to be insufficient, the development of additional trial designs should be encouraged to improve the chances of obtaining positive results from the test program.

Where two or more symbols in the collection are very similar, include only one in the test program. The symbol which best conforms to the design criteria specified in [Clause 3.4](#) should be chosen.

Only symbol variants which have been prepared to a suitable and consistently high graphic quality shall be included in the testing.

D.3 Appropriateness assessment test

D.3.1 General

This test is required as indicated in [Clause 3.5.3](#).

D.3.2 Preparation of test material

The following test material is required:

- (a) *Information card* — Prepare an information card for each referent. The information card shall show the following:
 - (i) The name of the referent.
 - (ii) If the referent is on a sign, the function of the sign.
 - (iii) The fields of application.
 - (iv) Any excluded functions.

This information shall be extracted from the Establishment of Need form (see [Appendix C](#)).

- (b) *Test cards* — For each referent a set of test cards (size A7) shall be made, each showing one of the symbol or symbolic sign variants to be tested. Each symbol or sign should be of standard size, 28 mm ($\pm 5\%$) $\times$ 28 mm ($\pm 5\%$), and be positioned in the centre of the card.

A code number identifying the referent, and a code letter identifying the variant are marked on each test card.

When presenting the material to respondents, all cards for a given referent shall be made up into a pack. The information card shall be on the top of the pack and the variants shall, where possible, be arranged randomly in the pack each time it is used. No less than four random orderings of the pack shall be used, each being given to approximately the same number of respondents.

D.3.3 Respondents

The number of respondents required to test a set of variants of a given referent shall not be less than 20.

The composition of the sample of respondents should be representative of the eventual user population. The sample should consist only of respondents who are familiar with a given referent.

D.3.4 Respondents' task

The following instructions shall be given to respondents before the test is commenced:

- (a) For each referent, the respondent is instructed to read the information card showing the function and each field of application of the referent, and to bear these in mind when making judgments. Where the referent has excluded functions specified at Item 2 on the Establishment of Need form, draw the attention of the respondent to these excluded functions.
- (b) The respondent is instructed to consider each test card in turn, and to assess and record how well he or she considers that the general population (or members of a relevant group where the referent is used in a restricted field) would be able to determine the correct meaning of that symbol according to the following 7-point scale:
- 1 No-one will understand what it means.
 - 2 Most people will not understand what it means.
 - 3 Somewhat less than half the population will understand what it means.
 - 4 About half the population will understand what it means.
 - 5 Somewhat more than half the population will understand what it means.
 - 6 Most people will understand what it means.
 - 7 Everyone will understand what it means.

D.3.5 Analysis and presentation of results of appropriateness assessment test

The results shall be analysed and presented as follows:

- (a) Compute the mean assessment score for each variant by dividing the sum of all of its scores by the number of respondents.
- (b) Prepare separate results forms for each referent, as shown in [Figure D.1](#). Within each form, present variants in descending order of mean assessment score.
- (c) On the results form for each referent, include the following information:
- (i) The name of the referent.
 - (ii) The function of the referent.

- (iii) The field of application.
- (iv) The number of respondents.
- (v) Copies of the symbol variants tested.
- (vi) Identification codes of the variants.
- (vii) The source of each variant.
- (viii) The mean assessment score for each variant.
- (ix) A reference to this test method, i.e. AS 1743 Appendix D.

An example of test results is given in [Figure D.2](#).

APPROPRIATENESS ASSESSMENT TEST—RESULTS
Referent name:
Function:
Field of application:
Number of respondents:
Variants tested:
Code:
Source:
Mean assessment score:
Variants tested:
Code:
Source:
Mean assessment score:

Figure D.1 — Form for presenting results of appropriateness assessment test

APPROPRIATENESS ASSESSMENT TEST—RESULTS	
Referent name: Seaport symbol	
Function: Indicating a seaport	
Field of application: Symbol to be used on road signs	
Number of respondents: 30	
Variants tested:	Variants tested:
	
Code: A	Code: B
Source: From Queensland Main Roads	Source: From WA Main Roads
Mean assessment score: 2	Mean assessment score: 1.5
Variants tested:	Variants tested:
	
Code: C	Code: D
Source: From VicRoads	Source: From SA Department of Transport
Mean assessment score: 5.5	Mean assessment score: 4.0

Figure D.2 — Example showing results of the appropriateness assessment test

Appendix E (normative)

Comprehension and recall tests

E.1 Scope

This appendix specifies the method of conducting both comprehension and recall tests.

The methodology may be adapted to a computerized or online platform. In this case, computer screens or monitors of a suitable size shall be used and each card shall be replaced by a screen image, separately viewed.

E.2 Application

The comprehension test is applied to the symbol or symbolic sign variants which have been selected and assessed in accordance with [Clause 3.5.4](#). Generally, not more than three variants of any one symbol or symbolic sign will be subjected to this test.

The recall test is only applied to a symbol or symbolic sign which has failed the comprehension test after all reasonable attempts have been made to design symbols which will pass the comprehension test.

E.3 Preparation of test materials

The sets of test material shall be prepared for either test using the variants for each referent selected as in [Clause E.2](#). The graphic representation of the test symbols shall conform to [Clause 3.6](#) for design of graphic symbols and with [Clause 3.7](#) for the design of signs incorporating symbols. If necessary, appropriate adjustments shall be made to the test graphics.

The test material shall be prepared as follows:

- (a) Reproduce each variant on an A7 size sheet, utilizing a standard symbol size of 28 mm ($\pm 5\%$) $\times$ 28 mm ($\pm 5\%$), with the symbol centred on the test sheet.
- (b) Allocate the different variants of all referents to different test sets, which may contain a number of different referents, but shall contain only one variant of any one referent. Collate each test set into a test booklet. Thus the maximum number of variants per referent selected for comprehension testing (usually three) determines the number of test sets.
- (c) Assign each test set a code letter, e.g. A, B, C, and mark this code letter on every test sheet in the test set.

NOTE 1 It has been found helpful for the test administrator if the pages of the test booklets are also coded by a black strip, printed along the bottom edge of each test sheet, specific to each test set. When viewed from the side, the length of this strip can be seen (and hence the code letter can be inferred) without opening the test booklet. This is of particular value in identifying and counting the test booklets of each test set when they are in large piles.

- (d) Assign each referent an identification number. Print this number after the code letter used to identify the test set on each test sheet in the test set.
- (e) Add a title sheet, an instruction sheet and an example sheet to the beginning of each test booklet.

On the title sheet, provide spaces for the test administrator to enter the type of test, e.g. comprehension, recall (first visit) or recall (second visit), the date of the test session, the location of the test session, the name of the person conducting the test, and the age of the respondent. The respondent's age shall be categorized according to the following age groups: between 15 and 30; between 31 and 50; over 50.

On the instruction sheet, ask the respondents to write down, in the space below each symbol, their interpretation of each symbol in the test booklet. Ask the respondents to write the response "Don't know" if they are unable to assign a meaning to the symbol. Include in the instruction sheet a broad indication of the context in which the symbols are designed to be used, e.g. road, factory, beach or riverside.

On the example sheet show a commonly known symbol, and below it write the name of the symbol. Arrange the symbols in the test booklets randomly. For each 100 booklets, use at least five random orders of symbols, i.e. no more than 20 booklets in 100 shall have the same order of presentation.

NOTE 2 When conducting the recall test, a fresh arrangement should be used for the second visit.

An example of the test material is given in [Figure E.1](#).

Alternative test material comprising colour slides for the variants of each referent in each set may be used. The same codings should be used for this test material and for the sheets on which the respondents are to record their responses.

The use of colour slides enables each group of respondents to be shown a set of test material all at the one time. This can result in a reduction in testing time.

E.4 Respondents

The sample of respondents for one symbol set should normally comprise at least 100 respondents whose age grouping should reflect, as far as practicable, the approximate age grouping of the expected user population. If it is considered that the variability of results in all cases is likely to be small, the number of respondents may be reduced, but never to less than 30.

The composition of the sample of respondents should be representative of the eventual user population. The sample should consist only of respondents who are familiar with a given referent.

If at the outset it is considered likely that a recall test will be required, the comprehension test should be regarded as the first visit for the recall test. Steps should therefore be taken when obtaining respondents to select those who will be available for the second visit.

NOTE There is no need, at any stage, to conceal from respondents that they may be required, subsequently, for the recall test.

E.5 Conduct of test

E.5.1 Comprehension test

The group of respondents shall be assembled at an appropriate venue for conducting the test and for the size of the group. A single test booklet shall be presented to each respondent. The respondents shall be requested to follow the instructions given on the second page of the booklet.

If using the alternative test material, i.e. colour slides, the respondent shall be requested to record their responses page by page as each slide is projected onto the screen. They shall be instructed to write "Don't know" on the response sheet when they cannot interpret the sign.