

Australian Standard[®]

**Development, testing and
implementation of information and
safety symbols and symbolic signs**

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STANDARDS AUSTRALIA

RECONFIRMATION
OF
AS 2432—1992
Development—testing and implementation of information and safety symbols and
symbolic signs

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NOTES

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PREFACE

This Standard was prepared by the Standards Australia Committee on Public Information Symbols to supersede AS 2342.1—1980, *The design and use of graphic symbols and public information symbol signs*, Part 1: *General principles*, AS 2342.2—1980, Part 2: *Method for determining the need for a symbol and for establishing the design criteria*, AS 2342.3—1980, Part 3: *Test procedures for evaluating graphic symbols and symbol signs*, AS 2342.4—1981, Part 4: *Principles for the design of graphic symbols*, AS 2342.5—1980, Part 5: *Design of signs incorporating symbols*, and AS 2342.6—1985, Part 6: *Guidelines for the implementation of symbol sign systems*.

Apart from the incorporation of all six parts of the original Standard into a single Standard for the convenience of users, this edition contains a number of important changes, especially in relation to the procedures for testing the understanding of symbols and symbolic signs. The most profound change is the setting aside of the recall test as the main criterion of acceptance, and its substitution with a comprehension test which scores test symbols according to respondents' initial comprehension of the symbol or symbolic sign at first sighting. The recall test now assumes a secondary or back-up role, and is to be used under specified conditions when the initial comprehension test fails to yield a successful symbol.

The test methods have been revised to include an improved assessment procedure for short-listing test symbols at the outset of testing, a procedure which also incorporates a facility for screening out potentially very poor performers.

Other changes include a revised *Assessment of Need* form and procedure, revised and updated design criteria for symbols and signs, and revised and enhanced detail on the implementation of sign systems.

Some procedures in this Standard have similarities with the provisions for request application and appropriateness ranking of ISO 9186. There are however, significant differences in detail between the provisions of ISO 9168 and those of this Standard.

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FOREWORD

The communication of information by means of graphic symbols or signs incorporating symbols has enjoyed considerable appeal in recent times. The use of symbols for this purpose has been variously promoted as conveying a message more quickly and efficiently than text, as being more legible at longer viewing distances for a given signboard size, and as being understood more readily by people who are poor readers of English. Although these are sound reasons for promoting communication by symbols there is always 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. Moreover, 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 Standard 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.

It is believed that by promoting this process, and by maintaining a register of standard symbols in other Australian Standards (e.g. the AS 2899 series) 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.

STANDARDS AUSTRALIA

Australian Standard

Development, testing and implementation of information
and safety symbols and symbolic signs

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE This Standard specifies principles and procedures for determining the need, and the selection, testing and design of graphic symbols which may be—

- (a) placed on equipment or parts of equipment to instruct or advise people handling the equipment as to its use and operation;
- (b) used in locations where people may work, assemble or move, to give them information or instructions, such as prohibitions, warnings, rules, limits, or directional guidance; or
- (c) used in pictorial representations on maps, plans, drawings, illustrations and similar documents.

It also specifies principles and procedures for the design and use of information and safety signs using these symbols.

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

1.2 REFERENCED DOCUMENTS The following documents are referred to in this Standard:

AS

- 1101 Graphical symbols for general engineering
- 1102 Graphical symbols for electrotechnology
- 1319 Safety signs for the occupational environment
- 1742 Manual of uniform traffic control devices
 - 1742.1 Part 1: General introduction and index of signs
 - 1742.2 Part 2: Traffic control devices for general use
 - 1742.3 Part 3: Traffic control devices for works on roads
 - 1742.4 Part 4: Speed controls
 - 1742.5 Part 5: Street name and community facility name signs
 - 1742.6 Part 6: Service and tourist signs for motorists
 - 1742.7 Part 7: Railway crossings
 - 1742.8 Part 8: Freeways
 - 1742.9 Part 9: Bicycle facilities
 - 1742.10 Part 10: Pedestrian control and protection
 - 1742.11 Part 11: Parking controls
 - 1742.12 Part 12: Bus, transit and truck lanes
 - 1742.13 Part 13: Local area traffic management
- 1906 Retroreflective materials and devices for road traffic control purposes
 - 1906.1 Part 1: Retroreflective materials
- 2293 Emergency evacuation lighting in buildings
- 2700 Colour standards for general purposes
- 2899 Public information symbol signs
 - 2899.0 Part 0: Consolidated index
 - 2899.1 Part 1: General information signs
 - 2899.2 Part 2: Water safety signs
 - 2899.3 Part 3: Hospital signs

ISO

- 7001 Public information symbols
- 9186 Procedures for the development and testing of public information symbols

1.3 DEFINITIONS For the purpose of this Standard the definitions below apply.

1.3.1 Background—that part of a sign immediately behind a symbol or word.

1.3.2 Colour code—one or more colours used symbolically to represent a particular function.

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

1.3.4 Conspicuity of a sign—the extent to which a sign is more easily noticed than anything else in the visual field.

- 1.3.5 Direction sign**—a sign that indicates the direction to a particular facility or destination.
- 1.3.6 Enclosure**—a coloured band or outline forming part of the symbolic representation of the sign function.
- 1.3.7 Field of application**—the context in which the use of a particular symbol is appropriate.
- 1.3.8 Fire sign**—one that indicates the location of fire protection equipment or firefighting equipment or which identifies such equipment.
- 1.3.9 Function**—the purpose of the symbolic sign, e.g. to regulate, warn or inform.
- 1.3.10 Image content**—the elements of the symbol and their configuration.
- 1.3.11 Information sign**—one that supplies information about the availability or location of facilities and when and where activities are permitted.
- 1.3.12 Irradiation**—a 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**—the extent to which the details of a symbol are sufficiently discernible to enable the meaning of the symbol to be determined.
- 1.3.14 Public information symbol**—a symbol intended to give information to the general public, the understanding of which is not normally dependent on specialist or occupational training.
- 1.3.15 Referent**—a precise statement of what the symbol signifies.
- 1.3.16 Regulatory signs**—
- (a) *Regulatory sign*—a sign that contains an instruction for which non-compliance constitutes an offence at law.
 - (b) *Mandatory sign*—a regulatory sign that indicates that the instruction given is obligatory.
 - (c) *Prohibition sign*—a regulatory sign that indicates that an action or activity is prohibited.
 - (d) *Limitation or restriction sign*—a regulatory sign that indicates the degree to which an activity or use of a facility is limited or restricted.
- 1.3.17 Safe condition sign**—a sign that indicates that it is safe to proceed or that an activity can be undertaken with safety.
- 1.3.18 shall**—indicates that a statement is mandatory.
- 1.3.19 should**—indicates a recommendation.
- 1.3.20 Sign**—an inscribed board, plaque or other delineated space on which text or symbols or both are used to convey a message.
- 1.3.21 Significant detail**—detail in the image content which is critical to the comprehension of the symbol.
- 1.3.22 Standard symbol**—a symbol approved by Standards Australia and published in AS 2899.
- 1.3.23 Structural elements**—the individual components that together make up a symbolic sign (see Table 5.1).
- 1.3.24 Surround**—the fine outline of colour on the outer edge of a sign that is sometimes formed during the manufacturing process.
- 1.3.25 Symbol**—a graphic or pictorial device used to represent objects or concepts, but for the purposes of this Standard, excluding letters, numerals and punctuation marks.
- NOTE: Directional arrows, although normally classed as symbols, are dealt with in this Standard as though they were a separate sign element.
- 1.3.26 Symbol set**—an integrated range or series of graphic symbols for use in a defined field of application.
- 1.3.27 Symbolic shape**—a shape that is used systematically to indicate a particular class of sign.
- 1.3.28 Symbolic sign**—a 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**—alternative symbol designs for a given referent.
- 1.3.30 Warning sign**—a sign that warns of a particular danger or of dangerous conditions.

SECTION 2 DETERMINATION OF NEED FOR A SYMBOL AND ESTABLISHMENT OF DESIGN CRITERIA

2.1 DETERMINATION OF NEED

2.1.1 General The need for a symbol or symbolic sign, as opposed to communication in another form, e.g. a worded sign, must be rigorously and objectively researched. This is critical to ensure 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.

2.1.2 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 need to 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 workers or 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 upon in a critical safety situation.

2.1.3 Establishment of Need form Unless the preliminary considerations in Clause 2.1.2 indicate a course other than development of a symbol or symbolic sign, the Establishment of Need form in Appendix A shall be completed for each referent as specified in Clauses 2.1.4 to 2.1.7.

2.1.4 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 form in Appendix A.
- (b) *Field of application* All of the contexts within which the symbol is required shall be determined and itemized at Item 2 in Appendix A.
- (c) *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 3 in Appendix A, 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 should be listed under the heading 'Excluded functions'.

2.1.5 The need for a symbol In addressing Items 4, 5 and 6 of the Establishment of Need form, an analysis of various aspects of the communication problem shall be undertaken as follows:

- (a) Identification of the user population by completing Item 4 of the form. This may provide an insight into the likelihood of symbols being better understood than words, and will be needed for the selection of respondents for the comprehension and related tests specified in Section 3.
- (b) Identification of regional or cultural problems by completing Item 5 of the form. Problems associated with language difficulties should be reported under Item 4.
- (c) A summarization of the factors confirming the need for a symbol or symbolic sign. Applicants should deal with the elements of Item 6 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.

2.1.6 Referent diversity Items 7 and 8 on the Establishment of Need form require the applicant to consider whether the original referent is likely to generate a need for additional referents, either—

- (a) by division of the original referent into sub-groups (Item 7), e.g. the subdivision of 'food availability' into 'cafeteria/light refreshments' and 'restaurant'; or
- (b) by extension of the original referent to complementary or related referents (Item 8), e.g. the requirement for the referent 'petrol and repairs' in addition to 'petrol'.

2.1.7 Test symbol recommendations Item 9 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 Standard. 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.

2.2 STANDARDIZATION PROCEDURE When it has been established that a symbolic sign appears to be the best or only solution, the national standardization process is initiated by forwarding a copy of the Establishment of Need form to Standards Australia together with advice on what steps are to be, or are being taken towards selection, design and testing of a suitable symbol in accordance with this Standard.

2.3 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 is required by 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. Information given under Item 2 of the Establishment of Need form can be used in preparing these descriptions.
- (b) *Legibility distance* Factors that affect the distance at which a symbol needs to be legible (e.g. whether the users are motorists, pedestrians, factory workers), 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 Items 7 and 8 of the Establishment of Need form 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.

SECTION 3 SELECTION AND TESTING OF GRAPHIC SYMBOLS AND SYMBOLIC SIGNS

3.1 GENERAL The steps which are to be followed in the selection and testing of graphic symbols and symbolic signs are as follows:

- (a) Collection of symbol variants (see Clause 3.2).
- (b) Appropriateness assessment test (see Clause 3.3).
- (c) Comprehension test (see Clause 3.4).
- (d) Recall test (if required, see Clause 3.5).

This procedure is illustrated in the flow chart in Figure 3.1.

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

3.2 COLLECTION OF SYMBOL VARIANTS Collection of variants shall be carried out in accordance with the procedures specified in Appendix B, Paragraph B2. To increase as much as possible the chances of finding the optimum symbol or symbolic sign for a purpose, it is highly desirable that as many variants as possible are selected in the first instance. If considered necessary, additional designs should be prepared.

3.3 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 3.2. 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 set out in Appendix B, Paragraph B3. 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 will be reduced to less than three.

The appropriateness assessment test is not normally required if only three or less variants have been collected. However, 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. Consequently, 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. Furthermore, if all variants score less than three they shall all be rejected. This latter 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.

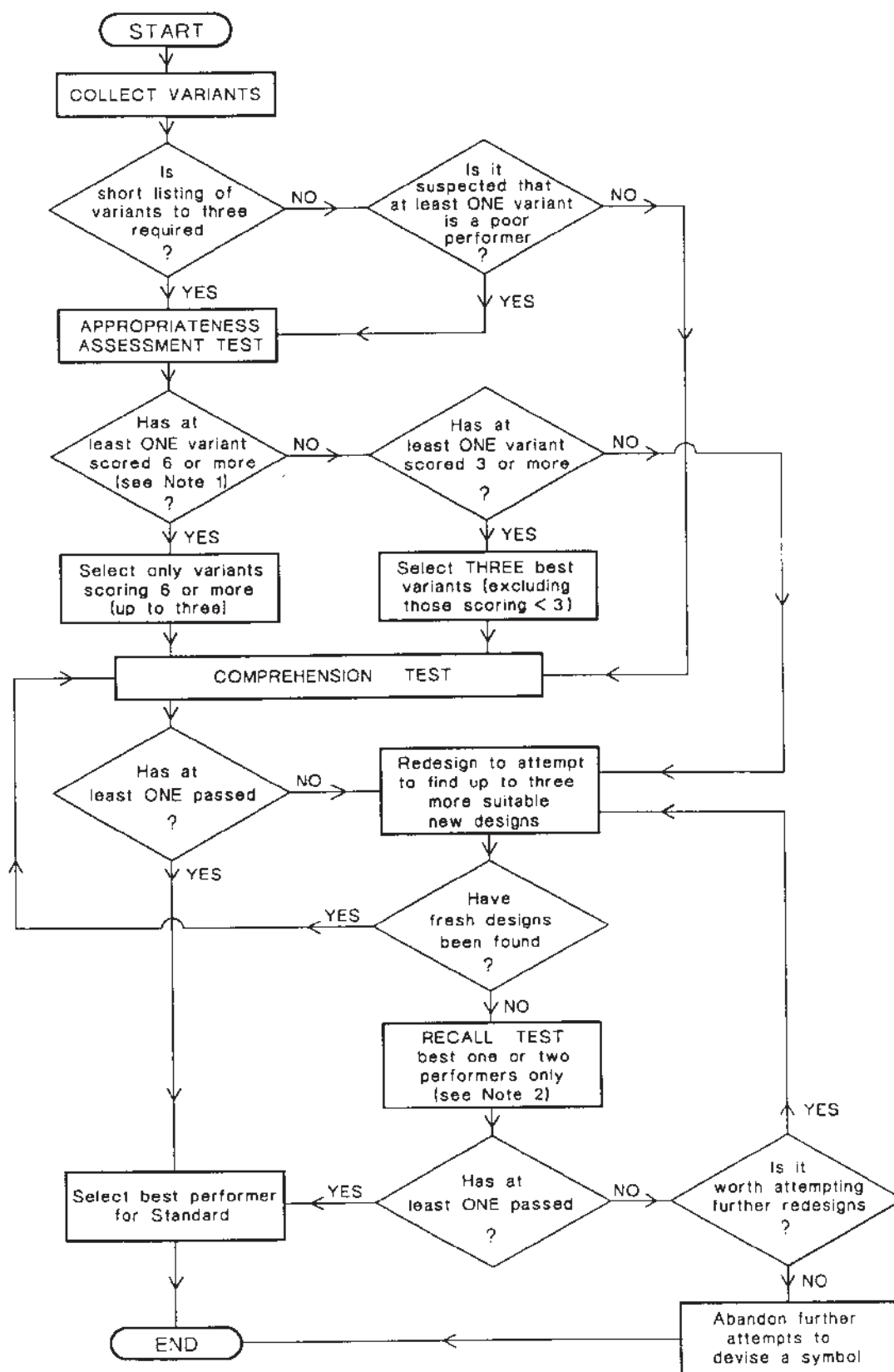
Any variants which score six or more in the appropriateness assessment test may be accepted at this point for comprehension testing to the exclusion of all others. If there are more than three in this category, the three highest scoring variants are selected. This is an optional step, i.e. if there are 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.

3.4 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 Appendix C, Paragraph C6.3.

When assessed in accordance with the comprehension test in Appendix C, a symbol or symbolic sign which complies with the following criteria shall be accepted:

- (a) At least 85 percent correct or nearly correct responses (response category 1).
- (b) Not more than 5 percent opposite or potentially hazardous responses (response category 4).
- (c) Not more than 10 percent wrong responses in total (response categories 3 plus 4).

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



NOTES:

- 1 This is an optional step (see Clause 3.3). If it is desired to include variants scoring less than 6, proceed to the next (adjacent) question.
- 2 The recall test may not be appropriate for public information symbols (see Clause 3.5).

FIGURE 3.1 SELECTION AND TESTING PROCEDUREFLOW CHART