Australian Standard®

LETTER SYMBOLS FOR USE IN ELECTROTECHNOLOGY

Part 1—GENERAL

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Australian Electrical and Electronics Manufacturers Association
Australian Institute of Refrigeration, Air Conditioning and Heating Inc.
Confederation of Australian Industry
Department of Construction
Department of Defence
Department of Productivity
Department of Transport
Electricity Supply Association of Australia
Institute of Draftsmen, Australia
Institution of Radio and Electronics Engineers, Australia
Melbourne and Metropolitan Board of Works
Queensland Chamber of Mines
Railways of Australia Committee
Technical press
Telecom Australia

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Part 1—GENERAL

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PREFACE

This standard is one of a series being prepared by the Association's Committee on Symbols, Units and Quantities for Electrotechnology under the authority of both the Telecommunications and Electronics, and the Electrical Standards Boards. It is a revision of the 1972 edition.

In its terminology, format and general treatment of the subject, this standard is consistent with IEC 27-1 published by the International Electrotechnical Commission. Acknowledgement is made of the assistance received from this source.

This standard was originally based on IEC 27(1966) with account being taken of changes made in international symbology following the publication of ISO 1000, SI Units and Recommendations for the Use of Their Multiples and of Certain Other Units. Subsequently IEC 27 was superseded by IEC 27-1 and 27-1A and this revision was undertaken to bring the standard into line with the revised requirements therein.

The purpose of the standard is thus to collate symbols for the quantities and units fundamental to the various disciplines involved in electrotechnology. While it remains very largely in line with IEC 27-1, it incorporates some changes in the advice given on the use of symbols to bring it into line with AS 1000, The International system of Units (SI) and Its Application.

A further reason for revision was given by the publication of IEC 27-2 on symbols for telecommunications and electronics which forms Part 2 of this standard. The revision of Part 1 was necessary to provide guidance for the use of Part 2 particularly with regard to the use of indices and the structure of complex symbols. The symbols given in Table 4-G, Acoustics, of the first edition of Part 1 are now in Part 2.

In some degree, this standard is complementary to AS 1000 insofar as it covers letter symbols for many quantities and includes some information, for example on mathematical symbols, not within the scope of AS 1000. Some non-SI units are mentioned because of their extensive use in textbooks and papers originating overseas but it is emphasized that for future Australian practice preference should be given to those units within the International System. This standard should therefore be read in conjunction with AS 1000.

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard for LETTER SYMBOLS FOR USE IN ELECTROTECHNOLOGY

PART 1 — GENERAL

1 SCOPE. This standard specifies letter symbols for physical quantities and abbreviations and symbols for units for general use in electrotechnology and lays down general principles governing their use.

2 APPLICATION. The recommendations in this standard on the use of symbols, alphabets and type fonts relate specifically to printed matter. In written and typewritten documents it is recommended that the choice of type be indicated by underlining with a straight line for italic type and with a wavy line for bold type.

In order to make the best use of the limited number of readily available alphabets and fonts, it is recommended that the general principles specified internationally be adopted.

Even with the provisions made for the use of different fonts, and cases, the number of distinctive letter symbols available for use is insufficient to enable each physical quantity or unit to be allotted a unique symbol or abbreviation. Alternatives have therefore been allotted where a need for them is most likely to arise or where alternative usage has been firmly established.

The use of the preferred symbol or abbreviation is strongly recommended.

3 LETTER SYMBOLS FOR PHYSICAL QUANTITIES.

3.1 Choice of Alphabet. Letter symbols for physical quantities shall be single letters of the Latin or Greek alphabets, with subscripts or other modifying signs where appropriate.

3.2 Choice of Type. Letter symbols for physical quantities shall be printed in *italic* (sloping) *type*.

It is recommended that subscripts to letter symbols for physical quantities or running numbers should also be printed in *italic type.*

Examples:

C_p heat capacity at constant pressure p

F_x x-component of force

σ_{xy} x, y-component of a stress tensor σ

a_n coefficient with $n = 1, 2, 3 \ldots .$

All other subscripts should be printed in roman (upright) type.

Examples:

C_g heat capacity in the gas phase

μ_r relative permeability

B_i intrinsic magnetic flux density

N_A Avogadro constant

m_o rest mass of the electron.

It is recognized that on many occasions it will be unnecessary or undesirable to adhere to this principle; then the same type should be used consistently for all subscripts.

3.3 Vector Quantities. Letter symbols indicating the vector character of a physical quantity shall be printed in ***bold face italic type*** (e.g. $\mathbf{H}$). When such type is not available an arrow should be placed above the symbol (e.g. $\vec{H}$).

3.4 Quantities Which Vary with Time.

3.4.1 *Physical quantities.* Quantities which vary with time shall be indicated as in Table 1.

Case 1 applies where both upper-case (capital) and lower-case letters are available.

Case 2 applies where only upper-case or only lower-case letters are available.

3.4.2 *General comments.* Time-dependent quantities can be periodic, transient or random. The variable quantity can often be represented by a combination, e.g. sum, product, polynomial, of components which are functions such as trigonometric functions, exponentials, distributions, etc.

The intention of this clause is to codify additional symbols for the components of a combination of functions or for special values, e.g. instantaneous, root-mean-square, of more complicated time-dependent quantities, e.g. modulated wave, sets of impulses.

3.4.3 *Terminology.* The terminology for designating parts of symbols, additional marks and subscripts is specified in Clause 6. Definitions of special values or components of a time-dependent quantity are given in AS 1852 (101), International Electrotechnical Vocabulary—Mathematics. No definitions are given, the meaning of the symbols being illustrated by the figures in Appendix C.

3.4.4 *Types of symbol for time-dependent quantities.* Two types of symbols are given, one using additional marks, the other using only letter subscripts such as are found on an ordinary typewriter. A combination of both systems is possible. Most examples given in Table 7I use one set of those symbols only.

The symbol for a time-dependent quantity implies in itself the dependency on time and indicates therefore the instantaneous value.

Where both upper-case and lower-case letters are used, the lower-case letter indicates an instantaneous value and an upper-case letter an average value.

Example:

i instantaneous value of a time-dependent electric current

I its r.m.s. value.