

SINGAPORE STANDARD

**SI units and recommendations for the use
of their multiples and of certain other
units**



SS ISO 1000 : 1992
(ICS 01.060)

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Standards
SPRING Singapore
1 Fusionopolis Walk,
#01-02 South Tower, Solaris
Singapore 138628
Email : standards@spring.gov.sg

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CONTENTS

	Page
National Foreword - - - - -	4
1. Scope - - - - -	6
2. Normative reference - - - - -	6
3. SI units - - - - -	6
4. Multiples of SI units - - - - -	7
5. Use of SI units and their multiples - - - - -	9
6. Rules for writing unit symbols - - - - -	9
7. Non-SI units which may be used with SI units and their multiples - - - - -	10

ANNEXES

A. Examples of decimal multiples and sub-multiples of SI units and of some other units which may be used (normative) - - - - -	12
B. Definitions of the base units of the international system of units (informative) - - - - -	27

TABLES

1. SI base units - - - - -	7
2. SI derived units with special names, including SI supplementary units - - - - -	8
3. SI derived units with special names admitted for reasons of safeguarding human health - - - - -	9
4. SI prefixes - - - - -	9
5. Units used with the SI - - - - -	10
6. Units used with the SI, whose values in SI units are obtained experimentally - - - - -	11

NATIONAL FOREWORD

The Singapore Standard was prepared by the Technical Committee on Specification for Rules for the Use of Units of the International System (SI) under the direction of the Mechanical Standards Committee.

It is a revision of SS 52 : 1977. This revised Singapore Standard is identical with ISO 1000 : 1992 *SI units and recommendations for the use of their multiples and of certain other units*, published by the International Organization for Standardisation (ISO). ISO 1000 was prepared by Technical Committee ISO/TC 12 - Quantities, units, symbols, conversion factors.

It is intended to serve generally to afford guidance to industry and other users in relation to metric usage.

In Singapore Standards, it is a practice to use a full point in the baseline as the decimal marker whereas in ISO Standards, a comma is used throughout as a decimal marker and a space for the thousand marker.

New terms such as lineic, areic, massic and volumic are used. Definitions are given in ISO 31.

Historical Note

The idea of decimal system of units was conceived by Simon Stevin (1548 - 1620) who also developed the even more important concept of decimal fractions. Decimal units were also considered in the early days of the French Academie des Sciences founded in 1666, but the adoption of the metric system as a practical measure was part of the general increase in administrative activity in Europe which followed the French Revolution. Advised by the scientists of his day, the statesman Talleyrand aimed at the establishment of an international decimal system of weights and measures 'à tous les temps, à tous les peuples'. It was based on the metre as the unit of length (it was intended to be one ten-millionth part of the distance from the North Pole to the equator at sea level through Paris, but the circumstances did not permit this aim to be achieved with any great accuracy) and the gram as the unit of quantity of matter. The gram was to be the mass of one cubic centimetre of water at 0°C.

Although the metric system was primarily devised as a benefit to industry and commerce, physicists soon realized its advantages and it was adopted also in scientific and technical circles. In 1873, the British Association for the Advancement of Science selected the centimetre and the gram as basic units of length and mass for physical purposes.

Measurements of other quantities called for a basic unit of time and the adoption of the second for this purpose gave the centimetre-gram-second (c.g.s) system. Around 1900, practical measurements in metric units began to be based on the metre, the kilogram and the second (the MKS system). In 1935, the International Electrotechnical Commission (IEC) accepted the recommendation of Professor Giorgi that this system of units of mechanics should be linked with the electro-magnetic units by the adoption of any one of the latter as a fourth basic unit. The ampere, the unit of electrical current, was adopted by the IEC in 1950 as the fourth basic unit, giving the MKSA (or Giorgi) system.

Since 1875, all international matters concerning the metric system have been the responsibility of the Conférence Generale des Poids et Mesures (CGPM) which was constituted following the Convention held in Paris in that year. The CGPM meets in Paris, and controls the Comité International des Poids et Mesures (CIPM) and various Subcommittees as well as the Bureau International des Poids et Mesures (BIPM).

The laboratories of BIPM at Sevres are the repository of the standard kilogram and the former standard metre. The kilogram is still defined in terms of the international prototype at Sevres but the metre is now defined in terms of the length of the path travelled by light in vacuum during a time interval of $1/299\,792\,458$ of a second.

The SI units were adopted by a resolution of the Tenth 'Conference Générale des Poids et Mesures' (CGPM) in 1954. In 1960, the Eleventh CGPM formalized this system and named it the International System of Units (abbreviated to SI).

NOTE

1. Singapore Standards are subjected to periodical review to keep abreast of technological changes and new technical developments. The revisions of Singapore Standards are announced through the issue of either amendment slips or revised editions.
2. Compliance with a Singapore Standard does not exempt users from legal obligations.

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1 Scope

This International Standard

- a) describes the International System of Units¹⁾ (in clauses 3, 4 and 6);
- b) recommends selected decimal multiples and sub-multiples of SI units for general use and gives certain other units which may be used with the International System of Units (in clauses 5 and 7, and annex A);
- c) quotes the definitions of the SI base units (in annex B).

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of

IEC and ISO maintain registers of currently valid International Standards.

IEC 27-1:1971,²⁾ *Letter symbols to be used in electrical technology — Part 1: General*

3 SI units

The name International System of Units (Système International d'Unités), with the international abbreviation SI, was adopted by the 11th General Conference on Weights and Measures (Conférence Générale des Poids et Mesures, CGPM) in 1960.

This system includes:

- base units
 - derived units including supplementary units
- which together form the coherent system of SI units.

3.1 Base units

The International System of Units is based on the seven base units listed in table 1.

1) Full information about the International System of Units is given in a publication by the International Bureau of Weights and Measures (Bureau International des Poids et Mesures, BIPM): *Le Système International d'Unités (SI)*, including an authorized English translation.

2) 5th edition, currently being revised.