

Specification for

Quantities, units and symbols —

Part 4: Heat

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Systems Department Steering Committee (S/-) to Technical Committee S/1, upon which the following bodies were represented:

- Chartered Institution of Building Services Engineers
- Department of Trade and Industry (National Physical Laboratory)
- Department of Trade and Industry (National Weights and Measures Laboratory)
- EEA (the Association of Electronics, Telecommunications and Business Equipment Industries)
- Institute of Physics
- Institute of Trading Standards Administration
- Institution of Chemical Engineers
- Institution of Electrical Engineers
- Institution of Mechanical Engineers
- Institution of Structural Engineers
- Royal Society
- Royal Society of Chemistry
- Schools Mathematics Project
- Society of Chemical Industry

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National foreword

This Part of BS 5775 has been prepared under the direction of the Systems Department Steering Committee. It is identical with ISO 31-4:1992 *Quantities and units — Part 4: Heat*, published by the International Organization for Standardization (ISO). ISO 31-4 was prepared by Technical Committee ISO/TC 12 “*Quantities, units, symbols, conversion factors*” with the active participation and approval of the UK.

This Part of BS 5775 supersedes BS 5775-4:1979, which is withdrawn. The principal changes made in this revised version are as follows:

- a) the decision by the International Committee for Weights and Measures (Comité International des Poids et Mesures, CIPM) in 1980 concerning the status of supplementary units has been incorporated;
- b) the International Practical Temperature Scale 1968, IPTS-68, has been replaced by the International Temperature Scale 1990, ITS-90;
- c) a number of new items have been added.

BS 5775 comprises the following Parts, each of which is identical with the corresponding Part of ISO 31.

- *Part 0: General principles;*
- *Part 1: Space and time;*
- *Part 2: Periodic and related phenomena;*
- *Part 3: Mechanics;*
- *Part 4: Heat;*
- *Part 5: Electricity and magnetism;*
- *Part 6: Light and related electromagnetic radiations;*
- *Part 7: Acoustics;*
- *Part 8: Physical chemistry and molecular physics;*
- *Part 9: Atomic and nuclear physics;*
- *Part 10: Nuclear reactions and ionizing radiations;*
- *Part 11: Mathematical signs and symbols for use in the physical sciences and technology;*
- *Part 12: Characteristic numbers;*
- *Part 13: Solid state physics.*

Cross-references

International standard	Corresponding British Standard
	BS 5775 <i>Specification for quantities, units and symbols</i>
ISO 31-0:1992	Part 0:1993 <i>General principles</i> (Identical)
ISO 31-8:1992	Part 8:1993 <i>Physical chemistry and molecular physics</i> (Identical)

The reference to *Metrologia*, **27** (1990), No. 1 is given in the remarks to items 4-1.a and 4-2.a for information only and does not affect the use of this standard.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 14, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Introduction

0.1 Arrangement of the tables

The tables of quantities and units in ISO 31 are arranged so that the quantities are presented on the left-hand pages and the units on the corresponding right-hand pages.

All units between two full lines belong to the quantities between the corresponding full lines on the left-hand pages.

Where the numbering of an item has been changed in the revision of a part of ISO 31, the number in the preceding edition is shown in parentheses on the left-hand page under the new number for the quantity; a dash is used to indicate that the item in question did not appear in the preceding edition.

0.2 Tables of quantities

The most important quantities within the field of this document are given together with their symbols and, in most cases, definitions. These definitions are given merely for identification; they are not intended to be complete.

The vectorial character of some quantities is pointed out, especially when this is needed for the definitions, but no attempt is made to be complete or consistent.

In most cases only one name and only one symbol for the quantity are given; where two or more names or two or more symbols are given for one quantity and no special distinction is made, they are on an equal footing. When two types of italic (sloping) letter exist (for example as with ϑ , θ ; φ ; ϕ ; g , g) only one of these is given. This does not mean that the other is not equally acceptable. In general it is recommended that such variants should not be given different meanings. A symbol within parentheses implies that it is a “reserve symbol”, to be used when, in a particular context, the main symbol is in use with a different meaning.

0.3 Tables of units

0.3.1 General

Units for the corresponding quantities are given together with the international symbols and the definitions. For further information, see ISO 31-0.

The units are arranged in the following way:

- a) The names of the SI units are given in large print (larger than text size). The SI units have been adopted by the General Conference on Weights and Measures (Conférence Générale des Poids et Mesures, CGPM).

The SI units and their decimal multiples and sub-multiples are recommended, although the decimal multiples and sub-multiples are not explicitly mentioned.

- b) The names of non-SI units which may be used together with SI units because of their practical importance or because of their use in specialized fields are given in normal print (text size).

These units are separated by a broken line from the SI units for the quantities concerned.

- c) The names of non-SI units which may be used temporarily together with SI units are given in small print (smaller than text size) in the “Conversion factors and remarks” column.

- d) The names of non-SI units which should not be combined with SI units are given only in annexes in some parts of ISO 31. These annexes are informative and not integral parts of the standard. They are arranged in three groups:

- 1) special names of units in the CGS system;
- 2) names of units based on the foot, pound and second and some other related units;
- 3) names of other units.

0.3.2 Remark on units for quantities of dimension one

The coherent unit for any quantity of dimension one is the number one (1). When the value of such a quantity is expressed, the unit 1 is generally not written out explicitly. Prefixes shall not be used to form multiples or sub-multiples of this unit. Instead of prefixes, powers of 10 may be used.

Examples

Refractive index $n = 1,53 \times 1 = 1,53$

Reynolds number $Re = 1,32 \times 10^3$

Considering that plane angle is generally expressed as the ratio between two lengths, and solid angle as the ratio between an area and the square of a length, the CIPM specified in 1980 that, in the International System of Units, the radian and steradian are dimensionless derived units. This implies that the quantities plane angle and solid angle are considered as dimensionless derived quantities. The units radian and steradian may be used in expressions for derived units to facilitate distinction between quantities of different nature but having the same dimension.

0.4 Numerical statements

All numbers in the “Definition” column are exact.

When numbers in the “Conversion factors and remarks” column are exact, the word “exactly” is added in parentheses after the number.