FINAL DRAFT
International Standard

IEC/FDIS 80000-13

Quantities and units —

Part 13: Information science and technology

Grandeurs et unités —

Partie 13: Science et technologies de l'information

ISO/TC **12**

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

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QUANTITIES AND UNITS –

Part 13: Information science and technology

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IEC 80000-13 has been prepared by IEC technical committee 25: Quantities and units in close cooperation with ISO/TC 12 Quantities and units. It is an International Standard.

This second edition cancels and replaces the first edition published in 2008. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) addition of new prefixes for binary multiples.

The text of this International Standard is based on the following documents:

Draft	Report on voting
25/XX/FDIS	25/XX/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

A list of all parts in the ISO 80000 and IEC 80000 series, published under the general title *Quantities and units*, can be found on the ISO and IEC websites.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

INTRODUCTION

0.1 Tables of quantities

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 letters exist (for example as with *J* and *θ*; *φ* and *f*; *a* and *a*; *g* and *g*), only one of these is given. This does not mean that the other is not equally acceptable. It is recommended that such variants should not be given different meanings. A symbol within parenthesis 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.

0.2 General

The names of units for the corresponding quantities are given together with the international symbols and the definitions. These unit names are language-dependent, but the symbols are international and the same in all languages. For further information, see the SI Brochure (9th edition 2019, updated in 2022) from BIPM and ISO 80000-1.

The units are arranged in the following way:

- The coherent SI units are given first. The SI units have been adopted by the General Conference on Weights and Measures (Conférence Générale des Poids et Mesures, CGPM). The use of coherent SI units, and their decimal multiples and submultiples formed with the SI prefixes are recommended, although the decimal multiples and submultiples are not explicitly mentioned.
- Some non-SI units are then given, being those accepted by the International Committee for Weights and Measures (Comité International des Poids et Mesures, CIPM), or by the International Organization of Legal Metrology (Organisation Internationale de Métrologie Légale, OIML), or by ISO and IEC, for use with the SI. Such units are separated from the SI units in the item by use of a broken line between the SI units and the other units.

0.3 Remark on units for quantities whose dimensional exponents are all equal to zero

The coherent unit for any quantity whose dimensional exponents are equal to zero is the number one, symbol 1. When the value of such a quantity is expressed, the unit symbol 1 is generally not written out explicitly. Quantities that are ratios of quantities of the same kind (for example length ratios and amount fractions) have the option of being expressed with units (m/m, mol/mol) to aid the understanding of the quantity being expressed and also allow the use of SI prefixes, if this is desirable (μm/m, nmol/mol).

EXAMPLE 1

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

Prefixes shall not be used to form multiples or submultiples of this unit. Instead of prefixes, powers of 10 are recommended.

EXAMPLE 2

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

0.4 Numerical statements in this International Standard

The sign = is used to denote "is exactly equal to", the sign ≈ is used to denote "is approximately equal to", and the sign:= is used to denote "is by definition equal to".

QUANTITIES AND UNITS –

Part 13: Information science and technology

1 Scope

This document specifies names, symbols and definitions for quantities and units used in information science and technology. Where appropriate, conversion factors are also given. Prefixes for binary multiples are also given.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at https://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp

The names, definitions and symbols for quantities and units of information science and technology are given in Table 1 on the following pages.

Table 1 – Quantities and units in information science and technology

Item No.	Quantity			Unit		Remarks
	Name	Symbol	Definition	Name	Symbol	
13-1	traffic intensity	A	number of simultaneously busy resources in a particular pool of resources	erlang	E	1 E corresponds to the occupancy of one resource. The name "erlang" was given to the traffic intensity unit in 1946 by the International Telephone Consultative Committee (CCIF), in honour of the Danish mathematician, A. K. Erlang (1878-1929), who was the founder of traffic theory in telephony. See IEV 715-05-02.
13-2	traffic offered intensity	A_o	traffic intensity (item 13-1) of the traffic that would have been generated by the users of a pool of resources if their use had not been limited by the size of the pool	erlang	E	1 E corresponds to the occupancy of one resource. See IEV 715-05-05.
13-3	traffic carried intensity, traffic load	Y	traffic intensity (item 13-1) of the traffic served by a particular pool of resources	erlang	E	1 E corresponds to the occupancy of one resource. General practice is to estimate the traffic intensity as an average over a specified time interval, e.g. the busy hour. See IEV 715-05-04.
13-4	mean queue length	L, (Ω)	time average of queue length	one	1	For the unit one, see the Introduction. See IEV 171-02-34.
13-5	loss probability	B	probability for losing a call attempt	one	1	For the unit one, see the Introduction.
13-6	waiting probability	W	probability for waiting for a resource	one	1	For the unit one, see the Introduction.
13-7	call intensity, calling rate	λ	number of call attempts over a specified time interval divided by the duration (ISO 80000-3:2019, item 3-9) of this interval	second to the power of minus one inverse second	s^{-1}	See IEV 715-03-13.
13-8	completed call intensity	μ	call intensity (item 13-7) for the call attempts that result in the transmission of an answer signal	second to the power of minus one inverse second	s^{-1}	For a definition of the complete call attempt, see IEV 715-03-11.

Item No.	Quantity			Unit		Remarks
	Name	Symbol	Definition	Name	Symbol	
13-9	storage capacity, storage size	*M*	amount of data that can be contained in a storage device, expressed as a number of specified data elements	one	1	For the unit one, see the Introduction.
				bit	bit	The specified data elements depend on the organization of the storage device, for example, binary elements (also called "bits"), octets (also called "bytes"), words of a given number of bits, blocks. A subscript referring to a specified data element can be added to the symbol. EXAMPLES: storage capacity for bits, M_{bit} storage capacity for octets, M_o or M_B. For registers, the term "register length" is used with the same meaning. Although in this context the designation "bit", symbol bit, is not really a unit, it is often used like a unit, e.g. M_{bit} = 32 000, where the unit one is implicit, is often written as M = 32 000 bit. Similarly, although the designation octet or byte, symbols o and B, respectively, are not units, they are often used like units, e.g., M_o = 4 000 or M_B = 4 000, where the unit one is implicit, are often written M = 4 000 o or M = 4 000 B. When used to express a storage capacity or an equivalent binary storage capacity, the bit and the octet (or byte) may be combined with SI prefixes or prefixes for binary multiples. In English, the name "byte", symbol B, is used as a synonym for "octet". Here, "byte" means an eight-bit byte. However, "byte" has been used for numbers of bits other than eight. To avoid the risk of confusion, it is strongly recommended that the name "byte" and the symbol B be used only for eight-bit bytes. The symbol B for byte is not international and is not to be confused with the symbol B for bel.
				octet	o	
				byte	B	

Item No.	Quantity			Unit		Remarks
	Name	Symbol	Definition	Name	Symbol	
13-10	equivalent binary storage capacity	M_e	M_e = lb n where n is the number of possible states of the given device	one bit	1 bit	For the unit one, see the Introduction. The minimum storage capacity of a bit-organized storage device which would contain the amount of data in the given storage device is equal to the smallest integer greater than or equal to the equivalent binary storage capacity. When used to express a storage capacity or an equivalent binary storage capacity, the bit may be combined with SI prefixes or prefixes for binary multiples (see Clause 4). In this context, “bit” is a special name as well as symbol for the coherent unit one. For the unit one, see the Introduction.
13-11	transfer rate	r, (v)	quotient of the number of specified data elements transferred in a time interval by the duration of this interval	second to the power of minus one inverse second digit per second octet per second, byte per second	s^{-1} o/s, B/s	The symbol v is the Greek letter nu. A subscript referring to a specified data element can be added to the symbol. EXAMPLES: digit rate, r_d or v_d (see IEV 702-05-23 and IEV 704-16-06); transfer rate for octets (or bytes), r_o, r_B, v_d, or v_B; binary digit rate or bit rate (item 13-13). In English, the name "byte", symbol B, is used as a synonym for "octet". Here "byte" means an eight-bit byte. See remarks in item 13-9. The octet per second (or byte per second) may be combined with prefixes, for example kilooctet per second, symbol ko/s (or kilobyte per second, symbol kB/s).

Item No.	Quantity			Unit		Remarks
	Name	Symbol	Definition	Name	Symbol	
13-12	period of data elements, period duration of data elements	T	$T = 1 / r$ where r is the transfer rate (item 13-11) when the data elements are transmitted in series	second	s	A subscript referring to a specified data element can be added to the symbol. EXAMPLES: period of digits, T_d; period of octets (or bytes), T_o or T_B. For the unit second, see IEV 112-02-04. See IEV 171-06-05.
13-13	binary digit rate, bit rate	r_{bit}, (v_{bit})	transfer rate (item 13-11) where the data elements are binary digits	second to the power of minus one inverse second	s^{-1}	In English, the systematic name would be "transfer rate for binary digits". The bit per second may be combined with prefixes, for example megabit per second, symbol Mbit/s.
				bit per second	bit/s	See IEV 704-16-07.
13-14	period of binary digits, period duration of binary digits, bit period	T_{bit}	$T_{bit} = 1 / r_{bit}$ where r_{bit} is the binary digit rate (item 13-13) when the binary digits are transmitted in series	second	s	See IEV 171-06-06.
13-15	equivalent binary digit rate, equivalent bit rate	r_e, (v_e)	binary digit rate (item 13-13) equivalent to a transfer rate (item 13-11) for specified data elements	second to the power of minus one inverse second	s^{-1}	In English, the systematic name would be "equivalent binary transfer rate". See IEV 704-17-05.
				bit per second	bit/s	
13-16	modulation rate, line digit rate	r_m, u	inverse of the shortest duration of a signal element	second to the power of minus one inverse second	s^{-1}	The term "modulation rate" is used in conventional telegraphy and data transmission. In isochronous digital transmission, the term "line digit rate" is generally used. 1 Bd := s^{-1}
				baud	Bd	Baud is a special name for the second to the power of minus one for this quantity. The baud may be combined with prefixes, for example kilobaud, symbol kBd, megabaud, symbol MBd. See IEV 704-17-03.