International Standard ISO 2955

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Information processing — Representation of SI and other units in systems with limited character sets

Traitement de l'information — Représentation des unités du Système international et d'autres unités dans des systèmes comprenant des jeux de caractères limités

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been authorized has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 2955 was developed by Technical Committee ISO/TC 97, *Information processing systems*, and was circulated to the member bodies in October 1980.

It has been approved by the member bodies of the following countries :

Australia	Ireland	South Africa, Rep. of
Belgium	Italy	Spain
Canada	Japan	Sweden
Cuba	Netherlands	Switzerland
Finland	New Zealand	United Kingdom
France	Poland	USSR
Germany, F. R.	Romania	

No member body expressed disapproval of the document.

This second edition cancels and replaces the first edition (i.e. ISO 2955-1974).

Information processing — Representation of SI and other units in systems with limited character sets

1 Scope and field of application

1.1 This International Standard specifies two sets of representations, for SI units and other internationally recognized units defined in ISO 1000 along with their decimal multiples and sub-multiples formed by the use of prefixes, for use in data interchange by systems with limited graphic character sets.

NOTE — The representations of units as listed in this International Standard are intended for use only in systems with limited graphic character set capabilities. They are not intended to replace the international symbols in other applications. ISO 31 and ISO 1000 provide the approved international symbols.

1.2 The two sets of representations are :

Form I : For systems which have the capability to use both upper and lower case letters (double case), digits, and other graphics, at least the graphical symbols apostrophe ('), quotation mark ("), hyphen (-), full stop or period (.), and solidus (/), but which do not have the capability to use the Greek letters Ω and μ, the degree symbol (°), and letters, digits and signs in the superscript position.

NOTE — The ISO 646 alphabet is an example of such a character set.

Form II : For systems which have the capability to use single-case letters only (either upper or lower), digits, and other graphics, at least the graphical symbols hyphen (-), full stop or period (.), and solidus (/), but which do not have the capability to use the Greek letters Ω and μ, the degree symbol (°), and letters, digits and signs in the superscript position.

NOTE — CCITT alphabet No. 2 is an example of such a character set.

The annex contains a brief description of the International System (SI) of units.

1.3 This International Standard applies to the interchange of information among data processing systems and associated equipment, and within message transmission systems.

It does not apply to printed matter for publication or to other forms of public information transfer. In these cases, the representations of Forms I and II should be replaced by the international symbols in ISO 31 and ISO 1000 or, if these are not available, by the unabbreviated unit names.

2 References

ISO 31, *Quantities, units and symbols.*

ISO 646, *7-bit coded character set for information processing interchange.*

ISO 1000, *SI units and recommendations for the use of their multiples and of certain other units.*

3 Requirements for the representation of units

3.1 Units and prefixes shall be represented as shown in the appropriate columns in tables 1 and 2.

NOTE — These tables also contain the international symbols in ISO 31 and ISO 1000.

3.2 In narrative (free text) data, a space character shall be used to separate the numerical value and the unit representation, for example 10 m, 2 m^2. In formatted data, as in records, the use or non-use is defined in the format description.

3.3 Multiplication of units shall be indicated by a full stop (.) between the representations of units.

Examples

1) Pa.s to designate pascal second, unit of dynamic viscosity.

2) N.m to designate newton metre.

NOTE — The use of the full stop is intended to avoid confusion which could occur between m.N (metre newton) and mN (millinewton) : the use of N.m instead of m.N is an additional safeguard against ambiguity.

3.4 Division of units shall be indicated either by separation of the numerator and the denominator by a solidus (/) or, alternatively, by expressing the denominator with a negative exponent; for example m/s or m.s – 1 for metre per second.

3.5 Positive exponents shall be indicated by the respective numerals without any further sign, directly after the representation of the unit; for example m2 for m^2.

3.6 Negative exponents shall be indicated by a minus sign followed by the respective numeral, both together directly after the representation of the unit; for example m – 3 for m^{-3}.

3.7 Decimal multiples and sub-multiples of units shall be indicated by the combination of a prefix representation from table 2 with the representation of any unit in table 1 except the kilogram, kg. Decimal multiples and sub-multiples for units of mass shall be based on the gram, g.

NOTE — It follows that prefix representations may not stand alone without a unit representation. Thus, T alone stands for tesla not tera.

There shall be no separator or space between the prefix representation and the unit representation. Compound prefixes shall not be used; for example, use nm (nanometre) and not mum (millimicrometre), use mg (milligram) and not ukg (microkilogram).

The combination of prefix representation and unit representation forms a new unit representation which may be raised to a power with positive or negative exponent and which may be combined with other unit representations to form representations for compounds units; for example, cm2 for cm^2, kN/m2 or kN.m – 2 for kN/m^2.

Table 1 — Representations of units

Name of unit	International symbol (common use symbol)	Representation		
		Form I (double case)	Form II (single case lower)	Form II (single case upper)
Base SI units				
metre	m	m	m	M
kilogram	kg	kg	kg	KG
second	s	s	s	S
ampere	A	A	a	A
kelvin	K	K	k	K
mole	mol	mol	mol	MOL
candela	cd	cd	cd	CD
Supplementary SI units				
radian	rad	rad	rad	RAD
steradian	sr	sr	sr	SR
Derived SI units with special names				
hertz	Hz	Hz	hz	HZ
newton	N	N	n	N
pascal	Pa	Pa	pal	PAL
joule	J	J	j	J
watt	W	W	w	W
coulomb	C	C	c	C
volt	V	V	v	V
farad	F	F	f	F
ohm	Ω	Ohm	ohm	OHM
siemens	S	S	sie	SIE
weber	Wb	Wb	wb	WB
tesla	T	T	t	T
henry	H	H	h	H
degree Celsius	°C	Cel	cel	CEL
lumen	lm	lm	lm	LM
lux	lx	lx	lx	LX
becquerel	Bq	Bq	bq	BQ
gray	Gy	Gy	gy	GY
sievert	Sv	Sv	sv	SV
Other units from ISO 1000				
grade (angle)	g(s)*	gon	gon	GON
degree (angle)	°(s)	deg	deg	DEG
minute (angle)	′(s)	′(s)	mnt	MNT
second (angle)	″(s)	″(s)	sec	SEC
litre	l**	l**	l	L
are	a	a	are	ARE
hectare	ha	ha	har	HAR
minute (time)	min	min	min	MIN
hour	h	h	hr	HR
day	d	d	d	D
year	a	a	ann	ANN
gram	g	g	g	G
tonne	t	t	tne	TNE
bar	bar	bar	bar	BAR
poise	P	P	p	P
stokes	St	St	st	ST
electronvolt	eV	eV	ev	EV
atomic mass unit	u	u	u	U
astronomic unit	AU	AU	asu	ASU
parsec	pc	pc	prs	PRS

*(s) indicates symbol is used in the right superscript position (in the position of an exponent).

** The symbol L can be used as an alternative to the symbol l.

Table 2 — Representations of prefixes

Prefix	Factor by which the unit is multiplied	International symbol (common use symbol)	Representation		
			Form I (double case	Form II (single case lower)	(single case upper)
exa	10^{18}	E	E	ex	EX
peta	10^{15}	P	P	pe	PE
tera	10^{12}	T	T	t	T
giga	10^{9}	G	G	g	G
mega	10^{6}	M	M	ma	MA
kilo	10^{3}	k	k	k	K
hecto	10^{2}	h	h	h	H
deca	10^{1}	da	da	da	DA
deci	10^{-1}	d	d	d	D
centi	10^{-2}	c	c	c	C
milli	10^{-3}	m	m	m	M
micro	10^{-6}	µ	u	u	U
nano	10^{-9}	n	n	n	N
pico	10^{-12}	p	p	p	P
femto	10^{-15}	f	f	f	F
atto	10^{-18}	a	a	a	A

Annex

Brief description of the International System (SI) of units

(This annex is based on ISO 1000 and does not form an integral part of this International Standard.)

A.1 The name "Système International d'unités" (International System of Units), with the abbreviation SI, was adopted by the 11th Conférence générale des poids et mesures in 1960.

This system includes three classes of units :

a) base units,

b) supplementary units,

c) derived units,

which together form the coherent system of SI units.

A.2 The International System of Units is based on the following seven base units :

metre (m)	ampere (A)
kilogram (kg)	kelvin (K)
second (s)	mole (mol)
	candela (cd)

as units for the base quantities : length, mass, time, electric current, thermodynamic temperature, amount of substance and luminous intensity.

A.3 The SI units for plane angle and solid angle, the radian (rad) and the steradian (sr) respectively, are supplementary units in the International System of Units. These units are regarded as derived units.

A.4 The expressions for the derived SI units are stated in terms of base units; for example, the SI unit for velocity is metre per second (m/s).

For some of the derived SI units, special names and symbols exist; those approved by the Conférence générale des poids et mesures are listed in table 3.

It may sometimes be advantageous to express derived units in terms of other derived units having special names; for example the SI units of electric dipole moment (A·s·m) is usually expressed as C·m.

A.5 Decimal multiples and sub-multiples of the SI units are formed by means of the prefixes (see 3.7).

Table 3 — Derived SI units with special names

Quantity	Name of SI unit	Symbol	Expressed in terms of basic or derived SI units
Frequency	hertz	Hz	1 Hz = 1 s^{-1}
Force	newton	N	1 N = 1 kg·m/s^2
Pressure and stress	pascal	Pa	1 Pa = 1 N/m^2
Work, energy, quantity of heat	joule	J	1 J = 1 N·m
Power	watt	W	1 W = 1 J/s
Quantity of electricity	coulomb	C	1 C = 1 A·s
Electric potential, potential difference, electromotive force	volt	V	1 V = 1 W/A
Electric capacitance	farad	F	1 F = 1 C/V
Electric resistance	ohm	Ω	1 Ω = 1 V/A
Electric conductance	siemens	S	1 S = 1 $Ω^{-1}$
Magnetic flux	weber	Wb	1 Wb = 1 V·s
Magnetic flux density, magnetic induction	tesla	T	1 T = 1 Wb/m^2
Inductance	henry	H	1 H = 1 Wb/A
Celsius temperature	degree Celsius	°C	1 °C = 1 K
Luminous flux	lumen	lm	1 lm = 1 cd·sr
Illumination	lux	lx	1 lx = 1 lm/m^2
Activity (radioactivity)	becquerel	Bq	1 Bq = 1 s^{-1}
Absorbed dose	gray	Gy	1 Gy = 1 J/kg
Dose equivalent	sievert	Sv	1 Sv = 1 J/kg

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