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International Standard ISO 1000

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

Unités SI et recommandations pour l'emploi de leurs multiples et de certaines autres unités

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (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 set up 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 1000 was developed by Technical Committee ISO/TC 12, *Quantities, units, symbols, conversion factors and conversion tables.*

This second edition was submitted directly to the ISO Council, in accordance with clause 5.10.1 of part 1 of the Directives for the technical work of ISO. It cancels and replaces the first edition (i.e. ISO 1000-1973), which had been approved by the member bodies of the following countries:

Austria	Hungary	Romania
Belgium	India	Sri Lanka
Brazil	Iran	Sweden
Bulgaria	Ireland	Switzerland
Canada	Israel	Thailand
Chile	Italy	Turkey
Denmark	Japan	United Kingdom
Egypt, Arab Rep. of	Netherlands	USA
Finland	New Zealand	USSR
France	Norway	
Germany, F.R.	Portugal	

The member bodies of the following countries had expressed disapproval of the document on technical grounds:

Australia
Czechoslovakia
South Africa, Rep. of

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

ERRATUM

Replace the Erratum published 1981-09-01 by the following :

Page 3

Sub-clause 4.2, examples : Delete "0,003 96 m" and substitute "0,003 94 m".

Page 4

Table 7, column 4, line 12 : Replace "1 u = 1,660 53 × 10^{-27} kg" by "1 u = 1,660 57 × 10^{-27} kg".

Page 6

Quantity No. 3-1.1, column 4, line 3 : Delete "m" and substitute "mg".

Page 9

Quantity No. 5-6.1, column 4, line 1 : Delete "M/V" and substitute "MV".

Page 10

Quantity No. 5-33.1, column 2, line 3 : Insert closing parenthesis after "current".

Page 12

Title of Part 7 : Delete "Acoustic" and substitute "Acoustics".

Contents

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

1 Scope and field of application

This International Standard

a) describes the International System of Units[1] (in clauses 2 and 3);

b) recommends selected decimal multiples and sub-multiples of the SI units for general use and gives certain other units which may be used with the International System of Units (in clauses 4 and 5, and annex A);

c) defines base and supplementary SI units (in annex B).

2 SI Units

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

This system includes three classes of units:

— base units

— supplementary units

— derived units,

which together form the coherent system of SI units.

1) Full information about the International System of Units is given in a publication from the International Bureau of Weights and Measures: *Le Système International d'Unités* (authorized English translations have been published in the United Kingdom through the National Physical Laboratory, and in the United States of America through the National Bureau of Standards).

2.1 Base units

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

Table 1

Quantity	Name of base SI unit	Symbol
length	metre	m
mass	kilogram	kg
time	second	s
electric current	ampere	A
thermodynamic temperature	kelvin	K
amount of substance	mole	mol
luminous intensity	candela	cd

For the definitions of the base units and the supplementary units, see annex B.

2.2 Supplementary units

The Conférence Générale des Poids et Mesures has not classified certain units of the International System under either base units or derived units.

These units, listed in table 2, are called "supplementary units" and may be regarded either as base units or as derived units.[1]

Table 2

Quantity	Name of supplementary SI unit	Symbol
plane angle	radian	rad
solid angle	steradian	sr

2.3 Derived units

Derived units are expressed algebraically in terms of base units and/or supplementary units. Their symbols are obtained by means of the mathematical signs of multiplication and division; for example, the SI unit for velocity is metre per second (m/s) and the SI unit for angular velocity is radian per second (rad/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 tables 3 and 4.

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

Table 3

Quantity	Special name of derived SI unit	Symbol	Expressed in terms of base or supplementary SI units or in terms of other derived SI units
frequency	hertz	Hz	1 Hz = 1 s^{-1}
force	newton	N	1 N = 1 kg·m/s^2
pressure, stress	pascal	Pa	1 Pa = 1 N/m^2
energy, work, quantity of heat	joule	J	1 J = 1 N·m
power	watt	W	1 W = 1 J/s
electric charge, quantity of electricity	coulomb	C	1 C = 1 A·s
electric potential, potential difference, tension, electromotive force	volt	V	1 V = 1 J/C
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}
flux of magnetic induction, 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[2]
luminous flux	lumen	lm	1 lm = 1 cd·sr
illuminance	lux	lx	1 lx = 1 lm/m^2

Table 4 — Derived SI units with special names accepted for the sake of safeguarding human health

Quantity	Special name of derived SI unit	Symbol	Expressed in terms of base units or derived SI units
activity (of a radionuclide)	becquerel	Bq	1 Bq = 1 s^{-1}
absorbed dose, specific energy imparted, kerma, absorbed dose index	gray	Gy	1 Gy = 1 J/kg
dose equivalent	sievert	Sv	1 Sv = 1 J/kg

1) However, in October 1980 the International Committee of Weights and Measures decided to interpret the class of supplementary units in the International System as a class of dimensionless derived units for which the General Conference of Weights and Measures leaves open the possibility of using these or not in expressions of derived units of the International System.

2) For the use of degree Celsius (°C), see note 2 under the definition of kelvin in annex B.

3 Multiples of SI units

The prefixes given in table 5 (SI prefixes) are used to form names and symbols of multiples (decimal multiples and sub-multiples) of the SI units.

The symbol of a prefix is considered to be combined with the single unit symbol[1)] to which it is directly attached, forming with it a new symbol (for a decimal multiple or sub-multiple) which can be raised to a positive or negative power, and which can be combined with other unit symbols to form symbols for compound units.

Examples

$1\ \text{cm}^3$	=	$(10^{-2}\ \text{m})^3$	=	$10^{-6}\ \text{m}^3$
$1\ \mu\text{s}^{-1}$	=	$(10^{-6}\ \text{s})^{-1}$	=	$10^6\ \text{s}^{-1}$
$1\ \text{mm}^2/\text{s}$	=	$(10^{-3}\ \text{m})^2/\text{s}$	=	$10^{-6}\ \text{m}^2/\text{s}$

Compound prefixes shall not be used; for example, write nm (nanometre), never mμm.

NOTE — Because the name of the base unit for mass, kilogram, contains the name of the SI prefix "kilo", the names of the decimal multiples and sub-multiples of the unit of mass are formed by adding the prefixes to the word "gram", e.g. miligram (mg) instead of microkilogram (μkg).

Table 5

Factor	Prefix	Symbol
10^{18}	exa	E
10^{15}	peta	P
10^{12}	tera	T
10^{9}	giga	G
10^{6}	mega	M
10^{3}	kilo	k
10^{2}	hecto	h
10	deca	da
10^{-1}	deci	d
10^{-2}	centi	c
10^{-3}	milli	m
10^{-6}	micro	μ
10^{-9}	nano	n
10^{-12}	pico	p
10^{-15}	femto	f
10^{-18}	atto	a

4 Use of the SI units and their multiples

4.1 The choice of the appropriate multiple (decimal multiple or sub-multiple) of an SI unit is governed by convenience, the multiple chosen for a particular application being the one which will lead to numerical values within a practical range.

4.2 The multiple can usually be chosen so that the numerical values will be between 0,1 and 1000.

Examples

$1{,}2 \times 10^4$ N	can be written as	12 kN
0,003 94 m	can be written as	3,94 mm
1401 Pa	can be written as	1,401 kPa
$3{,}1 \times 10^{-8}$ s	can be written as	31 ns

However, in a table of values for the same quantity or in a discussion of such values within a given context, it will generally be better to use the same multiple for all items, even when some of the numerical values will be outside the range 0,1 to 1000. For certain quantities in particular applications, the same multiple is customarily used; for example, the millimetre is used for dimensions in most mechanical engineering drawings.

4.3 It is recommended that only one prefix be used in forming a multiple of a compound SI unit.

4.4 Errors in calculations can be avoided more easily if all quantities are expressed in SI units, prefixes being replaced by powers of 10.

4.5 Rules for writing unit symbols

4.5.1 Unit symbols should be printed in roman (upright) type (irrespective of the type used in the rest of the text), should remain unaltered in the plural, should be written without a final full stop (period) except for normal punctuation, e.g. at the end of a sentence, and should be placed after the complete numerical value in the expression for a quantity, leaving a space between the numerical value and the unit symbol.

Unit symbols should generally be written in lower case letters except that the first letter is written in upper case when the name of the unit is derived from a proper name.

Examples

m	metre
s	second
A	ampere
Wb	weber

1) In this case, the term "unit symbol" means only a symbol for a base unit, a derived unit with a special name or a supplementary unit; see, however, the note about the base unit kilogram.

4.5.2 When a compound unit is formed by multiplication of two or more units, this may be indicated in one of the following ways:

N·m N.m N m

NOTE — The last form may also be written without a space, provided that special care is taken when the symbol for one of the units is the same as the symbol for a prefix, e.g. mN means millinewton, not metre newton.

When a compound unit is formed by dividing one unit by another, this may be indicated in one of the following ways:

$\frac{m}{s}$, m/s or by writing the product of m and s^{-1}, for example $m \cdot s^{-1}$.

In no case should more than one solidus (as in m/s) on the same line be included in such a combination unless parentheses be inserted to avoid all ambiguity. In complicated cases, negative powers or parentheses should be used.

5 Non SI units which may be used together with the SI units and their multiples

5.1 There are certain units outside the SI which are recognized by the Comité International des Poids et Mesures (CIPM) as having to be retained because of their practical importance (table 6) or for use in specialized fields (table 7).

5.2 Prefixes given in table 5 may be attached to many of the units given in tables 6 and 7; for example, millilitre, ml; megaelectronvolt, MeV. See also annex A, column 6.

5.3 In a limited number of cases, compound units are formed with the units given in tables 6 and 7 together with SI units and their multiples; for example, kg/h; km/h. See also annex A, columns 5 and 6.

Table 6

Quantity	Name of unit	Unit symbol	Definition
time	minute	min	1 min = 60 s
	hour	h	1 h = 60 min
	day	d	1 d = 24 h
plane angle	degree	°	1° = (π/180) rad
	minute	′	1′ = (1/60) °
	second	″	1″ = (1/60) ′
volume	litre	l, L[1)]	1 l = 1 dm^3
mass	tonne	t	1 t = 10^3 kg

1) The two symbols for litre are on an equal footing. The CIPM will, however, before the 18th CGPM make a survey on the development of the use the two symbols in order to see if one of the two may be suppressed. [16th CGPM (1979), Resolution 6]

Table 7

Quantity	Name of unit	Unit symbol	Definition
energy	electronvolt	eV	1 electronvolt is the kinetic energy acquired by an electron in passing through a potential difference of 1 volt in vacuum; 1 eV = 1,602 19 × 10^{-19} J (approximately)
mass of an atom	atomic mass unit	u	1 (unified) atomic mass unit is equal to the fraction 1/12 of the mass of an atom of the nuclide ^{12}C; 1 u = 1,660 53 × 10^{-27} kg (approximately)
length	astronomic unit	AU[1)]	1 AU = 149 597,870 × 10^6 m (adopted value in System of Astronomic Constants, 1979)
	parsec	pc	1 parsec is the distance at which 1 astronomic unit subtends an angle of 1 second of arc; 1 pc = 206 265 AU = 30 857 × 10^{12} m (approximately)
pressure of fluid	bar[2)]	bar	1 bar = 10^5 Pa

1) The unit has no international symbol; AU is the abbreviation of the English name; the abbreviation of the French name is UA.

2) The bar is not mentioned by CIPM in this group of units; in many countries, however, there are special requirements for this unit.

Annex A

Examples of decimal multiples and sub-multiples of SI units and of some other units which may be used

For a number of commonly used quantities, examples of decimal multiples and sub-multiples of SI units, as well as of some other units which may be used, are given in this annex. It is suggested that the selection shown, while not intended to be restrictive, will none the less prove helpful in presenting values of quantities in an identical manner in similar contexts within the various sectors of technology. For some needs (for example, in applications in science and education), it is recognized that greater freedom will be required in the choice of decimal multiples and sub-multiples of SI units than is exemplified in the list which follows.

NOTE — Factors for conversion to SI units from the other units listed are given in the relevant parts of ISO 31.

Item No. in ISO 31	Quantity	SI unit	Selection of multiples of the SI unit	Units outside the SI which are nevertheless recognized by the CIPM as having to be retained either because of their practical importance or because of their use in specialized fields		Remarks, and information about units used in special fields
				Units	Multiples of units given in column 5	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Part 1: **Space and time**						
1-1.1	angle (plane angle)	rad (radian)	mrad µrad	° (degree) ′ (minute) ″ (second)		If the radian is not used, the units degree or grade (or gon) may be used. Decimal subdivisions of degree are preferable to minute and second for most applications. grade (g) or gon, $1^g = 1\ \text{gon} = \frac{\pi}{200}$ rad
1-2.1	solid angle	sr (steradian)				
1-3.1...7	length	m (metre)	km cm mm µm nm pm fm			1 international nautical mile = 1 852 m
1-4.1	area	m^2	km^2 dm^2 cm^2 mm^2			ha (hectare), 1 ha = 10^4 m^2 a (are), 1 a = 10^2 m^2
1-5.1	volume	m^3	dm^3 cm^3 mm^3	l, L[1)] (litre)	hl 1 hl = 10^{-1} m^3 cl 1 cl = 10^{-5} m^3 ml 1 ml = 10^{-6} m^3 = 1 cm^3	In 1964, the Conférence Générale des Poids et Mesures declared that the name litre (l) may be used as a special name for the cubic decimetre (dm^3) and advised against the use of the name litre for high-precision measurements.

1) See table 6.

Item No. in ISO 31	Quantity	SI unit	Selection of multiples of the SI unit	Units outside the SI which are nevertheless recognized by the CIPM as having to be retained either because of their practical importance or because of their use in specialized fields		Remarks, and information about units used in special fields
				Units	Multiples of units given in column 5	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1-6.1	time	s (second)	ks ms µs ns	d (day) h (hour) min (minute)		Other units such as week, month and year (a) are in common use.
1-7.1	angular velocity	rad/s				
1-9.1	velocity	m/s			km/h $1\ \text{km/h} = \frac{1}{3,6}\ \text{m/s}$	1 knot = 0,514 444 m/s
1-10.1	acceleration	m/s^2				
Part 2 : **Periodic and related phenomena**						
2-3.1	frequency	Hz (hertz)	THz GHz MHz kHz			
2-3.2	rotational frequency	s^{-1}		min^{-1}		The designations "revolution per minute" (r/min) and "revolution per second" (r/s) are widely used for rotational frequency in specifications on rotating machinery.[1)]
Part 3 : **Mechanics**						
3-1.1	mass	kg (kilogram)	Mg g mg µg	t (tonne)		
3-2.1	density (mass density)	kg/m^3	Mg/m^3 or kg/dm^3 or g/cm^3	t/m^3 or kg/l	g/ml g/l	For litre, see item 1-5.1.
3-5.1	linear density	kg/m	mg/m			1 tex = 10^{-6} kg/m The unit tex is used for textile filaments.
3-7.1	momentum	kg·m/s				
3-8.1	moment of momentum, angular momentum	$kg{\cdot}m^2/s$				
3-9.1	moment of inertia	$kg{\cdot}m^2$				
3-10.1	force	N (newton)	MN kN mN µN			

1) See also IEC Publication 27-1 (1971).

Item No. in ISO 31	Quantity	SI unit	Selection of multiples of the SI unit	Units outside the SI which are nevertheless recognized by the CIPM as having to be retained either because of their practical importance or because of their use in specialized fields		Remarks, and information about units used in special fields
				Units	Multiples of units given in column 5	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
3-12.1	moment of force	N·m	MN·m kN·m mN·m µN·m			
3-13.1	pressure	Pa (pascal)	GPa MPa kPa mPa µPa	bar[1]	mbar µbar	1 bar = 10^5 Pa
3-13.2	normal stress	Pa or N/m^2	GPa MPa or N/mm^2 kPa			
3-21.1	viscosity (dynamic)	Pa·s	mPa·s			P (poise)[2] 1 cP = 1 mPa·s
3-22.1	kinematic viscosity	m^2/s	mm^2/s			St (stokes)[2] 1 cSt = 1 mm^2/s
3-23.1	surface tension	N/m	mN/m			
3-24.1	energy, work	J (joule)	EJ PJ TJ GJ MJ kJ mJ	eV (electronvolt)	GeV MeV keV	The units W·h, kW·h, MW·h, GW·h and TW·h are used in the field of consumption of electrical energy. The units keV, MeV and GeV are used in atomic and nuclear physics and in accelerator technology.
3-25.1	power	W (watt)	GW MW kW mW µW			
Part 4: **Heat**						
4-1.1	thermodynamic temperature	K (kelvin)				
4-2.1	Celsius temperature	°C (degree Celsius)[3]				The Celsius temperature t is equal to the difference $t = T - T_0$ between two thermodynamic temperatures T and T_0, where T_0 = 273,15 K.
4-1.1 4-2.1	temperature interval	K				For temperature interval, °C may be used instead of K.

1) For the bar, see 5.1 and table 7.

2) Poise and stokes are special names for CGS units. They and their multiples should not be used together with SI units.

3) For the definition and the use of degree Celsius (°C), see note 2 under the definition of kelvin in annex B.

Item No. in ISO 31	Quantity	SI unit	Selection of multiples of the SI unit	Units outside the SI which are nevertheless recognized by the CIPM as having to be retained either because of their practical importance or because of their use in specialized fields		Remarks, and information about units used in special fields
				Units	Multiples of units given in column 5	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
4-3.1	linear expansion coefficient	K^{-1}				For degree Celsius, see footnote 3), page 7.
4-6.1	heat, quantity of heat	J	EJ PJ TJ GJ MJ kJ mJ			
4-7.1	heat flow rate	W	kW			
4-9.1	thermal conductivity	W/(m·K)				For degree Celsius, see footnote 3), page 7.
4-10.1	coefficient of heat transfer	$W/(m^2 \cdot K)$				For degree Celsius, see footnote 3), page 7.
4-14.1	heat capacity	J/K	kJ/K			For degree Celsius, see footnote 3), page 7.
4-15.1	specific heat capacity	J/(kg·K)	kJ/(kg·K)			For degree Celsius, see footnote 3), page 7.
4-17.1	entropy	J/K	kJ/K			
4-18.1	specific entropy	J/(kg·K)	kJ/(kg·K)			
4-20.1	specific internal energy	J/kg	MJ/kg kJ/kg			
—	specific latent heat	J/kg	MJ/kg kJ/kg			
Part 5: **Electricity and magnetism**						
5-1.1	electric current	A (ampere)	kA mA µA nA pA			
5-2.1	electric charge, quantity of electricity	C (coulomb)	kC µC nC pC			1 A·h = 3,6 kC
5-3.1	volume density of charge, charge density	C/m^3	C/mm^3 MC/m^3 or C/cm^3 kC/m^3 mC/m^3 $\mu C/m^3$			

Item No. in ISO 31	Quantity	SI unit	Selection of multiples of the SI unit	Units outside the SI which are nevertheless recognized by the CIPM as having to be retained either because of their practical importance or because of their use in specialized fields		Remarks, and information about units used in special fields
				Units	Multiples of units given in column 5	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
5-4.1	surface density of charge	C/m²	MC/m² or C/mm² C/cm² kC/m² mC/m² μC/m²			
5-5.1	electric field strength	V/m	MV/m kV/m or V/mm V/cm mV/m μV/m			
5-6.1 5-6.2 5-6.3	electric potential potential difference (tension) electromotive force	V (volt)	MV kV mV μV			
5-7.1	electric flux density, displacement	C/m²	C/cm² kC/m² mC/m² μC/m²			
5-8.1	electric flux, (flux of displacement)	C	MC kC mC			
5-9.1	capacitance	F (farad)	mF μF nF pF			
5-10.1	permittivity	F/m	μF/m nF/m pF/m			
5-13.1	electric polarization	C/m²	C/cm² kC/m² mC/m² μC/m²			
5-14.1	electric dipole moment	C·m				
5-15.1	current density	A/m²	MA/m² or A/mm² A/cm² kA/m²			

Item No. in ISO 31	Quantity	SI unit	Selection of multiples of the SI unit	Units outside the SI which are nevertheless recognized by the CIPM as having to be retained either because of their practical importance or because of their use in specialized fields		Remarks, and information about units used in special fields
				Units	Multiples of units given in column 5	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
5-16.1	linear current density	A/m	kA/m or A/mm A/cm			
5-17.1	magnetic field strength	A/m	kA/m or A/mm A/cm			
5-18.1	magnetic potential difference	A	kA mA			
5-19.1	magnetic flux density, magnetic induction	T (tesla)	mT µT nT			
5-20.1	magnetic flux	Wb (weber)	mWb			
5-21.1	magnetic vector potential	Wb/m	kWb/m or Wb/mm			
5-22.1 5-22.2	self inductance mutual inductance	H (henry)	mH µH nH pH			
5-24.1	permeability	H/m	µH/m nH/m			
5-27.1	electromagnetic moment, (magnetic moment)	A·m²				
5-28.1	magnetization	A/m	kA/m or A/mm			
5-29.1	magnetic polarization	T	mT			
(IEC Pub. 27, item 86)	magnetic dipole moment	N·m²/A or Wb·m				
5-33.1	resistance (to direct current)	Ω (ohm)	GΩ MΩ kΩ mΩ µΩ			
5-34.1	conductance (to direct current)	S (siemens)	kS mS µS			

Item No. in ISO 31	Quantity	SI unit	Selection of multiples of the SI unit	Units outside the SI which are nevertheless recognized by the CIPM as having to be retained either because of their practical importance or because of their use in specialized fields		Remarks, and information about units used in special fields
				Units	Multiples of units given in column 5	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
5-35.1	resistivity	Ω·m	GΩ·m MΩ·m kΩ·m Ω·cm mΩ·m µΩ·m nΩ·m			µΩ·cm = 10^{-8} Ω·m $\frac{\Omega \cdot mm^2}{m} = 10^{-6}$ Ω·m = µΩ·m are also used.
5-36.1	conductivity	S/m	MS/m kS/m			
5-37.1	reluctance	H^{-1}				
5-38.1	permeance	H				
5-41.1 5-41.2 5-41.3 5-41.4	impedance (complex impedance) modulus of impedance, (impedance) reactance resistance	Ω	MΩ kΩ mΩ			
5-43.1 5-43.2 5-43.3 5-43.4	admittance (complex admittance) modulus of admittance, (admittance) susceptance conductance	S	kS mS µS			
5-44.1	power	W	TW GW MW kW mW µW nW			In electric power technology, active power is expressed in watts (W), apparent power in voltamperes (V·A) and reactive power in vars (var).
Part 6: **Light and related electromagnetic radiations**						
6-3.1	wavelength	m	µm nm pm			Å (ångström), 1 Å = 10^{-10} m = 0,1 nm = 10^{-4} µm
6-6.1	radiant energy	J				
6-9.1	radiant power, radiant energy flux	W				
6-11.1	radiant intensity	W/sr				
6-12.1	radiance	W/(sr·m^2)				
6.13.1	radiant exitance	W/m^2				