

Directive 2009/3/EC of the European Parliament and of the Council of 11 March 2009 amending Council Directive 80/181/EEC on the approximation of the laws of the Member States relating to units of measurement (Text with EEA relevance)

Article 1

Amendments

Directive 80/181/EEC is hereby amended as follows:

- (1) Article 1(b) shall be replaced by the following:
 - (b) those listed in Chapter II of the Annex only in those Member States where they were authorised on 21 April 1973.;
- (2) Article 2(a) shall be replaced by the following:
 - (a) The obligations arising under Article 1 relate to measuring instruments used, measurements made and indications of quantity expressed in units of measurement.;
- (3) Article 3(2) shall be replaced by the following:
 2. The use of supplementary indications shall be authorised.;
- (4) the following Article shall be inserted:

Article 6b

The Commission shall monitor market developments relating to this Directive and its implementation with regard to the smooth functioning of the internal market and international trade and shall submit a report on those developments, accompanied by proposals where appropriate, to the European Parliament and to the Council by 31 December 2019.;

- (5) the Annex shall be amended as follows:
 - (a) in Chapter I, point 1.1, the paragraph entitled ‘Unit of thermodynamic temperature’ shall be replaced by the following:

Unit of thermodynamic temperature

The kelvin, unit of thermodynamic temperature, is the fraction 1/273,16 of the thermodynamic temperature of the triple point of water.

This definition refers to water having the isotopic composition defined by the following amount-of-substance ratios: 0,00015576 mole of ²H per mole of ¹H, 0,0003799 mole of ¹⁷O per mole of ¹⁶O and 0,0020052 mole of ¹⁸O per mole of ¹⁶O.

(Thirteenth CGPM (1967), resolution 4 and Twenty-third CGPM (2007), resolution 10);
 - (b) in Chapter I, point 1.1.1, the title shall be replaced by the following:

Special name and symbol of the SI derived unit of temperature for expressing Celsius temperature;

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- (c) in Chapter I, point 1.2, the title shall be replaced by the following:
1.2.SI derived units;
- (d) in Chapter I, point 1.2.1 shall be deleted;
- (e) in Chapter I, points 1.2.2 and 1.2.3 shall be replaced by the following:

1.2.2. General rule for SI derived units

Units derived coherently from SI base units are given as algebraic expressions in the form of products of powers of the SI base units with a numerical factor equal to 1.

1.2.3. SI derived units with special names and symbols

Quantity	Unit		Expression	
	Name	Symbol	In terms of other SI units	In terms of SI base units
Plane angle	radian	rad		$m \cdot m^{-1}$
Solid angle	steradian	sr		$m^2 \cdot m^{-2}$
Frequency	hertz	Hz		s^{-1}
Force	newton	N		$m \cdot kg \cdot s^{-2}$
Pressure, stress	pascal	Pa	$N \cdot m^{-2}$	$m^{-1} \cdot kg \cdot s^{-2}$
Energy, work; quantity of heat	joule	J	$N \cdot m$	$m^2 \cdot kg \cdot s^{-2}$
Power ^a , radiant flux	watt	W	$J \cdot s^{-1}$	$m^2 \cdot kg \cdot s^{-3}$
Quantity of electricity, electric charge	coulomb	C		$s \cdot A$
Electric potential, potential difference, electromotive force	volt	V	$W \cdot A^{-1}$	$m^2 \cdot kg \cdot s^{-3} \cdot A^{-1}$
Electric resistance	ohm	Ω	$V \cdot A^{-1}$	$m^2 \cdot kg \cdot s^{-3} \cdot A^{-2}$
Conductance	siemens	S	$A \cdot V^{-1}$	$m^{-2} \cdot kg^{-1} \cdot s^3 \cdot A^2$

^a Special names for the unit of power: the name volt-ampere (symbol “VA”) when it is used to express the apparent power of alternating electric current, and var (symbol “var”) when it is used to express reactive electric power. The “var” is not included in GCPM resolutions.

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Capacitance	farad	F	$C \cdot V^{-1}$	$m^{-2} \cdot kg^{-1} \cdot s^4 \cdot A^2$
Magnetic flux	weber	Wb	$V \cdot s$	$m^2 \cdot kg \cdot s^{-2} \cdot A^{-1}$
Magnetic flux density	tesla	T	$Wb \cdot m^{-2}$	$kg \cdot s^{-2} \cdot A^{-1}$
Inductance	henry	H	$Wb \cdot A^{-1}$	$m^2 \cdot kg \cdot s^{-2} \cdot A^{-2}$
Luminous flux	lumen	lm	$cd \cdot sr$	cd
Illuminance	lux	lx	$lm \cdot m^{-2}$	$m^{-2} \cdot cd$
Activity (of a radionuclide)	becquerel	Bq		s^{-1}
Absorbed dose, specific energy imparted, kerma, absorbed dose index	gray	Gy	$J \cdot kg^{-1}$	$m^2 \cdot s^{-2}$
Dose equivalent	sievert	Sv	$J \cdot kg^{-1}$	$m^2 \cdot s^{-2}$
Catalytic activity	katal	kat		$mol \cdot s^{-1}$

a Special names for the unit of power: the name volt-ampere (symbol “VA”) when it is used to express the apparent power of alternating electric current, and var (symbol “var”) when it is used to express reactive electric power. The “var” is not included in GCPM resolutions.

Units derived from SI base units may be expressed in terms of the units listed in Chapter I.

In particular, derived SI units may be expressed by the special names and symbols given in the above table; for example, the SI unit of dynamic viscosity may be expressed as $m^{-1} \cdot kg \cdot s^{-1}$ or $N \cdot s \cdot m^{-2}$ or $Pa \cdot s$;

- (f) in Chapter II, the following row shall be deleted from the table:

Land registration	acre	$1 \text{ ac} = 4\,047 \text{ m}^2$	ac
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- (g) in Chapter II, the final sentence shall be replaced by the following: ‘The units listed in this Chapter may be combined with each other or with those in Chapter I to form compound units.’