Council of the European Union

Brussels, 19 March 2019
(OR. en)

7685/19

MI 274
ENT 83

COVER NOTE

From:	European Commission
date of receipt:	15 March 2019
To:	General Secretariat of the Council
No. Cion doc.:	D060957/02
Subject:	COMMISSION DIRECTIVE (EU) .../… of XXX amending, for the purpose of its adaptation to technical progress, the Annex to Council Directive 80/181/EEC as regards the definitions of SI base units

Delegations will find attached document D060957/02.

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Encl.: D060957/02

Brussels, XXX
[…](2019) XXX draft

COMMISSION DIRECTIVE (EU) .../…

of XXX

amending, for the purpose of its adaptation to technical progress, the Annex to Council Directive 80/181/EEC as regards the definitions of SI base units

(Text with EEA relevance)

EN   **EN**

COMMISSION DIRECTIVE (EU) .../…

of XXX

amending, for the purpose of its adaptation to technical progress, the Annex to Council Directive 80/181/EEC as regards the definitions of SI base units

(Text with EEA relevance)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Directive 2009/34/EC of the European Parliament and of the Council of 23 April 2009 relating to common provisions for both measuring instruments and methods of metrological control[1], in particular Article 16 thereof,

Whereas:

(1)   Council Directive 80/181/EEC[2] defines the units of measurement to be used in the Union thus enabling to express measurements and indications of quantity in line with the International System of Units (SI), adopted by the General Conference on Weights and Measures (CGPM) set up by the Metre Convention signed in Paris on 20 May 1875.

(2)   Directive 2009/34/EC sets out the general framework for the adoption of separate Directives concerning, amongst others, measuring instruments and their technical requirements, units of measurement and the harmonisation of methods of measurement and metrological control. Article 16 of that Directive envisages that the Commission may amend the annexes to the separate Directives referred to in its Article 1 for the purpose of adaptation to technical progress, including Chapter I of the Annex to Directive 80/181/EEC.

(3)   The CGPM decided, at its 24th meeting in 2011, on a new way of defining the SI based on a set of seven defining constants drawn from the fundamental constants of physics and other constants of nature. This decision was confirmed at the 25th meeting of the CGPM in 2014.

(4)   On the 26th meeting of the CGPM in 2018, new definitions of the SI base units were adopted. The new definitions are based on the new principle of fixed numerical values of the defining constants and will be effective as from 20 May 2019. The new definitions are expected to improve the long-term stability and reliability of the SI base units as well as the accuracy and clarity of measurements.

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[1]   OJ L 106, 28.4.2009, p.7.
[2]   Council Directive 80/181/EEC of 20 December 1979 on the approximation of the laws of the Member States relating to units of measurement and on the repeal of Directive 71/354/EEC (OJ L 39, 15.2.1980, p. 40).

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(5)   The new definitions adopted by the CGPM reflect the latest developments in measurement science and standards. In order to adapt the definitions of the SI base units set out in Directive 80/181/EEC to technical progress and thus contribute to the uniform implementation of the SI, it is necessary to align them with the new definitions.

(6)   Directive 80/181/EEC should therefore be amended accordingly.

(7)   It is necessary to ensure that the new legislation applies as from the same date for all Member States, independently of the date of transposition, so that uniform implementation of Directive 80/181/EEC is in place.

(8)   The measures provided for in this Directive are in accordance with the opinion of the Committee for Adjustment to Technical Progress of the Directives referred to in Article 16 of Directive 2009/34/EC,

HAS ADOPTED THIS DIRECTIVE:

Article 1
Amendment

The Annex to Directive 80/181/EEC is amended in accordance with the Annex to this Directive.

Article 2
Transposition

1.   Member States shall adopt and publish, by … *[9 months from the entry into force of this Directive]* at the latest, the laws, regulations and administrative provisions necessary to comply with this Directive. They shall forthwith communicate to the Commission the text of those provisions.

They shall apply those provisions from … *[10 months from the entry into force of this Directive]*.

When Member States adopt those provisions, they shall contain a reference to this Directive or be accompanied by such a reference on the occasion of their official publication. Member States shall determine how such reference is to be made.

2.   Member States shall communicate to the Commission the text of the main provisions of national law which they adopt in the field covered by this Directive.

Article 3
Entry into force

This Directive shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

This Directive is addressed to the Member States.

Done at Brussels,

For the Commission
The President
Jean-Claude Juncker

In the Annex, Chapter I, section 1.1 is replaced by the following:

"1.1. **SI base units**

Quantity	Unit	
	Name	Symbol
Time	second	s
Length	metre	m
Mass	kilogram	kg
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Amount of substance	mole	mol
Luminous intensity	candela	cd

Definitions of SI base units:

Unit of time

The second, symbol s, is the SI unit of time. It is defined by taking the fixed numerical value of the caesium frequency Δv_{Cs}, the unperturbed ground-state hyperfine transition frequency of the caesium 133 atom, to be 9 192 631 770 when expressed in the unit Hz, which is equal to s^{-1}.

Unit of length

The metre, symbol m, is the SI unit of length. It is defined by taking the fixed numerical value of the speed of light in vacuum c to be 299 792 458 when expressed in the unit m/s, where the second is defined in terms of Δv_{Cs}.

Unit of mass

The kilogram, symbol kg, is the SI unit of mass. It is defined by taking the fixed numerical value of the Planck constant h to be 6.626 070 15 x 10^{-34} when expressed in the unit J s, which is equal to kg m^2 s^{-1}, where the metre and the second are defined in terms of c and Δv_{Cs}.

Unit of electric current

The ampere, symbol A, is the SI unit of electric current. It is defined by taking the fixed numerical value of the elementary charge e to be 1.602 176 634 x 10^{-19} when expressed in the unit C, which is equal to A s, where the second is defined in terms of Δv_{Cs}.

Unit of thermodynamic temperature

The kelvin, symbol K, is the SI unit of thermodynamic temperature. It is defined by taking the fixed numerical value of the Boltzmann constant k to be 1.380 649 x 10^{-23}

when expressed in the unit J K^{-1}, which is equal to kg m^2 s^{-2} K^{-1}, where the kilogram, metre and second are defined in terms of h, c and Δv_{Cs}.

Unit of amount of substance

The mole, symbol mol, is the SI unit of amount of substance. One mole contains exactly 6.022 140 76 x 10^{23} elementary entities. This number is the fixed numerical value of the Avogadro constant, N_A, when expressed in the unit mol^{-1} and is called the Avogadro number.

The amount of substance, symbol n, of a system is a measure of the number of specified elementary entities. An elementary entity may be an atom, a molecule, an ion, an electron, any other particle or specified group of particles.

Unit of luminous intensity

The candela, symbol cd, is the SI unit of luminous intensity in a given direction. It is defined by taking the fixed numerical value of the luminous efficacy of monochromatic radiation of frequency 540 x 10^{12} Hz, K_{cd}, to be 683 when expressed in the unit lm W^{-1}, which is equal to cd sr W^{-1}, or cd sr kg^{-1} m^{-2} s^3, where the kilogram, metre and second are defined in terms of h, c and Δv_{Cs}.

1.1.1. **Special name and symbol of the SI derived unit of temperature for expressing Celsius temperature**

Quantity	Unit	
	Name	Symbol
Celsius temperature	degree Celsius	°C

Celsius temperature t is defined as the difference $t = T - T_0$ between the two thermodynamic temperatures T and T_0 where $T_0 = 273,15$ K. An interval or difference of temperature may be expressed either in kelvins or in degrees Celsius. The unit 'degree Celsius' is equal to the unit 'kelvin'."