



COMMISSION OF THE EUROPEAN COMMUNITIES

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**COMMISSION STAFF WORKING DOCUMENT**

**on units of measurement (Directive 80/181/EEC)**

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## 1. INTRODUCTION

The use of units of measurement is prescribed in the European Union by means of 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<sup>1</sup>. Over time the directive has been updated a number of times, most recently by Directive 99/103/EEC<sup>2</sup>.

Currently there are two reasons to consider a further update of the directive:

- the extension of the SI system at international level
- the end of the period allowed by the directive for indicating supplementary non-SI units in 2009.

In addition there may be other issues which have been experienced during implementation which may benefit from clarification. Examination of alternatives will take place with due regard to simplification and better regulation.

At the end of each of the ten chapters in this document a question of particular importance for the Commission is put. The aim of the consultation is take the views of stakeholders in the widest sense: industry, trade unions, consumers, governments and interested individuals. Stakeholders are invited to bring up any other issues that they consider relevant. All reactions will be published on the website of DG Enterprise and Industry, unless the sender indicates otherwise. Those sending contributions will be sent a notice of the publication of the report on the public consultation. The address to which to send reactions is "[entr-metrology@ec.europa.eu](mailto:entr-metrology@ec.europa.eu)". Deadline is 1 March 2007.

This document has been prepared by the Commission services for consultation purposes. It does not in any way prejudge, or constitute the announcement of, any position on the part of the Commission concerning the issues covered.

## 2. EXTENSION OF THE INTERNATIONAL SI-SYSTEM

The Treaty Organisation, Conférence Général de Poids et Mesures (CGPM), governing the international system (abbreviated as "SI" from the French), has by means of a resolution in 1999 added the unit "katal" to the SI system. In its motivation of the resolution CGPM states that the "katal" has been used during the past 30 years to express catalytic activity in the fields of medicine and biochemistry. It defines "katal" (catalytic activity) as "mole per second". It also notes that in the absence of an international definition within the SI-system, other indications for catalytic activity are being used, either using alternative definitions or using alternative names (the annex contains the text of the CGPM resolution on the "katal").

Annex 1 of the current directive lists all SI units permitted as legal units of measurement in the European Community. It allows the use of the term "mole per second", and both "mol" and "second" are defined in the directive (as SI base units), but it does not mention the "katal"

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<sup>1</sup> OJ No L 39, 15.02.1980, p. 40

<sup>2</sup> OJ No L 34, 09.02.2000, p. 17

(as an SI derived unit having a name and symbol). Member States have either already adapted national law to include the “katal” or are preparing to do so. As long as the directive is not adapted, such changes in national law would strictly speaking need to be treated as infringements, although one could argue that the “katal” can be considered a supplementary indication in the sense of the directive.

The current directive would need to be updated in order to accommodate the extension of the international SI-system to include the “katal”. This change would become necessary if the possibility of a supplementary indication would no longer exist from 2010 onwards.

Stakeholders are requested to answer the following question:

1. Should the “katal” be introduced into Directive 80/181/EEC?

### 3. MULTIPLE INDICATION OF SI UNITS

There may be a need to indicate various SI units on a label. Example is the indication of contents in kilograms and in litres. The directive while prescribing the use of SI units in its Article 1 does not prioritise the use of SI units in any way. This is in some cases taken care of in derived legislation such as the recent proposal on nominal quantities<sup>3</sup> which amends the Aerosols directive requiring only an indication of the content of aerosols in litres. It would seem too complicated to attempt indicating priorities of indications. This should be left to other laws and rules where this is required in order to allow proper functioning of the Internal Market.

Stakeholders are requested to answer the following question:

2. Should the use of SI-indications in specific uses be left to other directives than Directive 80/181/EEC?

### 4. SO-CALLED ARBITRARY UNITS (U)

Arbitrary Units are established by other international organisations, such as WHO, in order to define new elements. Very often such an arbitrary unit defines the concentration of a reference material, for example a concentration of a measured protein complex. These arbitrary units, indicated as “U”, are widely used in many disciplines.

Another example is the “[pH](#)” is a measure of the activity of hydrogen ions ( $H^+$ ) in a solution and, therefore, its acidity or alkalinity<sup>4</sup>. This symbol has been in use for already nearly a century.

Arbitrary units are not in the scope of the directive, which according to its Article 1 concerns legal units of measurement. As long as there is no requirement by means of law of an

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<sup>3</sup> Amendment 12 by the European Parliament accepted by the Commission in COM(2006)171 states: “1. The aerosol dispensers shall indicate the nominal total capacity of the container. The indication shall be such as not to create confusion with the nominal volume of the contents. 2. By way of derogation from Article 8 (1) (e) of Council Directive 75/324/EEC, products which are sold in aerosol dispensers need not be marked with the nominal weight of their contents.”

<sup>4</sup> <http://en.wikipedia.org/wiki/PH>

arbitrary unit as a legal unit, such units can be used as indications. If there would be a legal requirement, however, Article 1 would exclude the use of such arbitrary units. Here again they could then be considered as supplementary indications the possibility of which would no longer exist from 2010 onwards.

Stakeholders are requested to answer the following question:

3. Should arbitrary units be included in Directive 80/181/EEC if supplementary indications are no longer allowed?

## **5. RATIOS (NOT EXPRESSED IN UNITS)**

The first case would be ratios using SI units, for example concentrations expressed as kg/l, mol/l or kat/l. These are mentioned as Compound Units under point 5 of Chapter 1 of the Annex of Directive 80/181.

The second case would be ratios using one or more non-SI, which would currently be considered to be supplementary indications, the use of which would be authorised until the end of 2009.

Stakeholders are requested to answer the following question:

4. Should ratio's be included in Directive 80/181/EEC if supplementary indications are no longer allowed?

## **6. NON-SI UNITS REQUIRED BY INTERNATIONAL TREATIES IN TRANSPORT**

The directive's scope does not extend to the units of measurement used in air, sea and rail transport, which have been laid down in international conventions or other agreements binding the Community or Member States (Article 2b).

Stakeholders are requested to answer the following question:

5. Should the exemption in Article 2b be maintained in Directive 80/181/EEC?

## **7. NON-SI UNITS USED IN TRADITIONAL INDUSTRIES AND IN NEW MARKETS**

In a number of instances non-SI units are used widely in industry. Examples are the ½, ¾ and 1 inch diameter in domestic water piping, the industry standard of a "scoop" for washing powder, the kcal the non-SI variant of kJ and prototype designs made in non-SI units.

Currently the directive allows the use such indications by several means. Article 4 of the Directive exempts products already on the market and replacements for such products. It is in these categories that domestic piping can be placed, although one could say that that this should not apply to completely new piping systems. It doesn't seem that any Member State has made this distinction.

Another way is to allow supplementary markings which are only defined by the directive as not being in the SI family, but not defined more precisely. The exception is the broadest of

exceptions. This allows Kcal and the Scoop for washing powder to be considered as supplementary markings, if they are to be considered legal units of measurement. The end of supplementary marking in 2010 would cause these indications to disappear.

Drawing board design may be conceived in imperial measures while the resulting products may be labelled in SI units. For replacement parts, however, precision may be required and it could be highly dangerous to replace a part that has not been calibrated to the measurements used in the original design. If it concerns existing products Article 4 would apply, but not for new design. New designs should therefore be in SI units.

New products are often marketed in the tradition of where they were first developed. The size of computer screens is indicated in inches, while for televisions, even of the plasma type, both inches and centimetres are used. As it concerns new products it does not seem that Article 4 is applicable. One could also contend that the size of neither type of screen is a legal unit, although it would seem to become so in the case of public procurement. The size of computer screens should under the current directive be stated in SI-units.

In informatics and computing binary measures, such as pixels, bits and bytes, are not SI-measures but are continuously used in public procurement and sales to the public.

Stakeholders are requested to answer the following question:

6. Should indications specific to certain sectors be included in Directive 80/181/EEC?

## **8. DATE OF SUPPLEMENTARY INDICATIONS IN NON-SI UNITS**

The use of supplementary indications in non-SI units are authorised by Article 3.1 of the Directive. There is no definition of what constitutes such an indication, other than that it is not in the SI-system. The exception is therefore the broadest possible and allows to cover a host of indications as mentioned in the points above.

The use of supplementary indications is authorised until the end of 2009. The consideration for extending the period was given in the 4<sup>th</sup> consideration of Directive 99/103/EEC:

Certain third countries do not accept on to their market products marked exclusively in the legal units established by Directive 80/181/EEC; companies exporting their products to these countries will be disadvantaged if supplementary indications are disallowed after 31 December 1999; supplementary indications in non-legal units should therefore be authorised for a further period.

The third country is the United States, where although metric labelling is the declared aim of policy for 150 years, metric-only labelling is prohibited for products covered by federal law and those in 4 states. To the credit of the US state authorities there has been a large increase in states that accept metric-only labeling in the United States. The 2009 deadline has therefore frequently been quoted by US authorities.

It would seem that to maintain an incentive for the US to adapt its federal legislation to allow metric only labelling should be welcomed. It saves producers all over the world from needing to relabel their products for the US market. The 2009 deadline has worked for state authorities so a deadline a bit further in time could work for the federal authorities.

The sanction of a clear deadline at a certain date, enticing as it may seem, would, however, backfire if really carried out. A metric-only EU would force US exporters to relabel all products they export to the EU. This would be a strange way of thanking the US for adapting their state and federal laws to conform to international standards. By requiring metric-only labeling the EU would be imposing a new barrier on trade to products from the US.

It would seem that there is reason to indefinitely extend the period of allowing supplementary markings on products on the EU market. This would allow all imports marked with the correct SI-marking to circulate freely on the EU market. It would not lead to higher costs than is currently the case.

It should, however, be stressed that supplementary marking need in no way be correct. There is no base in the current directive allowing Member States to require that supplementary indications be correct. There is even no base for Member States to limit the use of supplementary markings in any way. It is well known that the US fluid ounce does not equal the old UK imperial fluid ounce.

Supplementary indications have allowed for use within the EU of indications which are non-SI, such as the 'kilocalorie', which is virtually always used next to the equivalent SI-unit Joule. It is, therefore, not only an issue of cross-Atlantic relevance.

Stakeholders are requested to answer the following question:

7. Should the use of supplementary indications in Article 3 in Directive 80/181/EEC be able to continue?

## **9. SCOPE OF THE DIRECTIVE**

Before embarking on the alternatives it is useful to examine the exact scope of the directive which concerns according to article 1 "the legal units of measurements used for expressing quantities".

The second consideration of the directive explains the legal unit of measurement as being a very wide concept, but limited in the sense that it concerns those units that are subject to rules for their use:

Whereas units of measurement are essential in the use of all measuring instruments, to express measurements or any indication of quantity; whereas units of measurement are used in most fields of human activity; whereas it is necessary to ensure the greatest possible clarity in their use; whereas it is therefore necessary to make rules for their use within the Community for economic, public health, public safety or administrative purposes;

The third consideration points to the exemption of international transport:

Whereas, however, there exist international conventions or agreements in the field of international transport which bind the Community or the Member States; whereas these conventions or agreements have to be respected;

The fourth consideration pinpoints the motivation for the EC legislation in the matter as being barriers to trade:

Whereas the laws which regulate the use of units of measurement in the Member States differ from one Member State to another and as a result hinder trade; whereas, in these circumstances, it is necessary to harmonize laws, regulations and administrative provisions in order to overcome such obstacles;

At the time of the inception of the Directive (1980) the UK and Ireland were not yet metric. Currently both the UK and Ireland are fully metric, the only exception being the four exemptions<sup>5</sup>.

Stakeholders are requested to answer the following question:

8. Do market operators face any problems with the current system?

## 10. STAKEHOLDER CONSULTATION

Stakeholders are invited to give their comments on whether

9. all issues and alternatives concerning Directive 80/181/EEC have been highlighted in the above text

10. and to indicate any costs and benefits that they expect to have as a result of any of the alternatives.

Deadline for comments is **1 March 2007**.

Views of stakeholders may be sent to:

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<sup>5</sup> Road traffic signs, distance and speed measurement (miles, yards and inches); dispense of draught beer and cider and milk in returnable containers (pint); land registration (acre); transactions in precious metals (troy ounce). Ireland has changed its road traffic signs, distance and speed measurement to metrics on 1 January 2005.

## ANNEX

### **Resolution 12 of the 21<sup>st</sup> CGPM (1999)**

The 21st Conférence Générale des Poids et Mesures,

#### **considering**

- the importance for human health and safety of facilitating the use of SI units in the fields of medicine and biochemistry,
- that a non-SI unit called "unit", symbol U, equal to  $1 \mu\text{mol} \cdot \text{min}^{-1}$ , which is not coherent with the SI, has been in widespread use in medicine and biochemistry since 1964 for expressing catalytic activity,
- that the absence of a special name for the SI coherent derived unit mole per second has led to results of clinical measurements being given in various local units,
- that the use of SI units in medicine and clinical chemistry is strongly recommended by the international unions in these fields,
- that the International Federation of Clinical Chemistry and Laboratory Medicine has asked the Consultative Committee for Units to recommend the special name katal, symbol kat, for the SI unit mole per second,
- that while the proliferation of special names represents a danger for the SI, exceptions are made in matters related to human health and safety (15th General Conference, 1975, Resolutions 8 and 9, 16th General Conference, 1979, Resolution 5),

**noting** that the name katal, symbol kat, has been used for the SI unit mole per second for over thirty years to express catalytic activity,

**decides** to adopt the special name katal, symbol kat, for the SI unit mole per second to express catalytic activity, especially in the fields of medicine and biochemistry,

and **recommends** that when the katal is used, the measurand be specified by reference to the measurement procedure; the measurement procedure must identify the indicator reaction.

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Reference:

*Comptes rendus de la 21<sup>e</sup> CGPM (1999), 2001, 334*

*Metrologia*, **37**, 1, 95