

**TEXT OF THE RESOLUTIONS ADOPTED BY THE
23rd GENERAL CONFERENCE
ON WEIGHTS AND MEASURES
(2007)**

List of the Resolutions:

- 1 On the initiatives taken to strengthen the collaboration between National Metrology Institutes and recognized National Accreditation Bodies
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■ **On the initiatives taken to strengthen the collaboration between National Metrology Institutes and recognized National Accreditation Bodies**

Resolution 1

The 23rd General Conference,

noting the initiative by the International Committee for Weights and Measures (CIPM) and the International Laboratory Accreditation Cooperation (ILAC) to address the concerns raised in Resolution 11 of the 22nd General Conference on the importance of a close technical relationship between the staff of National Metrology Institutes and recognized National Accreditation Bodies,

welcomes

- the joint statement by the CIPM and the ILAC on the role and responsibilities of National Metrology Institutes and recognized National Accreditation Bodies,
- the regular meetings now taking place internationally, regionally and nationally to strengthen the relationship,
- the work of the International Bureau of Weights and Measures (BIPM) and the ILAC to identify areas of collaboration between the two bodies so as to strengthen the integrity of traceable measurements worldwide with the aim of benefiting users of the world metrology system,

recommends Member States to take note of the joint statement and to adapt it to their national situation,

invites the BIPM and the ILAC to pursue further initiatives to enhance their cooperation and regular dialogue.

■ **On the report of the International Committee to the General Conference on Evolving Needs for Metrology in Trade, Industry and Society, and the Role of the International Bureau of Weights and Measures (BIPM)**

Resolution 2

The 23rd General Conference,

considering

- Resolution 5 of the 22nd General Conference which noted the report on the long-term needs related to metrology, and which invited the International Committee to keep a careful watch on the increasing demands placed on National Metrology Institutes and the BIPM in relation to evolving needs,
- the request of the 22nd General Conference to the International Committee to report to the 23rd General Conference on the adequacy of the response of the BIPM to meet these needs, together with any financial and programme implications there may be in meeting such international needs through the activities of the BIPM, and to update its 2003 Report,

notes

- the continuing rise of requirements for improved measurement standards; for adoption of metrological concepts in new areas; and for an increase in national and international resources to address such issues,
- the relevance of metrology to trade, innovation and emerging technologies,
- the initiatives taken by the BIPM and the Consultative Committees of the International Committee to liaise, and collaborate, with an increasing number of intergovernmental organizations and international bodies with responsibilities in areas such as environment and climate change, health, food, drugs, and forensic work,
- that as a result of this collaboration, there has been an expansion of the impact and influence of the scientific and technical activities carried out under the auspices of the Metre Convention,

welcomes

- the updated report “Evolving Needs for Metrology in Trade, Industry and Society, and the Role of the BIPM”, presented to the 23rd General Conference,
- the initiatives taken by the International Committee to address the issues of traceability in materials metrology,
- proposals to address a number of these evolving needs in the BIPM programme of work,

thanks the many organizations and individuals who contributed to the report of the International Committee, and

invites

- the International Committee, Member States, and National Metrology Institutes to support initiatives to intensify the impact of concepts such as traceability to the International System of Units, and uncertainty of measurement into as many areas of economic and societal activity as possible,
- the International Committee to identify the highest priorities for improved metrology in areas such as nanotechnology, biosciences, medicine, food and environmental measurements and to prepare proposals for initiatives to be taken by the BIPM at the international level,

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- National Metrology Institutes to address evolving needs and to note the liaison and other work of the BIPM at the intergovernmental and international level so as to develop the collaborations necessary to pursue them at a national level,
- the International Committee to report to the next General Conference on the adequacy of the response of the BIPM to meet these needs and to consider whether they have implications for the coordination or the laboratory work of the BIPM and to come forward, if necessary, to the 24th General Conference with proposals in the BIPM programme of work for 2013-2016,
- the International Committee to continue to report to subsequent General Conferences on evolving needs in metrology.

■ **Dotation of the International Bureau of Weights and Measures (BIPM) for the years 2009 to 2012**

Resolution 3

The 23rd General Conference,

considering

- the increased importance of the work of the BIPM to facilitate international trade and industrial innovation, to the assessment of climate change and human health, and the nutritional content and safety of food in all Member States,
- the record of the BIPM as a scientifically expert body which reacts to the needs of Member States,
- the broadened responsibilities contained in the programme of work for 2005-2008 and which would be further broadened in the proposed 2009-2012 programme of work,
- the way in which the BIPM continues to adopt best management practice and improve the efficiency and effectiveness of its staff,
- the difficulty of the BIPM, for financial reasons, to recruit an adequate number of staff to meet programme goals presented to Member States,
- the initiatives taken by the BIPM to attract a greater number of its staff through secondments and fixed-term contracts or other short-term arrangements,
- that the BIPM's financial reserves need to be at a level which ensures that the BIPM can operate with adequate financial security in a changing world,
- the overall impact of previous financial and other decisions by the CGPM on the BIPM's budget,

thanks those Member States and their National Metrology Institutes (NMIs) who have supported the work of the BIPM through a variety of voluntary contributions,

notes that some Member States and NMIs have already expressed their firm intention to make voluntary contributions to support the programme of work of the BIPM,

urges NMIs to continue to provide their voluntary support, of all kind, to the BIPM at least at the level of their 2005-2008 contributions,

further urges Member States, as well as international organizations, private organizations and foundations also to provide additional voluntary financial and other support,

invites the CIPM to present, to the 24th CGPM, options for addressing the needs for dosimetry comparisons and calibrations using a linear accelerator,

decides that the fixed part of the annual dotation of the BIPM will be increased in such a way that the fixed part and the complementary part (defined in Article 6, 1921, of the Rules annexed to the Metre Convention (1875)) shall, for those States that are parties to the Metre Convention at the time of the 23rd General Conference be:

10 540 000 euros in 2009
10 751 000 euros in 2010
10 966 000 euros in 2011
11 185 000 euros in 2012,

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and further decides to support the increasing workload of the BIPM by an additional discretionary contribution of:

407 000 euros in 2009
415 000 euros in 2010
423 000 euros in 2011
431 000 euros in 2012,

requests Member States to declare to the BIPM, as soon as possible, their intention to pay their share of this discretionary contribution,

and requests the Director and the CIPM to prioritize the activities proposed in the programme of work in light of the dotation agreed by the CGPM.

■ **On the relevance to trade of the CIPM Mutual Recognition Arrangement, and other related Arrangements**

Resolution 4

The 23rd General Conference,

considering

- that in order to facilitate trade, it is necessary to reduce or eliminate barriers which may exist as a result of a lack of equivalence of the realization of the International System of Units at a national level,
- that the CIPM Mutual Recognition Arrangement, the Arrangement of the International Laboratory Accreditation Cooperation (ILAC) and the Mutual Acceptance Arrangement of the International Organization of Legal Metrology (OIML) complement each other and support a uniform worldwide metrology system,
- the role of the Technical Barriers to Trade Committee (TBT) of the World Trade Organization (WTO) and the mutual benefit which would be achieved through a joint activity to address traceability issues,

noting and welcoming

- the initiatives taken by the International Committee to respond to Resolution 6 of the 22nd General Conference on the importance of the CIPM Mutual Recognition Arrangement,
- the signature by the International Bureau of Weights and Measures (BIPM) of a common statement which promotes the use of the CIPM Mutual Recognition Arrangement, the Mutual Acceptance Arrangement of the OIML and the ILAC Arrangement, which was drawn up by these three bodies and which was transmitted to intergovernmental organizations, international bodies, and to bodies whose work is influenced by these Arrangements,
- the positive responses received from a number of bodies to whom the joint statement was sent,

and further noting that the long-standing application made by the BIPM for observer status at the WTO Committee on TBT has still not received a favourable response,

requests Member States to address any impediments to the acceptance of this application as soon as possible.

■ **On Associate States of the General Conference**

Resolution 5

The 23rd General Conference,

considering

- Resolution 3 of the 21st General Conference,
- that the status of Associate State should be a possible first step to accede to the Metre Convention,
- the technical and economic benefits gained by Associates,
- the level of the financial subscription of the Associates in relation to these activities and benefits,
- the increasing costs to Member States of the participation of Associates in the CIPM MRA and in some elements of the work of Consultative Committees,

invites the International Committee to draw up criteria which would enable it to review whether it would be appropriate for an Associate to become a Member State and to report to the 24th General Conference on any changes to the conditions regarding the status of Associate,

decides

- that the International Committee will review the situation of each Associate State five years after its admission as an Associate with a view to encouraging it to accede to the Metre Convention,
- that an application to become an Associate of the CGPM will not be considered from States which were previously a State party to the Metre Convention, and
- that an Associate State which accedes to the Metre Convention will pay an entrance fee from which its subscriptions paid as Associate of the CGPM, will be deducted, up to a maximum of five years subscription.

■ **On the acceptance of Economies as Associates of the General Conference**

Resolution 6

The 23rd General Conference,

considering

- Resolution 3 of the 21st General Conference,
- the discussions at the 22nd General Conference concerning the admission of formal regional economic cooperations as Associate Economies of the General Conference,
- that the Associate status has been granted to such an Economy,
- the desirability of setting criteria against which such applications be assessed,

decides

- that the International Committee shall develop criteria against which applications from Economies to become Associates of the CGPM should be assessed and to submit these criteria for approval to the next CGPM,
- that no further Economies shall become Associates of the CGPM until these criteria are approved by the CGPM.

■ **On the importance of promoting the work carried out under the Metre Convention to encourage more States to accede to the Metre Convention or become Associates of the General Conference**

Resolution 7

The 23rd General Conference,

considering

- that, in 1999, at its 21st meeting, the General Conference created the category of Associate of the General Conference for States which did not then accede to the Metre Convention and for Economies to facilitate the participation in the CIPM Mutual Recognition Arrangement (CIPM MRA) by States that might have an initial difficulty in allocating sufficient funds to meet the cost of acceding to the Metre Convention,
- the increasing number of States in development and States in transition that have become Associates of the General Conference,
- that it is in the interest of all States and Economies to establish links through their coordinating National Metrology Institute (NMI) to the world's measurement system organized and coordinated under the auspices of the Metre Convention,
- that there remain however a large number of States that find difficulties in accomplishing the formalities and paying the subscription required to become an Associate,
- that it is in the interest of all States and Economies to reduce, and to avoid, technical barriers to trade by becoming signatories to the CIPM MRA,
- that the Member States wish to create a simple, all inclusive, and cost-effective way to establish such links and to encourage these States to accede to the Metre Convention or become Associates of the General Conference,

recalling Resolution 4 of the 22nd CGPM on the value and benefits of the Metre Convention for the Member States and for Associates of the General Conference, and which invites Member States to promote wider membership,

welcomes the work of the Regional Metrology Organizations (RMOs) in promoting among their members the accession to the Metre Convention and the status of Associate of the CGPM,

decides

- that the BIPM should undertake a limited outreach activity to alert NMIs of States in development and in transition to the benefit of becoming a Member State or an Associate of the CGPM,
- that the BIPM shall set a policy open to the NMIs of those States which did neither accede to the Metre Convention nor become Associates of the General Conference, giving access to information related to the activities of the BIPM and enabling them to participate in seminars or meetings initiated, organized, or supported by the BIPM and which are dedicated to those States which address issues such as the international recognition of national metrology infrastructures, and encouraging those States and their NMIs to participate in RMOs,
- that an NMI wishing to take advantage of this policy may do so by application to the Director of the BIPM,
- that such an NMI shall be encouraged to work with the appropriate authorities in its State to accede to the Metre Convention or to become an Associate of the General Conference.

■ **On financial arrears of Member States**

Resolution 8

The 23rd General Conference,

recalling that Article 6 al. 6 to 8 of the Rules annexed to the Metre Convention reads:

- “6. Si un État est demeuré trois années sans effectuer le versement de sa contribution, celle-ci est répartie entre les autres États, au prorata de leurs propres contributions. Les sommes supplémentaires, versées ainsi par les États pour parfaire le montant de la dotation du Bureau, sont considérées comme une avance faite à l’État retardataire, et leur sont remboursées si celui-ci vient à acquitter ses contributions arriérées.*
7. *Les avantages et prérogatives conférés par l’adhésion à la Convention du Mètre sont suspendus à l’égard des États déficitaires de trois années.*
8. *Après trois nouvelles années, l’État déficitaire est exclu de la Convention, et le calcul des contributions est rétabli conformément aux dispositions de l’article 20 du présent Règlement. ”*

and Article 11 of the Metre Convention reads:

- “11. Les Gouvernements qui useraient de la faculté, réservée à tout État, d’accéder à la présente Convention, seront tenus d’acquitter une contribution dont le montant sera déterminé par le Comité sur les bases établies à l’article 9, et qui sera affectée à l’amélioration du matériel scientifique du Bureau. ”*

considering

- the importance of the work carried out by the International Bureau of Weights and Measures (BIPM) and the services delivered to Member States,
- the absolute necessity that contributions of Member States be paid timely and consistently to allow the BIPM to fulfil its mission and to avoid financial problems in the day-to-day operation of the BIPM,
- the need to define the decision-making process and a procedure governing the recovery of arrears and exclusion,

invites Member States which have failed to fulfil their financial obligations to pay their outstanding arrears,

decides that:

- when a Member State has not paid its contributions for six years, the International Committee for Weights and Measures (CIPM) shall send to the defaulting Member State a formal notification inviting it to fulfil its financial obligations and reminding it of the procedure governing the recovery of arrears and exclusion. Such a notification shall be sent no later than nine months before the next meeting of the General Conference on Weights and Measures (CGPM),
- the CIPM may enter into a rescheduling agreement with that defaulting Member State for the payment of its arrears,
- if, further to the above-mentioned notification, a Member State persists in its failure to fulfil its financial obligations or does not perform its obligations under an agreement with the CIPM, the latter shall recommend to the CGPM to take a decision with regard to the exclusion of that State in accordance with Article 6 al. 8 of the Rules annexed to the Metre Convention,
- the exclusion shall be notified by the CGPM to that Member State through the French Ministry of Foreign Affairs, which shall accordingly inform all Member States,

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- an excluded Member State may only again accede to the Metre Convention if its remaining arrears have been paid. Pursuant to Article 11 of the Metre Convention, that Member State shall pay an entrance contribution equal to its first annual contribution,
- a Member State which withdraws may only again accede to the Metre Convention if its remaining arrears have been paid. Pursuant to Article 11 of the Metre Convention, that Member State shall pay an entrance contribution equal to its first annual contribution.

■ **On the revision of the *mise en pratique* of the definition of the metre and the development of new optical frequency standards**

Resolution 9

The 23rd General Conference,

considering that:

- there have been rapid and important improvements in the performance of optical frequency standards,
- femtosecond comb techniques are now used routinely for relating optical and microwave radiations at a single location,
- National Metrology Institutes (NMIs) are working on comparison techniques for optical frequency standards over short distances,
- remote comparison techniques need to be developed at an international level so that optical frequency standards can be compared,

welcomes

- the activities of the Joint Working Group of the Consultative Committee for Length and the Consultative Committee for Time and Frequency to review the frequencies of optically-based representations of the second,
- the additions to the *mise en pratique* of the definition of the metre and to the list of recommended radiations made by the International Committee in 2002, 2003, 2005, 2006, and 2007,
- the initiative taken by the International Bureau of Weights and Measures (BIPM) to raise the issue of how to compare optical frequency standards,

recommends that:

- NMIs commit resources to the development of optical frequency standards and their comparison,
- the BIPM works toward the coordination of an international project with the participation of NMIs, oriented to the study of the techniques which could serve to compare optical frequency standards.

■ **Clarification of the definition of the kelvin, unit of thermodynamic temperature**

Resolution 10

The 23rd General Conference,

considering

- that the kelvin, unit of thermodynamic temperature, is defined as the fraction $1/273.16$ of the thermodynamic temperature of the triple point of water,
- that the temperature of the triple point depends on the relative amount of isotopes of hydrogen and oxygen present in the sample of water used,
- that this effect is now one of the major sources of the observed variability between different realizations of the water triple point,

notes and welcomes the decision by the International Committee for Weights and Measures in October 2005, on the advice of the Consultative Committee for Thermometry, that

- the definition of the kelvin refers to water of a specified isotopic composition,
- this composition be:

0.000 155 76 mole of ^2H per mole of ^1H ,

0.000 379 9 mole of ^{17}O per mole of ^{16}O , and

0.002 005 2 mole of ^{18}O per mole of ^{16}O ,

which is the composition of the International Atomic Energy Agency reference material Vienna Standard Mean Ocean Water (VSMOW), as recommended by the International Union of Pure and Applied Chemistry in “Atomic Weights of the Elements: Review 2000”,

- this composition be stated in a note attached to the definition of the kelvin in the SI Brochure as follows:

“This definition refers to water having the isotopic composition defined by the following amount-of-substance ratios: 0.000 155 76 mole of ^2H per mole of ^1H , 0.000 379 9 mole of ^{17}O per mole of ^{16}O and 0.002 005 2 mole of ^{18}O per mole of ^{16}O ”.

■ **On the importance of SI traceable measurements to monitor climate change**

Resolution 11

The 23rd General Conference,

recalling Resolution 4 of the 21st General Conference on Weights and Measures (1999) concerning the need to use SI units in studies of earth resources, the environment, human well-being and related issues,

considering

- the expansion in the number of international and national initiatives to address the challenges and implications of climate change for the world,
- working arrangements between the CIPM and the World Meteorological Organization (WMO),
- the increasing importance of optical radiation measurements and physico-chemical measurements of air, ground-based as well as air-borne, and physico-chemical measurements of ocean water, which support research into the understanding of the causes and impacts of climate change,
- the importance of basing long-term measurements which relate to climate change on the stable references of the International System of Units (SI),

welcomes the proposed BIPM/WMO international conference to address the increasing important role of metrology in studies on global climate change,

recommends relevant bodies to take steps to ensure that all measurements used to make observations which may be used for climate studies are made fully traceable to SI units,

and further recommends appropriate funding bodies to support the development of techniques which can make possible a set of SI-traceable radiometric standards and instruments to allow such traceability to be established in terrestrial and space based measurements.

■ **On the possible redefinition of certain base units of the International System of Units (SI)**

Resolution 12

The 23rd General Conference,

considering

- that, for many years, National Metrology Institutes (NMIs) as well as the International Bureau of Weights and Measures (BIPM) have made considerable efforts to advance and improve the International System of Units (SI) by extending the frontiers of metrology so that the SI base units could be defined in terms of the invariants of nature – the fundamental physical constants,
- that, of the seven base units of the SI, only the kilogram is still defined in terms of a material artefact – the international prototype of the kilogram (2nd CGPM, 1889, 3rd CGPM, 1901) and that the definitions of the ampere, mole and candela depend on the kilogram,
- Resolution 7 of the 21st General Conference (1999) which recommended that “national laboratories continue their efforts to refine experiments that link the unit of mass to fundamental or atomic constants with a view to a future redefinition of the kilogram”,
- the many advances, made in recent years, in experiments which relate the mass of the international prototype to the Planck constant h or the Avogadro constant N_A ,
- initiatives to determine the value of a number of relevant fundamental constants, including work to redetermine the Boltzmann constant k_B ,
- that as a result of recent advances, there are significant implications for, and potential benefits from, redefinitions of the kilogram, the ampere, the kelvin and the mole,
- Recommendation 1 of the International Committee (C1-2005) at its meeting in October 2005, and various Recommendations of Consultative Committees on the subject of a redefinition of one or more of the base units of the SI,

noting

- that any changes in definitions of units of the SI must be constrained by self-consistency,
- that it is desirable that definitions of the base units should be easily understood,
- the work of the International Committee and the Consultative Committees,
- the need to monitor the results of relevant experiments,
- the importance of soliciting comments and contributions from the wider scientific and user communities, and
- the decision of the International Committee in 2005 to approve, in principle, the preparation of new definitions of the kilogram, ampere, kelvin and the possibility of redefining the mole,

recommends that National Metrology Institutes and the BIPM

- pursue the relevant experiments so that the International Committee can come to a view on whether it may be possible to redefine the kilogram, the ampere, the kelvin, and the mole using fixed values of the fundamental constants at the time of the 24th General Conference (2011),

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- should, together with the International Committee, its Consultative Committees, and appropriate working groups, work on practical ways of realizing any new definitions based on fixed values of the fundamental constants, prepare a *mise en pratique* for each of them, and consider the most appropriate way of explaining the new definitions to users,
- initiate awareness campaigns to alert user communities to the possibility of redefinitions and that the technical and legislative implications of such redefinitions and their practical realizations be carefully discussed and considered,

and **requests** the International Committee to report on these issues to the 24th General Conference in 2011 and to undertake whatever preparations are considered necessary so that, if the results of experiments are found to be satisfactory and the needs of users met, formal proposals for changes in the definitions of the kilogram, ampere, the kelvin and mole can be put to the 24th General Conference.