

Dear Reader,



Welcome to the first issue of the KCDB Newsletter.

[Introduction from the Director of the BIPM, Prof. Andrew Wallard](#)

Participation in the CIPM MRA

In 1999, the International Committee for Weights and Measures (CIPM) drew up an arrangement for the mutual recognition of national measurements standards, and of calibration and measurement certificates issued by National Metrology Institutes (NMIs): the [CIPM MRA](#) (Mutual Recognition Arrangement).

On 14 October 1999, the directors of NMIs of 38 Member States of the Metre Convention and representatives of two international organizations signed the CIPM MRA.

This arrangement for mutual recognition has now been signed by the representatives of 59 institutes - from 44 Member States, 13 Associates of the General Conference on Weights and Measures (CGPM), and two international organizations - and covers a further 85 institutes designated by the signatory or other appropriate official bodies for specific services that they do not deliver themselves.

[Full list of signatories](#)

Information available from the KCDB Website

The BIPM key comparison database ([KCDB](#)) supports the CIPM MRA and is maintained by the BIPM. The KCDB website is a unique tool which serves as an important reference for users in the regulatory, accreditation and industrial sectors.

It provides users with searchable information in Appendix B and Appendix C.

[Appendix B of the KCDB](#) maintains records of international (key and supplementary) comparisons selected and managed by the Consultative Committees (CCs) of the CIPM and by Regional Metrology Organizations (RMOs).

Results of key comparisons are interpreted in terms of equivalence and published via the KCDB after formal approval by the appropriate CC. These results together with other information support the Appendix C data.

[Key comparison process flowchart](#)

[Appendix C of the KCDB](#) lists Calibration and Measurement Capabilities (CMCs) accepted by the participating institutes of the CIPM MRA. The CMC data is peer-reviewed through intra- and inter-regional examination, and formally approved by the Joint Committee of the RMOs and the BIPM ([JCRB](#)) prior to publication in the KCDB.

The acceptance and publication of these peer-reviewed CMCs means that all participating institutes recognize each other's technical capabilities. They are also encouraged to include the JCRB recognition statement on their calibration certificates.

[Certificate statement](#)

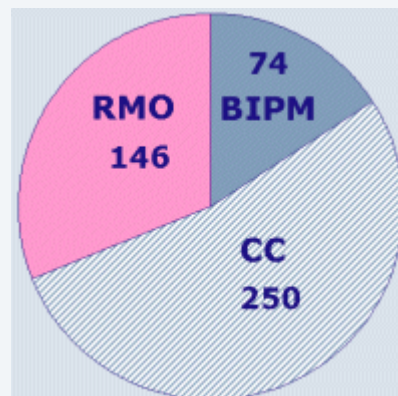
Current status of key comparisons

Since the launch of the KCDB, 470 key comparisons have been registered in Appendix B, among which 324 were conducted by the CIPM (CCs and BIPM), and 146 were conducted by one of the five RMOs participating in the JCRB.

The chart shows the distribution of key comparisons in May 2004.

Key comparisons (KCs) compare national measurement standards at the highest level of accuracy and test the principal techniques in that field.

BIPM key comparisons are based on an on-going series of bilateral comparisons involving the BIPM standards and facilities, while CC and RMO key comparisons are time-limited and full scale exercises involving transfer of instruments between laboratories.



Distribution of key comparisons registered in the KCDB in May 2004

Latest KCs published results

Key comparisons are carried out in all fields of metrology. However, BIPM key comparisons are conducted only in Electricity, Ionizing Radiation and Length. Several RMOs key comparisons have yet to be completed.

The results of the RMO key comparisons are linked to key comparison reference values established from CC and BIPM key comparisons by common participation of some institutes in both regional and international comparisons. This extends the metrological equivalence to a larger number of laboratories, including those of States or Economies that are Associates of the CGPM.

Since the inception of the CIPM MRA, the results of 141 key comparisons have been approved for equivalence, and subsequently published in Appendix B, among which eight were conducted by EUROMET (European Collaboration in Measurement Standards) and seven by APMP (Asian Pacific Metrology Programme). Therefore, 15 regional key comparisons are linked to the corresponding CIPM key comparison. For example, the [graph of equivalence](#) for the measurement of automotive gases (key comparison CCQM-K3) is extended to a number of other laboratories via the results of the corresponding exercise in the European (EUROMET.QM-K3) and in the Asian and Pacific regions (APMP.QM-K3).

Metrology subject areas

Acoustics, Ultrasound and Vibration (AUV)
Electricity and Magnetism (EM)
Length (L)
Mass and related quantities (M)
Photometry and Radiometry (PR)

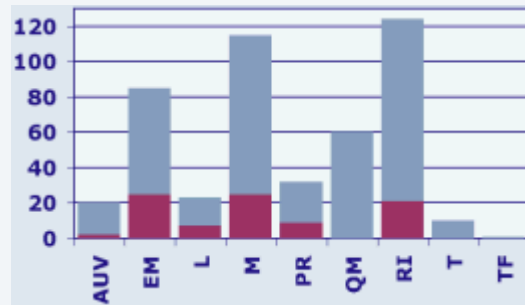
Amount of Substance (QM)
Ionizing Radiation (RI)
Thermometry (T)
Time and Frequency (TF)

Validity of key comparisons

The status "Approved for provisional equivalence" is given to key comparisons that were started before the inception of the CIPM MRA.

These were registered to provide support for the technical approval of CMCs during the initial four-year period of the CIPM MRA. After an appropriate time interval they will be run again according to the current guidelines.

Some 90 key comparisons were registered as "Approved for provisional equivalence"; their distribution is given in the bar chart for each metrology subject area.



Distribution of key comparisons "Approved for provisional equivalence" in each metrology subject area

In dark (purple): "Approved for provisional equivalence" KCs, and in light (grey): other registered KCs

Organization	All
Validity	All
Laboratory	All Current Archival
<input type="button" value="➔ Search"/>	

Appendix B search engine and its validity facility

The Appendix B search engine allows one to choose between two criteria of validity, "Current" and "Archival", when searching for a comparison. To date, all comparisons have been given the validity "Current".

However, when a comparison is repeated, and new results become available that supersede previous results, the first comparison could be attributed the criterion "Archival" if the relevant Consultative Committee agrees. Thus, the present "Approved for provisional equivalence" key comparisons may become archived while still on-line.

Highlights from the 12th JCRB meeting

During its 12th meeting, held at the CENAM, Queretaro, Mexico, 3-4 May, 2004, the JCRB defined the timeline for the final review of quality systems in NMIs participating in the CIPM MRA.

By 31 December 2004, NMIs should have a fully-implemented quality system that covers all calibration and measurement capabilities published in Appendix C or be undergoing an inter-regional review by that date. RMOs shall review these quality systems and send a report to the JCRB no later than 31 March, 2005. After that date, only those CMCs that are covered by an RMO-approved quality system will then remain in Appendix C. All new CMC submissions require a statement from the RMO indicating that it has reviewed and approved the quality system covering those CMCs.

The inter-regional CMC review process was also revised by the JCRB to include the requirement for RMO review of quality systems, a more direct participation from the technical contacts, and a time limit for the approval of final CMC files. This document is available on the JCRB web page at http://www.bipm.org/utis/common/documents/jcrb/CMC_review_flowchart.pdf.

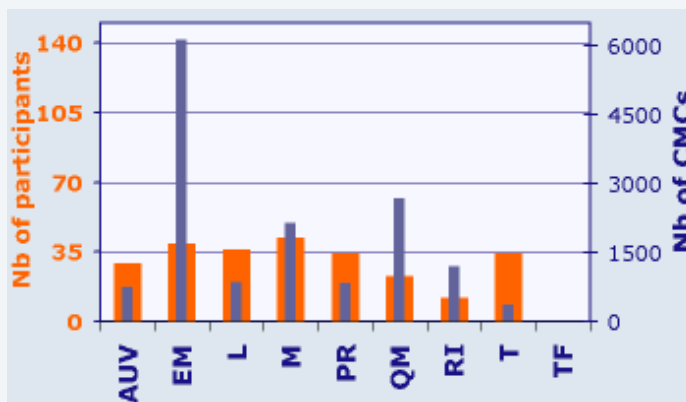
Finally, an important document providing guidance on CMC specifications was also approved by the JCRB. Document [JCRB-12/06\(2\)](#). "JCRB procedure for specifying the scope of CMCs" describes the different forms in which a CMC range and uncertainty may be written in Excel files.

Current status of Appendix C

To date, about 15000 lines of Calibration and Measurement Capabilities (CMCs) are available in Appendix C covering eight subject areas of metrology.

Taking into account the number of uncertainty values included in the "Uncertainty tables⁽¹⁾", there are over 30000 pieces of information published in the Appendix C.

As shown in the associated bar chart there are between 25 and 40 participating countries that have declared CMCs for most fields of activity.



Number of countries and CMCs in each metrology area (May 2004)

In Ionizing Radiation (RI), 12 countries have had their CMCs approved by the JCRB and the CMCs of 18 additional countries are still undergoing review. In the field of Thermometry (T), a large number of countries have declared CMCs that cover only some of the services delivered in "Temperature".

No Calibration and Measurement Capabilities have yet been published in Time and Frequency (TF); however, some are currently undergoing review.

⁽¹⁾Uncertainty tables enable a large amount of information regarding one CMC to be presented in a table. Its columns and rows contain the values taken by two physical quantities (parameters) involved in the declared CMC. So far, such tables of uncertainty have been used in [Electricity and Magnetism](#).

Latest CMCs published

KCDB demonstration at PITTCON'04

The KCDB was demonstrated, live on the internet, on the NIST stand at the PITTCON'04 held in Chicago in March 2004. This conference brings together some 25000 international experts in the field of chemistry.

Some 300 KCDB leaflets were distributed at this occasion.

The BIPM is very grateful to the NIST for their hospitality.



KCDB leaflet

Future meetings

Meeting of the Key Comparisons Working Group of the CCRI Section II

to be held at the BIPM, 21 September 2004

Meeting of the RMO Working Group on CMCs in Ionizing Radiation

to be held at the BIPM, from 23 to 24 September 2004

4th meeting of the CCAUV

to be held at the BIPM, from 27 to 28 September 2004

Meeting of RMO representatives for AUV

to be held at the BIPM, 29 September 2004

13th meeting of the JCRB

to be held at the BIPM, from 29 to 30 September 2004

Meeting of the directors of the NMIs

to be held at the BIPM, from 30 September to 1 October 2004

93rd meeting of the CIPM

to be held at the BIPM, from 5 to 8 October 2004

SIM General Assembly

Margarita Island, Venezuela, from 1 to 6 October 2004

APMP General Assembly

Beijing, China, from 18 to 23 October 2004