

The BIPM key comparison database



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The BIPM key comparison database

The KCDB is a **public-access website**

<http://www.bipm.org/kcdb>

built up upon a number of databases and
maintained by the BIPM



“The BIPM key comparison database” is a historic term that does not describe its actual content. It is generally known as “The KCDB”.

All the information it contains is
internationally reviewed and recognized
through the procedures described in the text of the
CIPM MRA and
always kept up to date

The CIPM MRA operation

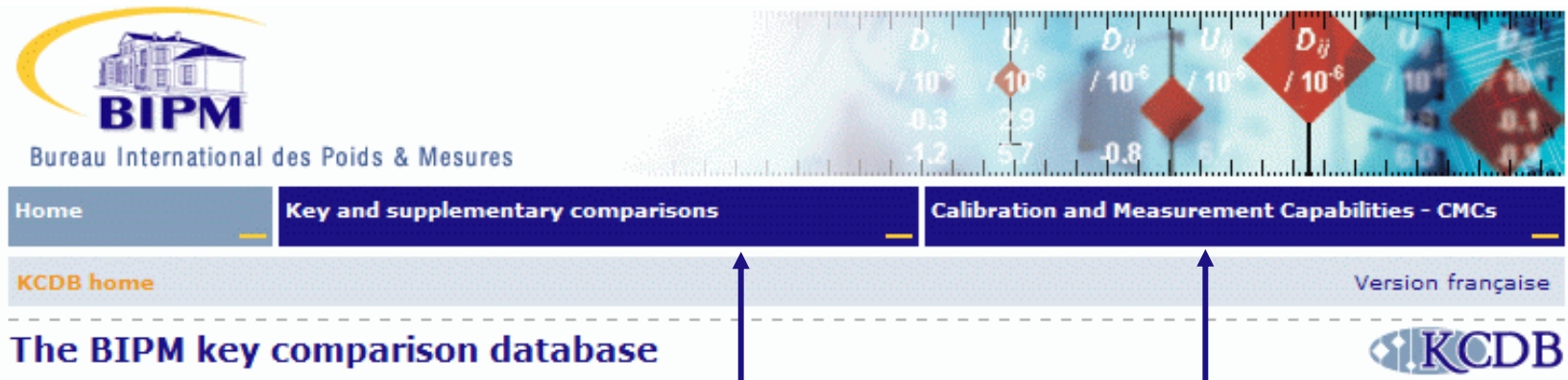
Participants in the CIPM MRA:

- participate in “**key comparisons**” organized by the CIPM’s Consultative Committees or by the Regional Metrology Organizations, chosen to characterize activities and calibration services in a particular technical area,
- declare the uncertainties associated with their **Calibration and Measurement Capabilities (CMCs)** used in day to day services and have these validated by international experts on the basis of results obtained in key and other international comparisons, and
- have installed an approved Quality System.

Participants in the CIPM MRA: about 220 Metrology Institutes (National Metrology Institutes and Designated Institutes), from 83 countries all over the world (plus 3 international organizations), maintaining national standards and delivering traceability to the SI in their respective countries.

Data available in the KCDB

- Results of these **key** (and other international) **comparisons** when they are approved by the appropriate body (CIPM's Consultative Committees or Regional Metrology Organizations), and
- Lists of **Calibration and Measurement Capabilities (CMCs)** declared by each participant in the CIPM MRA when these have been validated.



EQUIVALENCE OF NATIONAL STANDARDS

ACCEPTANCE OF CERTIFICATES

Calibration and Measurement Capabilities - CMCs

Recognition: the CIPM MRA Logo and Statement

CMCs published in the KCDB are drawn up by the declaring Institute, reviewed and validated by international experts from the different Regional Metrology Organizations (through **approval by the JCRB**: Joint committee of the RMOs and the BIPM) and **covered by an approved QS** (compliant with ISO/IEC 17025 or Guide 34).

Certificates supported by CMCs published in the KCDB are accepted worldwide by all participants in the CIPM MRA at whatever accuracy is stated in the KCDB.



Under the CIPM MRA, all participating institutes recognize the validity of each other's calibration and measurement certificates for the quantities, ranges and measurement uncertainties specified in the KCDB

Key comparisons

Definition:

A key comparison is one of the set of comparisons **selected by a Consultative Committee (CC) of the CIPM** to test the principal techniques and methods in the field

Results: interpreted in terms of equivalence

degrees of equivalence of each participant relative to an agreed reference value (offset + uncertainty) are shown in **graphs of equivalence**

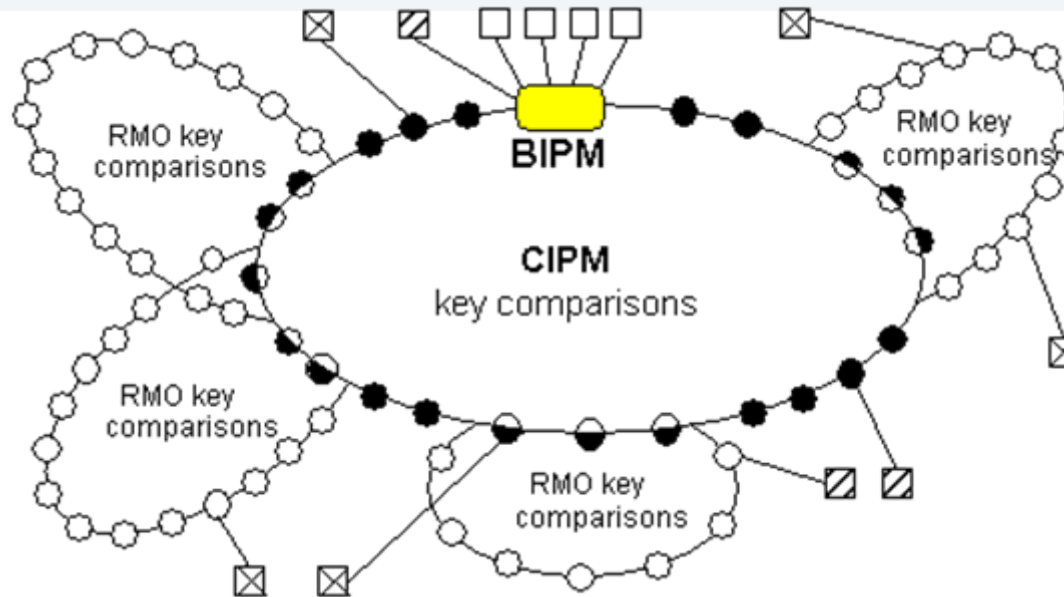


**EQUIVALENCE OF
NATIONAL
STANDARDS**

Since 1999, more than 1000 comparisons have been recorded in the KCDB, among which 73 % are key comparisons. They cover all Metrology areas.

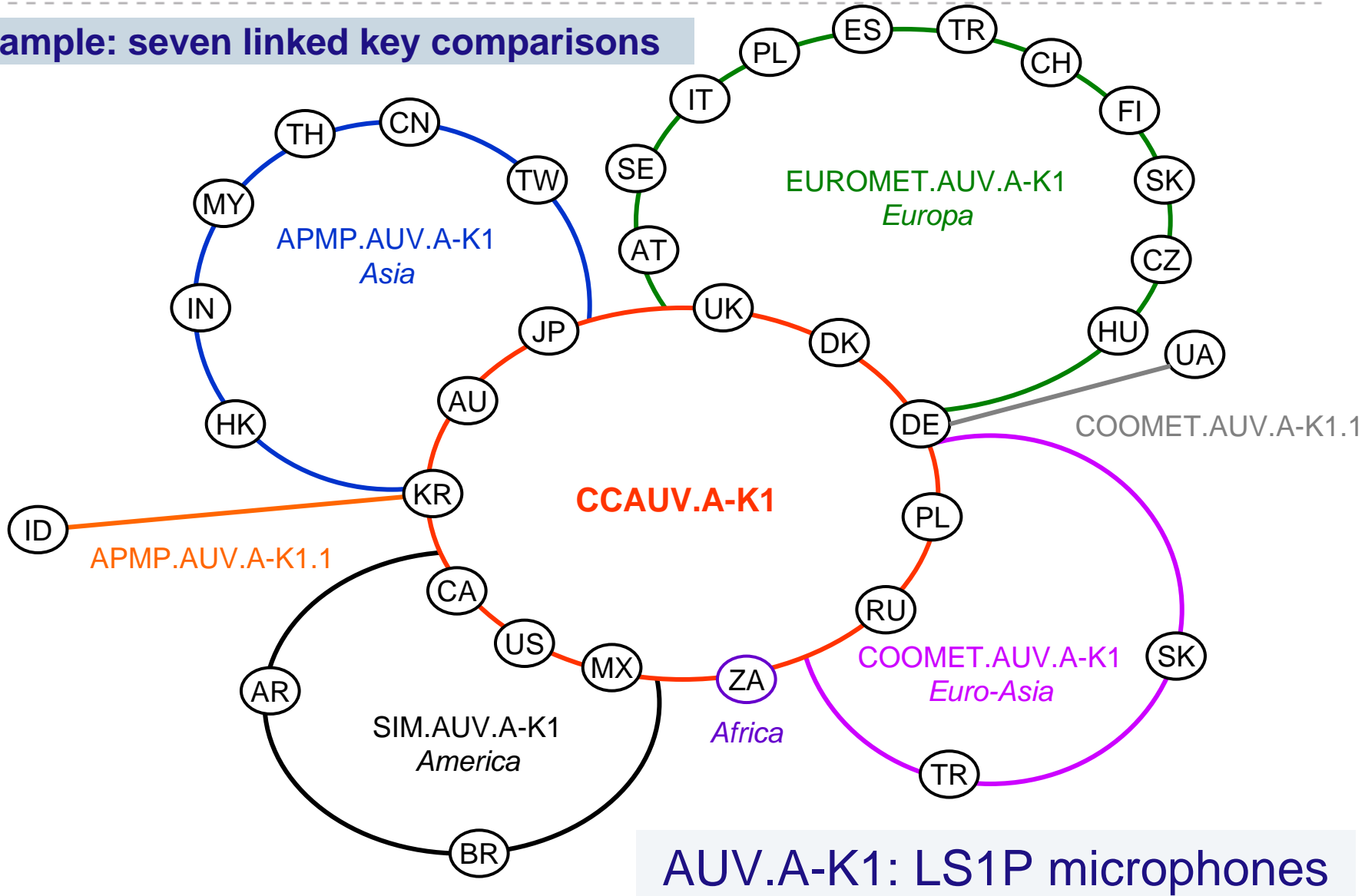
Key comparisons

Organization to form families: equivalence and linkage



- Results of key comparisons are interpreted to show equivalence between any one of the participants in any comparison of the family
- Comparison results in the KCDB are publicly available, ensuring the transparency of the whole CIPM MRA process.

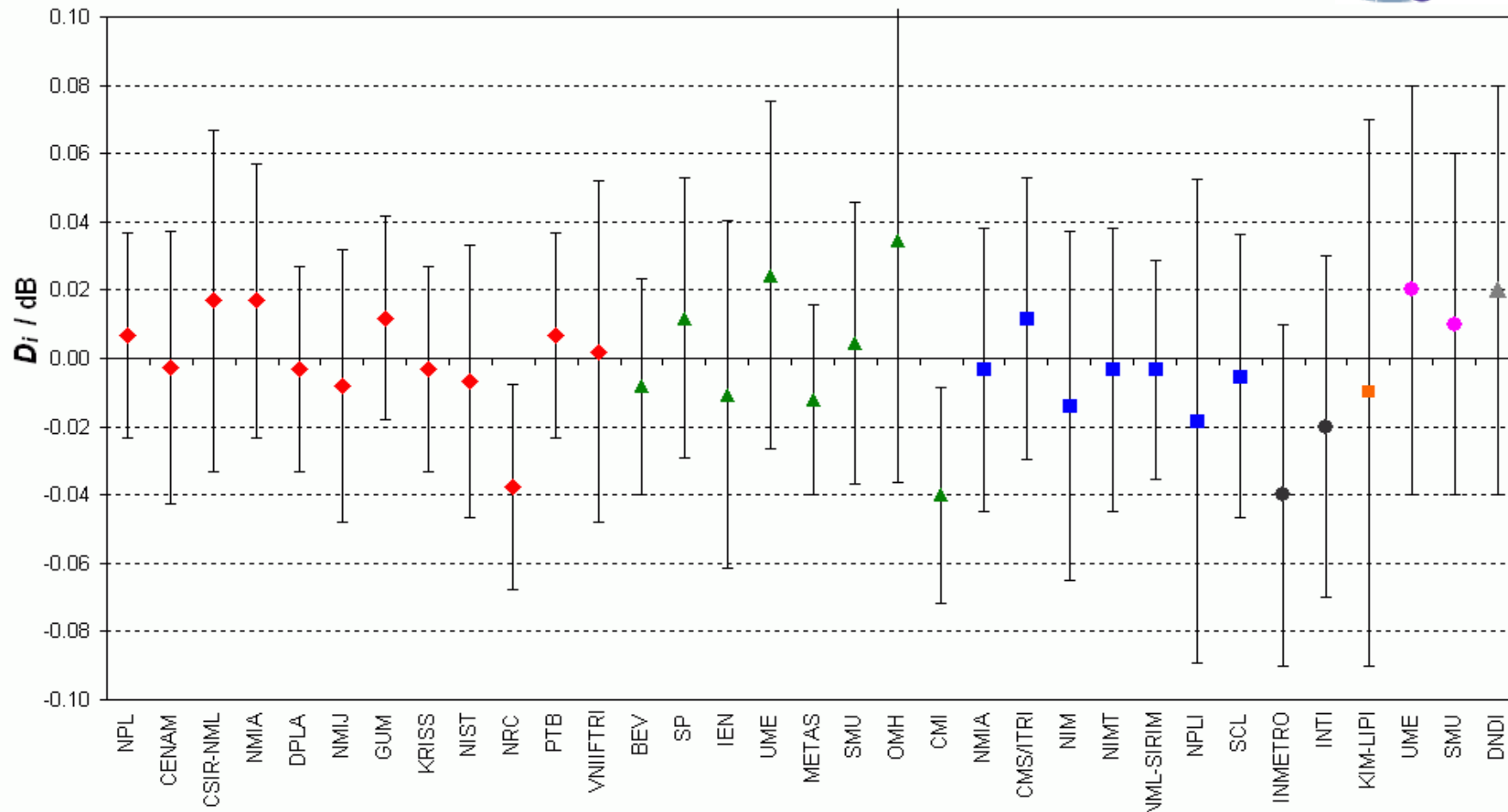
Example: seven linked key comparisons



CCAUV.A-K1, and EUROMET, APMP, and SIM.AUV.A-K1, APMP.AUV.A-K1.1, COOMET.AUV.A-K1, and COOMET.AUV.A-K1.1 - Microphone LS1P, frequency 250 Hz



Degrees of equivalence [D_i and its expanded uncertainty U_i ($k = 2$)]



Red diamonds : CCAUV.A-K1 participants

Green triangles : EUROMET.AUV.A-K1 participants only

Blue squares : APMP.AUV.A-K1 participants only

Black circles : SIM.AUV.A-K1 participants only

Orange square : APMP.AUV.A-K1.1 participant only

Pink circles : COOMET.AUV.A-K1 participants only

Grey triangle : COOMET.AUV.A-K1.1 participant only

The KCDB currently displays some 1700 graphs of equivalence.

Key and other international comparisons

After twelve years...

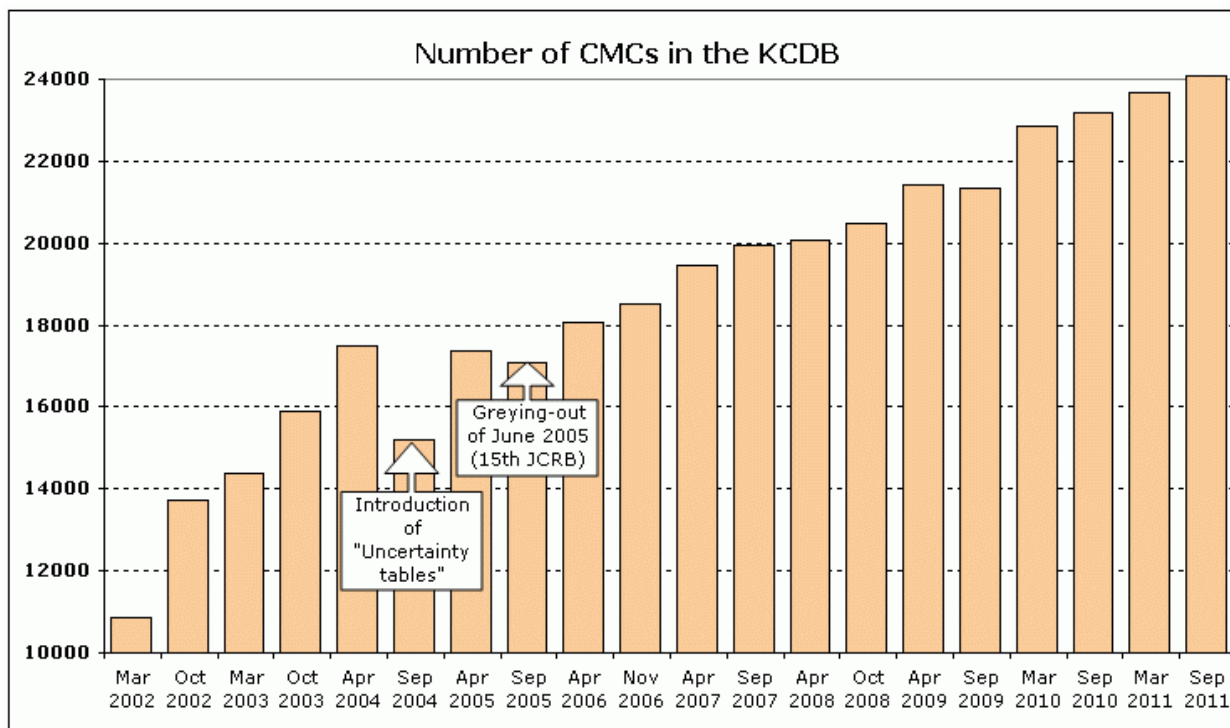
We have observed a clear improvement in the overall quality of international comparisons in metrology.

The KCDB is the preferred place to find results on the comparability of national standards of measurement and thus get information on their equivalence.

Calibration and Measurement Capabilities - CMCs

Situation as on 10 October 2011 - Evolution since March 2002

24 196 CMCs published in the KCDB

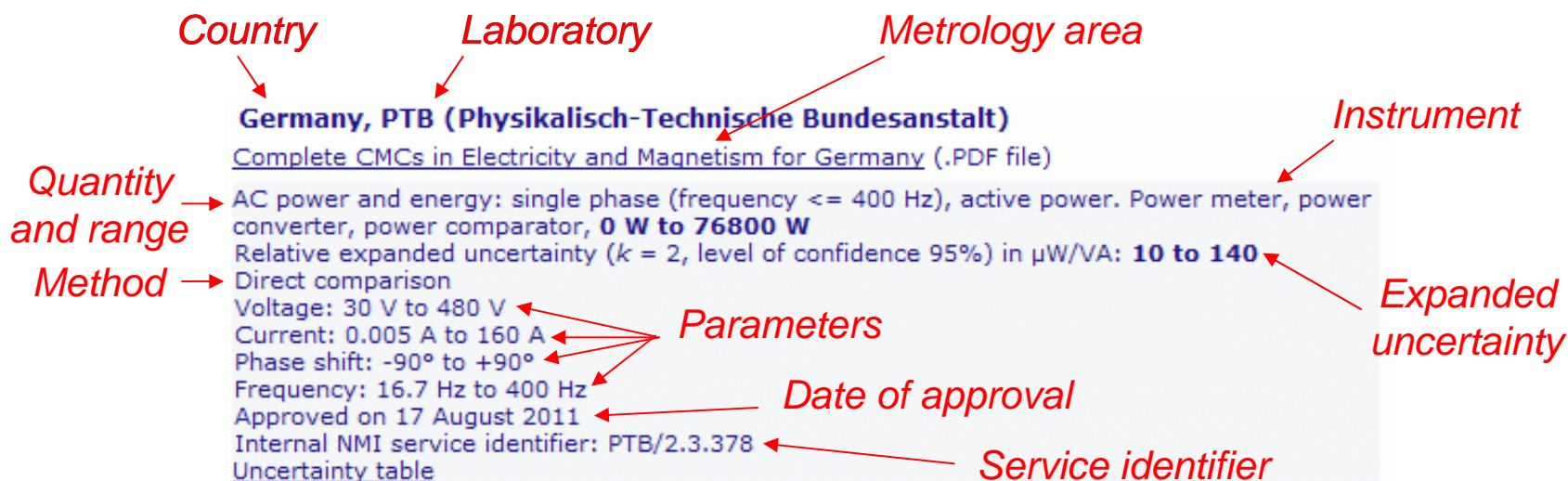


08 September 2011: very first set of CMCs approved for Ecuador (Mass)

Calibration and Measurement Capabilities - CMCs

Presentation of CMCs information in the KCDB

The CMCs information are made available in the KCDB in **open access**, under the form of **pdf files** and **html pages** returned by the web after a query has been made using one of the proposed search engines.



When the range of uncertainty does not correspond to a linear variation with the value of the measurand, the expanded uncertainty can be described using an Uncertainty table

Calibration and Measurement Capabilities - CMCs

Temporary removal (“greying-out”) and re-instatement

- CMCs that are approved by the JCRB and published in the KCDB may be **temporarily removed from the KCDB**. It generally happens when the QS that covers them is no more approved by the corresponding RMO. There may be other reasons such as temporary lack of staff or failure of the equipment.
- These CMCs are **not visible** from the KCDB web site but they remain in the appropriate EXCEL files (available to the declaring NMI) where they are shown on a **grey** background.
- They are re-instated once the problem is solved.
- The greying-out and re-instatement of CMCs was the source of much movement from 2004 to 2010. Since then, the sets of CMCs that are proposed for approval by the JCRB are generally known to be covered by an appropriate QS.

184 CMCs are currently greyed-out from the KCDB
(about 0.7 % of the total number of CMCs)

and only 10 of them have been greyed-out for more than five years (the limit decided by the JCRB)

Analysis of the visits to the KCDB website

Over 2009, 90 000 visitors opened a total of 821 000 KCDB web pages

Over 2010, 85 000 visitors opened a total of 1 250 000 KCDB web pages

Since January 2011, the average number of monthly visits has slightly increased (to 7 800 visits/month) and the average number of pages consulted during each visit has remained roughly constant.

Our “key” communities (NMIs, regulators, accreditors, etc.) are here and are showing a growing interest in the information displayed by the KCDB

- All pages equally visited.
- Visitors come from all over the world.
- 31 % of them reach the KCDB from links proposed in other websites, 60 % reach via personal bookmarking, direct URL address typing or using links given in e-mails, and 9 % from Internet search engines.

Publicity

KCDB Newsletter

Latest issue: No 15, issued on 15 June 2011

This was a special issue on Chemistry. Dr Robert Wielgosz, Director of the BIPM Chemistry Department, acted as co-editor.

Next issue: No 16, to be issued in December 2011

The KCDB and the BIPM QMS

All the KCDB work (registration, publication, creation of news, of the issues of the KCDB Newsletters, updating of all Statistic files, etc.) is covered by BIPM QMS Procedures.

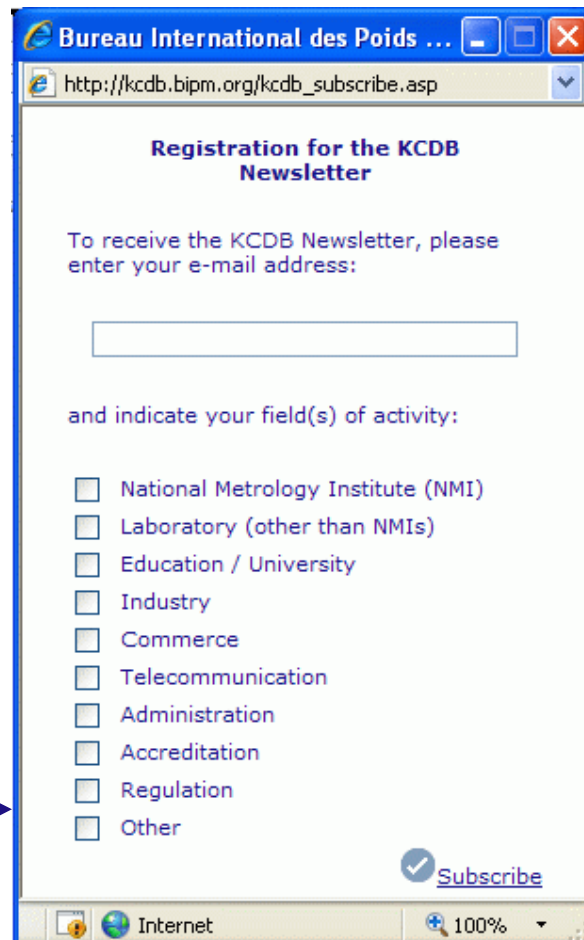
The KCDB QMS was successfully audited by the BIPM Quality Manager on 18 August 2011. He identified no non-conformities and made three minors observations for improvement in the documentation.

Conclusions

After twelve years of implementation

The KCDB is a unique tool that serves as the ultimate reference for all actors in metrology and for users in the regulatory, accreditation, and industrial sectors

*Subscribe for our
KCDB Newsletter*



The screenshot shows a web browser window titled "Bureau International des Poids ...". The address bar contains "http://kcdb.bipm.org/kcdb_subscribe.asp". The page content is titled "Registration for the KCDB Newsletter". It asks the user to enter their email address in a text box. Below that, it asks to indicate their field(s) of activity with a list of checkboxes: National Metrology Institute (NMI), Laboratory (other than NMIs), Education / University, Industry, Commerce, Telecommunication, Administration, Accreditation, Regulation, and Other. A "Subscribe" button with a checkmark icon is at the bottom right. The browser's status bar shows "Internet" and "100%" zoom.

Demonstration



KCDB Home Page: <http://kcdb.bipm.org/>

The access-restricted JCRB CMC website is at <http://www.bipm.org/JCRBCMCs/>

Username: **tcguest** and Password: **tcontact** (allow to download files)

For uploading files, please contact the JCRB Executive Secretary at jcrb_es@bipm.org

Search engines for CMCs in the KCDB

Calibration and Measurement Capabilities - CMCs

What's new about CMCs ?

- [Photometry and Radiometry - Japan](#)
09 June 2009
- [Length - Hong Kong, China](#)
08 June 2009
- [All news](#)

→ Choose your search engine to access CMCs information

Free search

New !! Try our new search engine

[Send us your feedback](#)

→ Search

Metrology area

- [AUV](#)
- [EM](#)
- [L](#)
- [M](#)
- [PR](#)
- [QM](#)
- [RI](#)
- [I](#)
- [TF](#)

Advanced search

Select a Metrology Area

→ Search

List of Metrology Areas

Acoustics, Ultrasound, Vibration (AUV)

Electricity and Magnetism (EM)

Search for specific CMCs in the KCDB

Calibration and Measurement Capabilities - CMCs



What's new about CMCs ?

- [Photometry and Radiometry - Japan](#)
09 June 2009
- [Length - Hong Kong, China](#)
08 June 2009
- [All news](#)

→ Choose your search engine to access CMCs information

Free search

New !! Try our new search engine

[Send us your feedback](#)

→ Search

Metrology area

- [AUV](#)
- [EM](#)
- [L](#)
- [M](#)
- [PR](#)
- [QM](#)
- [RI](#)
- [I](#)
- [TF](#)

Advanced search

Select a Metrology Area

→ Search

List of Metrology Areas

Acoustics, Ultrasound, Vibration (AUV)

Electricity and Magnetism (EM)

Refine your search

CMC AREA

CMCs General Physics (58)

PHYSICS

Sound in air (58)

Pressure sensitivity level (58)

GEOGRAPHIC LOCATION

- APMP (16)
 - Malaysia (6)
 - Japan (4)
 - Korea, Republic of (4)
 - Australia (1)
 - Chinese TAIPEI (1)
- EURAMET (15)
 - France (8)
 - Austria (3)
 - Bulgaria (3)
 - Czech Republic (1)
- COOMET (12)
 - Russian Federation (12)
- SIM (11)
 - Canada (5)
 - Argentina (3)
 - Brazil (3)
- AFRIMETS (4)
 - South Africa (4)

Result of the search

Your query 'Pressure sensitivity level LS1P microphone ' produced 58 results

[New search](#)

1 2 3

Czech Republic, CMI (Czech Metrology Institute)

[Complete CMCs in Acoustics, Ultrasound, Vibration for Czech Republic \(.PDF file\)](#)

Pressure sensitivity level. Measurement microphone type LS1P, **-24 dB (reference: 1V/Pa) to -28 dB (reference: 1V/Pa)**

Absolute expanded uncertainty ($k = 2$, level of confidence 95%) in dB: **0.05**

IEC 61094-2:1992

Frequency: 63 Hz to 1.0 kHz

Argentina, INTI (Instituto Nacional de Tecnologia Industrial)

[Complete CMCs in Acoustics, Ultrasound, Vibration for Argentina \(.PDF file\)](#)

Pressure sensitivity level. LS1P microphone. Measurand unit, **dB (reference: 1 V/Pa)**

Absolute expanded uncertainty ($k = 2$, level of confidence 95%) in dB: **0.05**

Pressure sensitivity level by reciprocity IEC 61094-2

Frequency: 63 Hz to 2 kHz

Internal NMI service identifier: INTI/02.01E.03.002

Pressure sensitivity level. LS1P microphone. Measurand unit, **dB (reference: 1 V/Pa)**

Absolute expanded uncertainty ($k = 2$, level of confidence 95%) in dB: **0.1**

Pressure sensitivity level by reciprocity IEC 61094-3

Frequency: 4 kHz to 8 kHz

Internal NMI service identifier: INTI/02.01E.03.002

Pressure sensitivity level. LS1P microphone. Measurand unit, **dB (reference: 1 V/Pa)**

Absolute expanded uncertainty ($k = 2$, level of confidence 95%) in dB: **0.2**

Pressure sensitivity level by comparison

Frequency: 63 Hz to 8 kHz

Refine my search

The BIPM key comparison database



Refine your search

CMC AREA

CMCs General Physics (3)

PHYSICS

Sound in air (3)

GEOGRAPHIC LOCATION

EURAMET (3)
Austria (3)

Result of the search

Your query 'Pressure sensitivity level LS1P microphone ' produced 3 results

[New search](#)

Austria, BEV (Bundesamt für Eich- und Vermessungswesen)

[Complete CMCs in Acoustics, Ultrasound, Vibration for Austria \(.PDF file\)](#)

Pressure sensitivity level. Measurement microphone type LS1P. Measurand unit, **dB**
(reference: 1 V/Pa)
Absolute expanded uncertainty ($k = 2$, level of confidence 95%) in dB: **0.05**
IEC 601094-2: 1992
Frequency: 63 Hz to 4 kHz

Pressure sensitivity level. Measurement microphone type LS1P. Measurand unit, **dB**
(reference: 1 V/Pa)
Absolute expanded uncertainty ($k = 2$, level of confidence 95%) in dB: **0.07**
IEC 601094-2: 1992
Frequency: 5 kHz to 8 kHz

Pressure sensitivity level. Measurement microphone type LS1P. Measurand unit, **dB**
(reference: 1 V/Pa)
Absolute expanded uncertainty ($k = 2$, level of confidence 95%) in dB: **0.09**
IEC 601094-2: 1992
Frequency: 10 kHz