

KCDB REPORT TO THE 29th JCRB MEETING

At the occasion of each JCRB meeting the KCDB Office prepares a report on the status of the KCDB. Each report describes the work of the KCDB Office during the previous six-month period, and the compilation of these reports to the JCRB thus provides a complete record of the evolution of the KCDB.

The previous report (JCRB-28/06) was presented at the 28th meeting of the JCRB, held on 3-4 April 2012 at the BIPM in Sèvres, and reflected the situation as at 01 March 2012. The present report covers the six-month period from 01 March 2012 to 01 September 2012.

Notes from the KCDB Office to the JCRB members

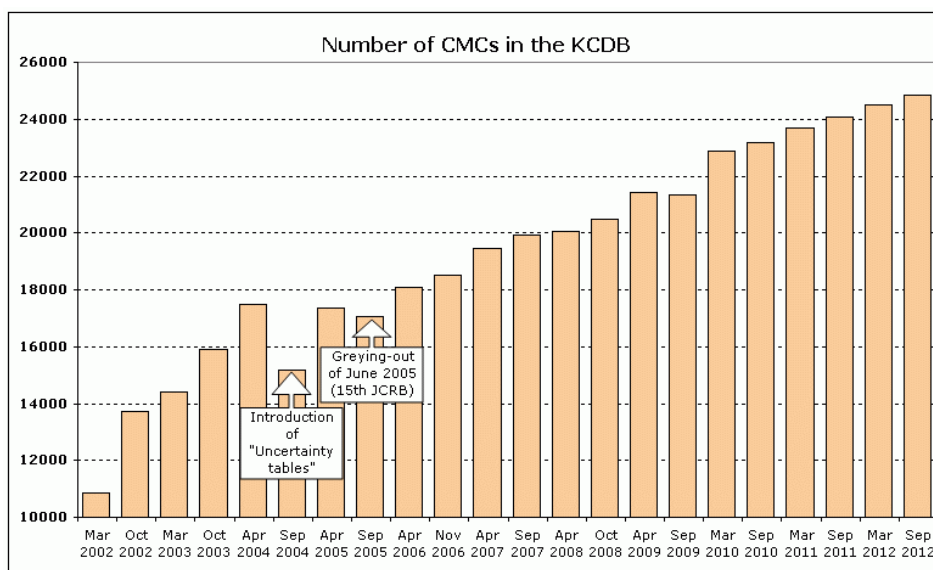
1. Statistics on the content of the KCDB are prepared by the KCDB Office and are available on-line from the [KCDB Statistics page](#). This includes the number of key and supplementary comparisons (updated in real-time), and PDF files showing the participation in key and supplementary comparisons (updated in May and November of each year) and the number of CMCs by metrology area and by country (updated in real-time).
2. The EXCEL files that are used to generate the PDF files displayed in the KCDB Statistics page are available from the [access-restricted JCRB CMC website](#) (link "[KCDB statistics](#)"). Note that these EXCEL files track all the changes (including greying-out and re-instatement of CMCs) and their dates, and thus allow some recollection of the history of the KCDB. In addition, many numbers that are not shown in the PDF files of statistics are given in the EXCEL files.
3. The KCDB Office provides on demand an additional EXCEL file containing the information of Appendix B of the KCDB, as a snapshot of the content of the database valid at a given date. This makes it possible to carry out statistical analysis using EXCEL functions or customized macro-functions. The file is compiled by the BIPM, using an SQL request named "Angela", and the delivery time is about two working days.
4. A box entitled "Related links" is provided on the left of each KCDB web page. It includes, among others, links to the KCDB Statistics page, to the KCDB FAQs page, and to the open-access CIPM MRA and JCRB documents, as well as to the open-access series of biannual KCDB Reports (located on the main BIPM website).

1. The CMC database

1.1. Content of the CMC database

As at 01 September 2012, the KCDB included a total of 24 834 CMCs:

- 15 923 in General Physics,
- 3 902 in Ionizing Radiation, and
- 5 009 in Chemistry.



Number of CMCs registered in the KCDB since March 2002

Over the period covered by this Report, 11 newly approved sets of CMCs were published (see Section 1.2 below), corresponding to an additional 325 CMCs. There were also some movements related to temporary removal and re-instatement of CMCs (see Section 1.3 below).

Details on the number of CMCs currently published in the KCDB, per country and per metrology area, are openly available in real-time from the [Statistics page of the KCDB](#) (PDF file).

1.2. New CMCs publication – see also “[CMCs News](#)”

Since 01 March 2012, the following sets of CMCs have been published in the KCDB (States or Economies in green are Associates):

- 07 March 2012; EURAMET.TF.7.2010 (EG); +4 CMCs.
- 13 March 2012; SIM.L.8.2012 (BR); +2 CMCs.
- 22 March 2012; EURAMET.T.10.2012 (AT, DE, FI, GB, HR, HU, NL, NO, **SI**, RS, SE, and FR); +100 CMCs.
- 11 April 2012; SIM.QM.13.2012, Categories 6 and 7 (CL, Cat 6; BR, Cat 6; BR, Cat 7; MX, Cat 6; MX, Cat 7; US, Cat 6; US, Cat 7); +0 CMC.
- 13 April 2012; APMP.EM.7.2011 (AU, CN, **HK**, IN, JP, KR, NZ, SG, and **TW**); +188 CMCs.
- 16 April 2012; SIM.QM.13.2012, other Categories than 6 and 7 (AR, Cat 11; BR, Cat 4; BR, Cat 12; CL, Cat 10; CL, Cat 11; MX, Cat 4; MX, Cat 8; MX, Cat 9; and MX, Cat 13); +27 CMCs.
- 18 April 2012; APMP.M.30.2011 (**VN**, Fluid Flow); +4 CMCs.
- 11 May 2012; AFRIMETS.AUV.3.2011 (ZA); +9 CMCs.
- 29 May 2012; APMP.T.6.2006 (JP, KR, and SG); +33 CMCs.
- 08 June 2012; EURAMET.M.23.2011 (**BA**); +7 CMCs (**very first set of CMCs from Bosnia and Herzegovina**).
- 12 June 2012; APMP.M.31.2012 (KR, Fluid Flow); +2 CMCs.
- 03 July 2012; SIM.M.23.2012 (US, Fluid Flow); +1 CMC.

In addition, the KCDB Office has dealt with numerous corrections:

- Editorial changes.
- Deletion of services that are no longer available [on 01 March 2012, FI (L) -4 CMCs; and on 24 May 2012, CH (T) -38 CMCs].

- Change in one laboratory acronym and name for Portugal: ITN changed for IST/ITN (23 March 2012), designated institute for Ionizing Radiation.

1.3. CMCs: temporary removal and re-instatement

The situation regarding temporary removal (“greying-out”) and re-instatement of CMCs is available on-line from page 5 of the [Statistics page of the KCDB](#) (PDF file).

Since 01 March 2012, the following actions have been taken:

- 14 March 2012; greying-out of 3 CMCs in PR from Mexico;
- 11 April 2012: re-instatement of 1 CMC in QM (Cat 7) from Mexico;
- 28 June 2012; definitive deletion of the 8 CMCs in AUV from Greece that had been greyed-out on 06 September 2006; and
- 27 August 2012; greying-out of 6 CMCs in M (Force and Torque) from Finland.

As at 01 September 2012, 189 CMCs were temporarily removed from the KCDB (see table below), exactly the same number as at 01 March 2012.

As at 01 September 2012, there remained only 2 CMCs greyed-out from the KCDB more than five years ago: MX (EM), 1 CMC; and MX (RI, Neutron measurements), 1 CMC.

This information is kept in the spreadsheet “Dates of CMCs greying-out” of the EXCEL file “CMCsNumber_2012, available from the [access-restricted JCRB CMC website](#) (link “[KCDB statistics](#)”).

	M	PR	EM	T	RI	L	QM	TF	Total
APMP									
NZ			5						5
KR							5 Cat 6		5
									Total APMP: 10
AFRIMETS									
ZA		5							5
									Total AFRIMETS: 5
EURAMET									
BG						1 DimMet			1
FI	3 Torque 3 Force								6
FR	3 Pressure								3
									Total EURAMET: 10
SIM									
MX		3	1		46 45 RI(II) & 1 RI(III)		6 Cat 2		56
AR					66 RI(II)				66
JM	22 Mass Standards								22
CA		9				11 DimMet			20
									Total SIM: 164
									Total: 189 CMCs deleted

*Number of CMCs temporary removed (“greyed-out”) from the KCDB,
by country and by metrology area, as at 01 September 2012*

1.4. Preparation of CMC EXCEL files divided by Category for the “Get Published CMCs”

Action 28/6 of the 28th meeting of the JCRB is as follows: “The KCDB manager will split the CMC files made available on the JCRB CMC review website for use in the CMC declaration and review process by category within the areas of Mass and Ionizing Radiation and will explore the possibility of doing the same for other areas in consultation with the relevant

Consultative Committee working groups. These CMC files are those that are available in the part “Get Published CMCs” of the access-restricted JCRB CMC website, and that are mentioned in Section 10 “Modification of existing CMCs” on page 23 of Document [CIPM MRA-D-04](#).

In answer to this Action, the KCDB Office has split the CMC EXCEL files in the fields of:

- AUV (3 categories: “Sound in air”, “Sound in water”, and “Vibration”);
- M (9 categories: “Mass standards”, “Density”, “Pressure”, “Force”, “Torque”, “Viscosity”, “Hardness”, “Gravity”, and “Fluid Flow”);
- RI (3 categories: “Dosimetry”, “Radioactivity”, and “Neutrons measurements”); and
- L (2 categories: “Laser”, and “Dimensional metrology”).

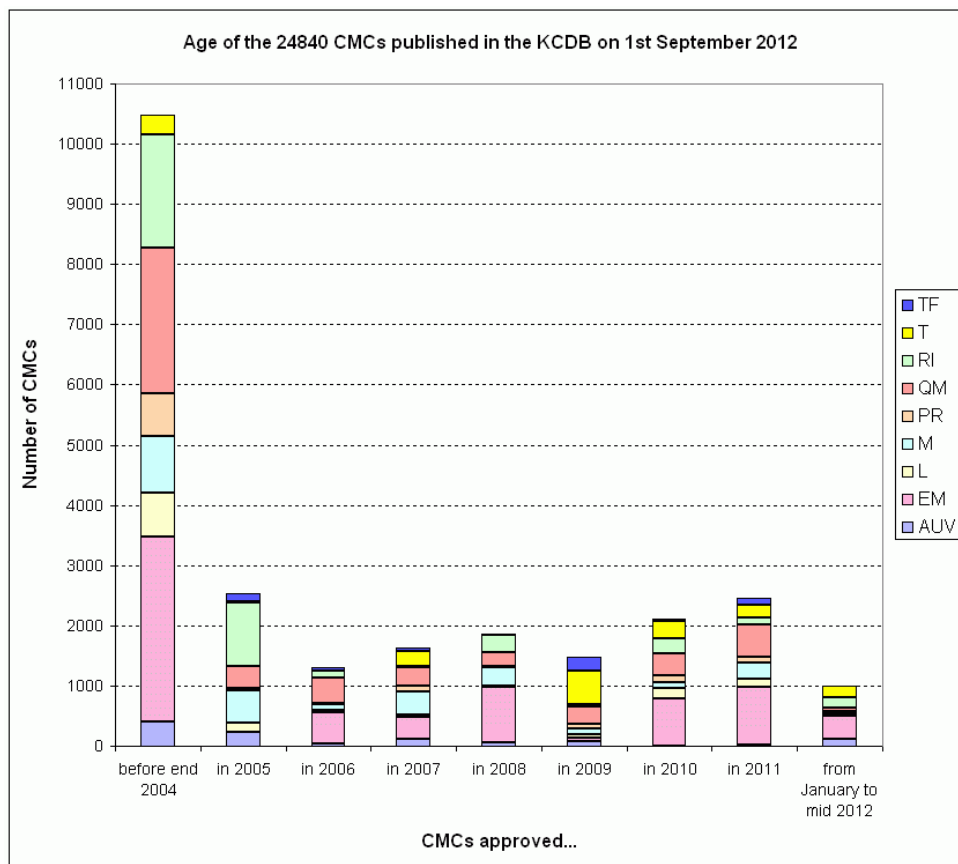
Chemistry CMCs have been divided by categories since the beginning of the CIPM MRA, and no decision has yet been taken for the other Metrology areas: EM, PR, T and TF.

The “Get Published CMCs” gives now access to the 867 “primary” EXCEL files of published CMCs. This looks a lot, but most of them are small files that are very easily manageable.

The PDF file of [CMC statistics](#) (placed on the open KCDB website) and the JCRB access-restricted web page [“Get Published CMCs”](#) have been updated accordingly on 21 August and 30 August 2012, respectively. It is recalled that, according to Document [CIPM MRA-D-04](#), those CMC EXCEL files that are placed in “Get Published CMCs” are those that must be used for any modification and deletion of existing CMCs.

1.5. Age of the CMCs recorded in the KCDB

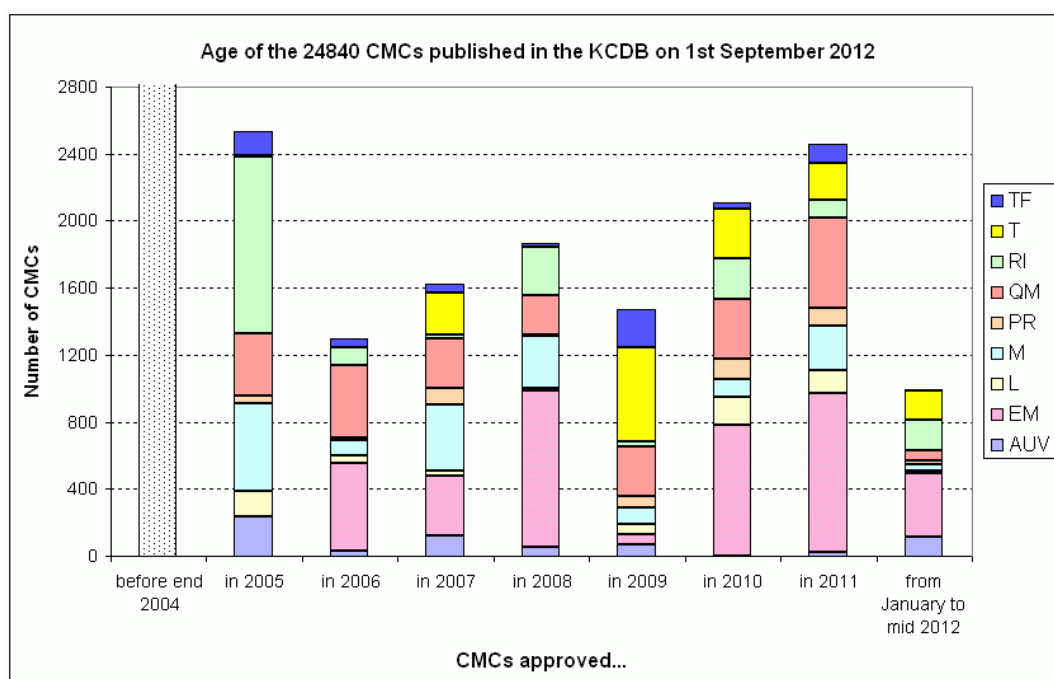
The date of approval by the JCRB of the CMCs published in the KCDB has been recorded since 24 May 2004. Those with no dates were approved before that date. It is thus possible to study the age of the CMCs by categorizing them according to the year, the first category spreading from the beginning of operation of the CIPM MRA until end 2004.



It should be noted that the date mentioned in a given CMC may be its date of birth, but not necessarily. It may also be the date of the most recent approval of an existing CMC that was re-submitted following modification.

The histogram shown above makes it possible to draw the following conclusions:

- 42 % of the CMCs currently posted in the KCDB were already there at the end of 2004. They may be considered as “old” CMCs, but it does not mean that they are not valid as the NMIs have the primary responsibility of maintaining their sets of CMCs, and they probably carefully do it, and as review of the Quality Systems covering them is carried out at regular intervals.
- On average some 1900 CMCs were approved annually over the years 2005 to 2011. The trend is similar for the year 2012 as already 993 CMCs had been approved between January 2012 and August 2012. This shows that the effort of declaration of new CMCs and maintenance of existing ones is continuous and constant. We may conclude that we have reached some kind of a stationary state.
- All Metrology areas are represented in this continuous effort (see the zoomed Figure shown below), revealing that all RMO Technical Committees/Working Groups and all CCs steadily contribute.
- The publication of CMCs from new “comers in the club” (new Associates of the CGPM) is not visible because it still concerns only small numbers of CMCs.



Zoom of the previous Figure

Follow-up of Action 17/1 from the 17th JCRB meeting

“Future KCDB reports to the JCRB are to include the information on CMC statistics (per RMO) thus avoiding the inclusion of this information in the RMO reports to the JCRB”.

Status as at 01 September 2012

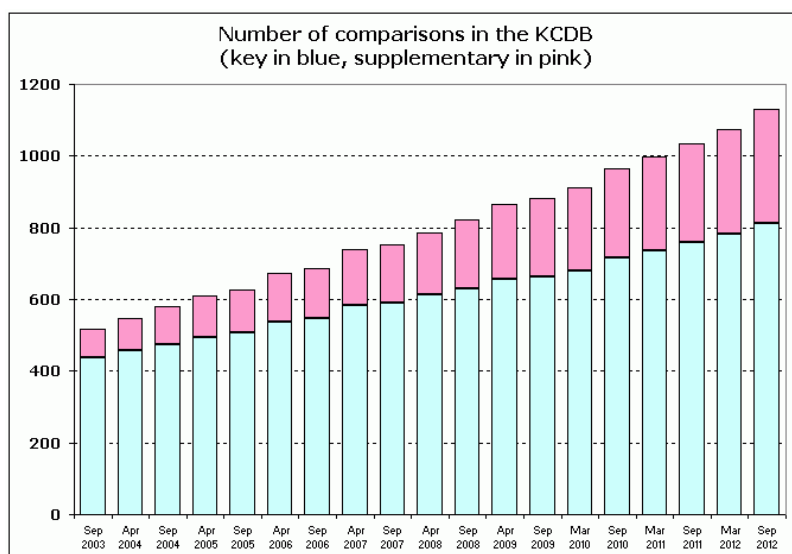
APMP:	5 668 CMCs
COOMET:	1 899 CMCs
EURAMET:	11 948 CMCs
AFRIMETS:	393 CMCs
SIM:	4 666 CMCs
IAEA:	13 CMCs
IRMM:	247 CMCs
WMO:	0 CMCs

2. Key and supplementary comparisons database

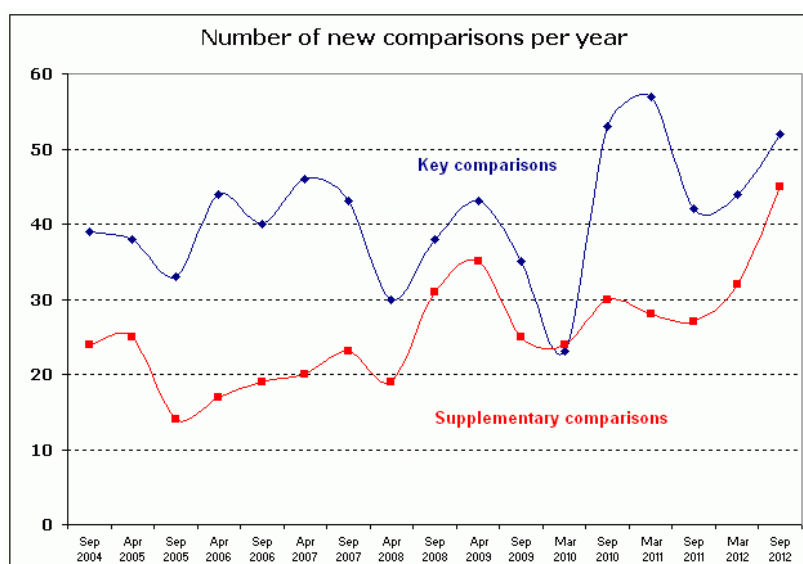
2.1. Content of the database

As at 01 September 2012, the database covered 811 key comparisons (86 from the BIPM, 400 from the CCs, 3 from AFRIMETS, 113 from APMP, 34 from COOMET, 129 from EURAMET, and 46 from SIM), and 320 supplementary comparisons.

Graphs showing the evolution since September 2003 of the total number of key comparisons and of supplementary comparisons registered in the KCDB, and the number of new key and supplementary comparisons registered in the KCDB over the one-year period ending at the date indicated on the x-axis are given below.



Total number of key comparisons and supplementary comparisons registered in the KCDB: evolution since September 2003



Number of new comparisons registered in the KCDB over the one-year period ending at the date indicated on the x-axis

The average rate of registration of new key comparisons is now constant in time. We observe an increase in the number of new supplementary comparisons registered each year in the

KCDB, which is due to the need of organizing regional exercises involving the NMIs of new Associates of the CGPM.

Updated graphs (PDF files) illustrating the participation in [key](#) and [supplementary](#) comparisons were made available from the [Statistics page of the KCDB](#) on 21 May 2012.

2.2. Key and supplementary comparisons: registration, suppression and modification

Since 01 March 2012, the following actions were taken:

- 07 March 2012; registration of [COOMET.EM.BIPM-K10.b](#).
- 13 March 2012; registration of [SIM.PR-S3](#).
- 14 March 2012; registration of [EURAMET.L-S21](#).
- 23 March 2012; registration of [APMP.L-S5](#) (Nano-Metrology) and [APMP.M.MM-S1](#) (Material Metrology).
- 28 March 2012; registration of [AFRIMETS.M.P-K2](#).
- 02 April 2012; transformation of SIM.T-S2, SIM.T-S3 and SIM.T-S4 in [SIM.T-K6.1](#), [SIM.T-K6.2](#) and [SIM.T-K6.3](#), respectively.
- 05 April 2012; registration of [SIM.M.P-S9](#).
- 11 April 2012; registration of [APMP.EM.RF-K8.CL](#).
- 16 April 2012; registration of [EURAMET.PR-S5](#).
- 17 April 2012; registration of [COOMET.AUV.W-S1](#).
- 26 April 2012; registration of [CCM.P-K4.2012](#).
- 07 May 2012, registration of [EURAMET.RI\(I\)-S10](#) and [SIM.M.M-S11](#).
- 14 May 2012; registration of [EURAMET.EM-K12](#) and [EURAMET.M.M-K2.3](#).
- 15 May 2012; registration of [SIM.T-S2](#).
- 17 May 2012; registration of [SIM.T-S3](#) and [SIM.T-S4](#).
- 23 May 2012; registration of [APMP.M.M-K5](#).
- 25 May 2012; registration of [AFRIMETS.T-S2](#).
- 29 May 2012; registration of [AFRIMETS.T-S3](#).
- 30 May 2012; registration of [SIM.T-K6.4](#).
- 31 May 2012; registration of [SIM.M.D-S4](#).
- 01 June 2012; registration of [EURAMET.M.M-K2.4](#).
- 04 June 2012; registration of [EURAMET.EM-S36](#).
- 05 June 2012; registration of [CCQM-K105](#).
- 06 June 2012; registration of [EURAMET.M.M-S4](#).
- 08 June 2012; renaming of EURAMET.T-K3 in [EURAMET.T-K3.4](#).
- 11 June 2012; deletion of SIM.EM-K3.
- 12 June 2012; registration of [CCT-S1](#).
- 14 June 2012; registration of [CCT-S2](#), [CCT-S3](#), and [SIM.M.FF-S5](#).
- 25 June 2012; registration of [SIM.EM.RF-K5.b.CL](#) and [APMP.EM.BIPM-K11.4](#).
- 26 June 2012; registration of [CCM.P-K12.1](#).
- 27 June 2012; registration of [AFRIMETS.M.M-S2](#).
- 28 June 2012; registration of [AFRIMETS.L-S3](#).
- 04 July 2012; registration of [SIM.M.M-S12](#).
- 23 July 2012; registration of [EURAMET.T-K7.3](#) and [CCQM-K102](#).
- 02 August 2012; registration of [SIM.M.F-S2](#), [EURAMET.M.M-K2.5](#), [SIM.M.F-S3](#), and [COOMET.QM-S2](#).
- 14 August 2012; registration of [SIM.EM-S10](#).
- 22 August 2012; registration of [APMP.L-K5.2006.1](#).
- 23 August 2012; registration of [COOMET.EM-S12](#).
- 24 August 2012; registration of [AFRIMETS.AUV.V-S3](#), and [AFRIMETS.L-S4](#).
- 28 August 2012; registration of [APMP.QM-K53](#), [CCQM-K6.1](#), [CCQM-K6.2](#), [CCQM-K11.2](#), [CCQM-K12.2](#), [CCQM-K103](#), [CCQM-K104](#), [CCQM-K106](#), [CCQM-K107](#), [CCQM-K108](#), and [CCQM-K109](#).

This resulted in an additional 30 key comparisons and 28 supplementary comparisons registered in the KCDB over the six-month period covered by this report.

2.3. Published results of key and supplementary comparisons

As at 01 September 2012, among the 811 key comparisons that were registered:

- 88 corresponded to exercises prior to the implementation of the CIPM MRA, and will never have results published in the KCDB; they have been “Approved for provisional equivalence”;
- 74 of the 88 ongoing BIPM key comparisons had results published in the KCDB; these are regularly extended as new data become available (13 new results were published since 01 March 2012); and
- another 386 CC and RMO key comparisons had their final reports approved and posted in the KCDB website, and corresponding tables of numbers and graphs entered in the database.

All together, the KCDB currently displays a total of 1861 graphs of equivalence, including more than 100 new graphs of equivalence published over the last six months.

The results of 163 RMO key comparisons (compared with 153 at the time of the 28th JCRB meeting) - 59 conducted by APMP, 19 by COOMET, 70 by EURAMET, and 15 by SIM - are published in the KCDB: see [“Comparisons News”](#) for the list of the most recent publications.

Linkage has also been carried out for 47 bilateral key comparisons subsequent to full-scale CC key comparisons; their results are included in the appropriate graphs of equivalence.

Since April 2012, we have had one example of a family of nine key comparisons linked together: [M.M-K1](#) (1 kg stainless steel standards), including 89 degrees of equivalence relative to the [CCM.M-K1](#) key comparison reference value. These results span over more than 15 years and a new central CIPM key comparison, [CCM.M-K4](#), has been launched with the BIPM acting as the pilot laboratory, then restarting the whole exercise. A number of similar examples gathering eight or seven key comparisons linked together can be found in the KCDB.

The final reports of 175 of the 320 supplementary comparisons registered in the KCDB were also posted in the KCDB as at 01 September 2012.

No new final reports of supplementary comparisons have been posted in the KCDB since 08 June 2012, the date when the new constraints applied to the “comment and editorial control” of final reports of supplementary comparisons, as now stated in Section 7.2 of Document [CIPM MRA-D-05](#), was decided by the CIPM on the recommendation 28/1 of the JCRB at its 28th meeting. The process may take several months to resume.

All together 65 % of the comparisons registered in the KCDB are ended and have their final reports posted in the KCDB, and also generally published in the [Metrologia Technical Supplement](#). This percentage has now been stable since several years.

3. Visits to the KCDB website

As reported previously, the average number of monthly visits to the KCDB website remained roughly constant over the year 2010, at the level of about 7 200. The average number of pages consulted during each visit had increased significantly, compared to the year 2009, as has the average duration of each visit.

The log-on statistics recorded for the period January – December 2011 indicates a slight increase of the average number of monthly visits, at the level of 7 800, and of the average number of KCDB web pages opened each month, at the level of 110 000. These numbers have climbed up to 9 600 and 203 000¹ over the six-month period January – June 2012.

We do believe that the KCDB website continues to attract our key communities: National Metrology Institutes, regulators, accreditors, commercial and industrial companies.

As already observed, all pages are equally visited, including the News page, the Statistics page, and the Newsletters; and PDF files of comparison reports and of CMC lists are

¹ These numbers do not include the movements generated by robots.

regularly downloaded. Visitors come from all over the world, and reach the KCDB website from links proposed in other websites (especially NMI websites), through Internet search engines (Google, Yahoo, etc.), but mainly via personal bookmarking, direct URL address typing or using links given in e-mails.

4. The KCDB system

The KCDB web system was not modified over the last six-month period.

The [tutorial presentation on the KCDB](#) posted in the page "[Reports on the KCDB](#)" of the BIPM web site was updated on 15 June 2012.

In view of the renovation of the BIPM and KCDB web sites that should take place early 2013, a [questionnaire](#) on the usability of our web applications was posted on the BIPM web site with a deadline for answering of 23 July 2012. The obtained results are currently under analysis.

5. Publicity

The series of the *KCDB Newsletters* ceased with [Issue 16](#) dated 15 December 2011. News on the KCDB and the JCRB are now published in the series of the [BIPM-eNews](#). This e-letter from the BIPM is issued twice a year, in June and December.

6. Participation of Associates of the CGPM in CIPM MRA activities

The following table summarizes the participation of NMIs of Associates of the CGPM in CIPM MRA activities as at 01 September 2012.

Associate of the CGPM	Date of becoming an Associate	Date of signature of the CIPM MRA	Total number of published CMCs	Total number of greyed-out CMCs	Date of publication of the first CMC	Number of key comparisons*	Number of supplementary comparisons*
Albania	10 September 2007	10 October 2007	0	0	-	3	0
Bangladesh	29 March 2010	25 March 2011	0	0	-	0	2
Belarus	05 May 2003	14 October 2003	158	0	07 April 2004	29	24
Bolivia	04 April 2008	16 May 2008	0	0	-	4	9
Bosnia and Herzegovina	24 May 2011	15 June 2011	7	0	08 June 2012	4	1
Botswana	30 May 2012	26 July 2012	0	0	-	1	3
CARICOM	10 October 2005	12 October 2005	0	0	-	0	7
Chinese Taipei	26 April 2002	04 June 2002	421	0	21 October 2003	68	37
Costa Rica	29 January 2004	06 October 2004	78	0	26 November 2008	16	11
Cuba	19 December 2000	18 June 2001	88	0	02 May 2005	6	13
Ecuador	20 November 2000	15 April 2001	20	0	16 September 2011	5	11
Estonia	27 January 2005	23 March 2005	0	0	-	6	7
Georgia	01 January 2008	17 June 2008	0	0	-	2	2
Ghana	17 September 2009	24 February 2010	0	0	-	1	1
Hong Kong (China)	08 April 2000	31 May 2000	330	0	13 December 2000	53	15
Jamaica	15 September 2003	21 July 2004	0	22	24 August 2006	8	4
Latvia	11 January 2001	13 March 2001	59	0	23 March 2005	12	6
Lithuania	12 March 2001	12 April 2001	91	0	11 December 2003	15	11
Macedonia, the FYR of	10 October 2006	14 November 2007	0	0	-	4	2
Malta	11 April 2001	20 June 2001	0	0	-	2	1
Mauritius	05 October 2010	09 March 2011	0	0	-	3	3
Moldova, Rep. of	01 January 2007	14 November 2007	0	0	-	1	2
Montenegro	01 August 2011	19 October 2011	0	0	-	2	0
Panama	03 August 2003	16 September 2003	34	0	11 September 2006	9	9
Paraguay	06 May 2009	27 October 2009	23	0	31 January 2011	2	9
Peru	28 May 2009	17 November 2009	26	0	03 August 2010	10	18
Philippines	01 June 2002	19 December 2002	0	0	-	10	5
Seychelles	10 September 2010	12 November 2010	0	0	-	1	1
Slovenia	02 June 2003	23 June 2003	296	0	11 May 2004	31	12
Sri Lanka	03 August 2007	14 November 2007	0	0	-	4	2
Ukraine	19 August 2002	14 October 2003	168	0	10 January 2005	32	36
Viet Nam	10 October 2003	16 September 2004	27	0	21 July 2010	24	7
Zambia	10 December 2010	3 February 2011	0	0	-	1	3
Zimbabwe	14 September 2010	14 January 2011	0	0	-	1	4

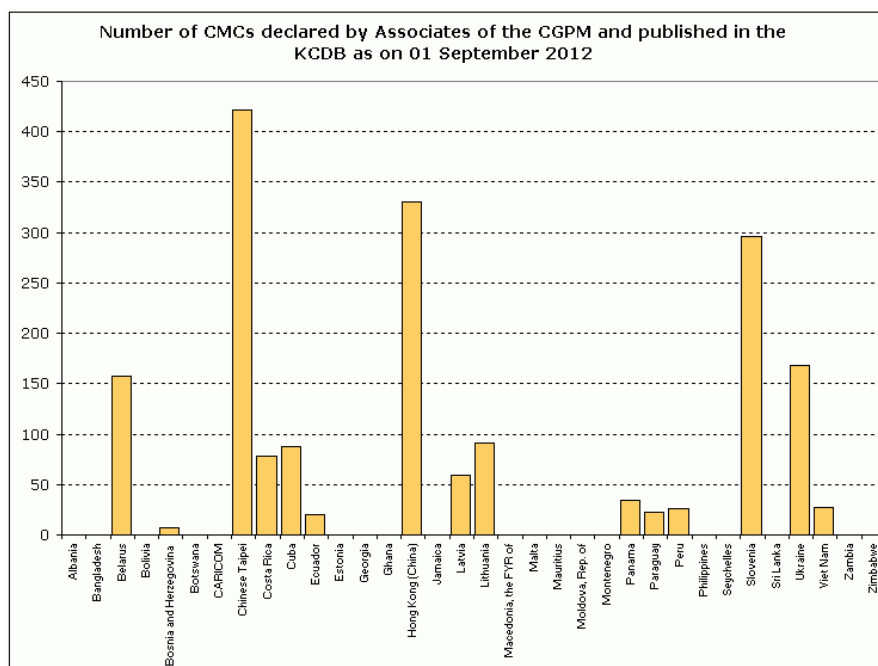
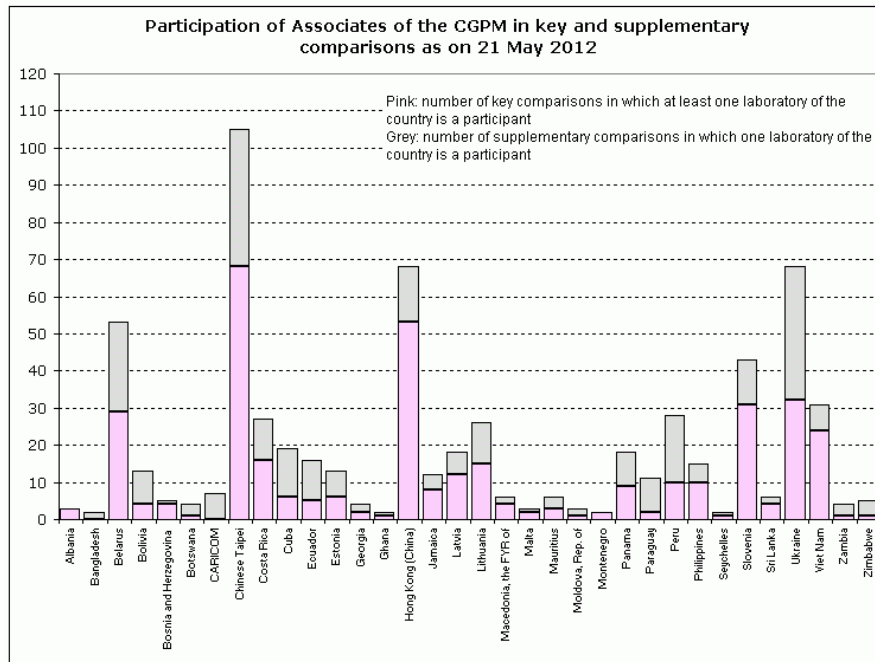
CIPM MRA activity of the NMIs of Associates of the CGPM: important dates, number of published CMCs and participation in key and supplementary comparisons

*These numbers take into account all comparisons registered in the KCDB, whatever their statuses are, for which at least one laboratory of the Associate is listed in the participants list.

Note:

As the numbers on participation in key and supplementary comparisons change only slowly with time, the corresponding KCDB statistics are updated every six months. The numbers given here show the situation as at 21 May 2012. However, as the numbers of CMCs published in the KCDB can vary quickly, they are updated in real-time in all KCDB Statistics files. The numbers of CMCs given here show the situation as at 01 September 2012.

One observes that all of the Associates who participate in the CIPM MRA have at least one of their metrology institutes listed as participant in a key or a supplementary comparison, whereas only 15 of the 34 currently have CMCs published in the KCDB, as shown on the graphs below. This situation was approximately the same six months ago and reveals how long and difficult the effort is to complete the whole CIPM MRA scheme.



7. The KCDB and the BIPM QMS

A total number of 11 QMS Procedures cover all the KCDB work: registration of comparisons, publication of comparison results and of CMCs, creation of news, etc. These are of course always kept up-to-date according to the requirements of the BIPM Quality Manual. Most of the KCDB QMS procedures are kept confidential.