

KCDB REPORT TO THE 36th JCRB MEETING

1 March to 1 September 2016

Introduction

This report summarizes the major progress and evolution of the BIPM Key Comparison Database (KCDB) over the last six months.

The EXCEL files used as a basis for the CMC statistics are available on the [access-restricted JCRB CMC website](#) (on “KCDB statistics”). They are updated successively during the year and the CMCs that have been modified are highlighted in pink according to previous JCRB decisions.

Further information on the KCDB may be found on the BIPM KCDB web pages. Notably, the number of key and supplementary comparisons, as well as the number of CMCs by metrology area and by country, are updated successively during the year and may be consulted on the [KCDB Statistics](#) web page¹.

The status of the database concerning **Calibration and Measurement Capabilities** are given in Section 1. In Section 2, recent information concerning **comparisons** carried out within the frame of the CIPM MRA is summarized. Section 3 highlights the status of **Associates** of the BIPM, and Information on the **revision of the KCDB**, in the context of the Review in the CIPM MRA, is presented in Section 4. The actions taken since the last meeting are summarized in Section 5.

1. CIPM MRA Appendix C : Calibration and Measurement Capabilities

1.1. Status of the KCDB CMC database

End of August 2016, the KCDB included a total of 24 655 CMCs:

- 18 492 in Physics,
- 6 163 in Chemistry.

Over the last six months 24 countries published CMCs. The total number of CMCs increased by 614 over the last 12 months, corresponding to a relative increase of 2.6 %. The number of CMCs in Chemistry increased hence by 4.7 % while CMCs in Physics increased by 1.9 %; **the increase of CMCs is not particularly large compared to previous.**

¹ On request, the KCDB Office may provide an EXCEL file listing information on the present contents of the CIPM MRA Appendix B.

The evolution of the number of CMCs since 2008 is depicted in Figure 1. The number of CMCs presently published in the KCDB by state/economy and metrology area is constantly available on [KCDB Statistics](#).

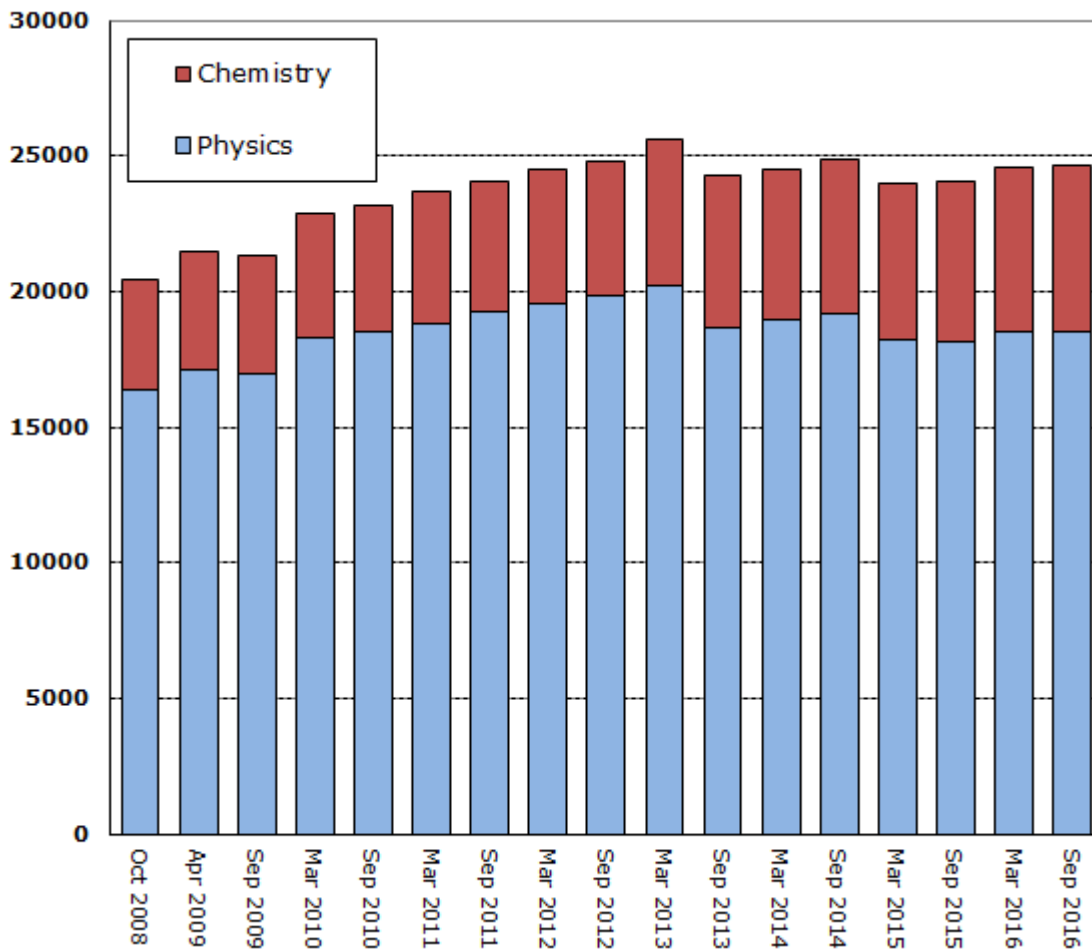


Figure 1. Number of CMCs registered in the KCDB since October 2008.

1.2. CMC publications (excluding revisions)

CMCs treated by the BIPM KCDB Office between 1 March and 1 September 2016 are listed in Table 1²

Table 1. Published CMCs from 1 March and 1 September 2016

	RMO / economy	Field	CMCs
March 2016	SIM : MX	RI	+ 6
	EURAMET : IAEA	RI	+ 4
	SIM : AR	PR	+ 1
	Belgium	M	- 3
	EURAMET : AT	M	+ 1
	Italy*	M	- 29
	COOMET : BY, RU	M	+ 1
April 2016	Slovakia ^A	L	- 5
	COOMET : BY, RU	PR	+ 10
	EURAMET : CH, CZ, DE, ES, FI, FR, UK, IE, IT, NL, PL, RS, SE, SI	EM	+ 14
	EURAMET : ES	RI	+ 10
	SIM : CL, CR, BR	EM	- 80
June 2016	United States	RI	- 3
	EURAMET : CZ, IT, ME	T	+ 51
	APMP : TH	M	+ 3
July 2016	AFRIMETS : KE	AUV	+ 9
	AFRIMETS : KE, ZA	QM	+ 61
	COOMET : BY, KZ, RU, UA	QM	+ 44
	EURAMET : DE, EU (IRMM), FR, GR, NL, RS, SI, SK, TR, UK	QM	+ 3
	SIM : BO, BR, CA, IO (WMO), MX, PE, US	QM	- 23
	August 2016	none	

* : result of greying out

Chile (UDEEC) provided their first CMCs in Electricity and Magnetism while Brazil and Costa Rica reduced their number of CMCs by applying matrices. Kenya published their first CMCs in AUV. **Bolivia and the World Meteorology Organization (WMO) published their first CMCs (Chemistry).**

² Published CMCs are announced in "[CMCs News](#)".

The annual April-meeting of CCQM is associated with a larger submission and revision of CMCs in Chemistry. As a consequence, CMCs were published in July 2016 and are detailed in Table 2. Information on the QS of the APMP lacked in the end of August 2016 and the corresponding CMCs have therefore not yet been published. Table 2 lists the changes in APMP CMCs that will occur once the QS is confirmed.

Table 2. CMCs in Chemistry of July 2016. At the date of the publication of this report, the CMCs of the APMP had not yet been published in the KCDB but are summarized below for information. Totals for APMP are purposely omitted.

AFRIMETS	Category	Change	Total
ZA	2	1	1
ZA	3	0	2
ZA	4	59	83
KE	11	1	2

APMP	Category	Change	Total
CN	1	10	
SG	1	2	
CN	3	7	
CN	4	18	
TH	4	1	
TW	4	3	
HK	5	2	
SG	5	2	
HK	10	3	
SG	10	2	
CN	11	2	
HK	11	3	
SG	11	4	
HK	12	2	
CN	14	1	

COOMET	Category	Change	Total
BY	4	0	13
KZ	4	3	3
UA	4	2	17
RU	4	33	457
RU	6	1	5
RU	7	1	4
UA	7	1	4
RU	10	3	4

EURAMET	Category	Change	Total
GB	1	1	27
SK	2	2	35
IRMM	3	1	11
GB	4	0	347
NL	4	3	251
RS	4	1	1
TR	4	2	3
GB	5	1	13
FR	6	1	4
DE	10	1	34
IRMM	10	-12	5
GR	10	-3	2
FR	10	2	10
SI	10	0	5
TR	10	3	21

SIM	Category	Change	Total
MX	1	8	62
PE	2	6	9
US	3	3	149
WMO	4	3	3
BO	6	2	2
BR	6	0	5
PE	6	1	4
BR	7	2	3
CA	10	0	32
US	10	-48	160

1.3. Deleted CMCs, Greying out and Re-instatements

Greying-outs, deletion and reinstatements of CMCs are coordinated by the JCRB Executive Secretary, and carried out by the KCDB Office. Table 3 lists the CMCs concerned during the last six months.

Table 3. Deleted, greyed-out or reinstated CMCs from 1 March to 1 September 2016

	State/economy	Field	Action
9 March	Belgium	M	Deletion of 3 CMCs in Force
24 March	Italy	M	Greying-out of 29 CMCs for Viscosity
4 April	Slovakia	L	Deletion of 3 CMCs and greying-out of 2 CMCs in Length (dimensional)
6 June	United States	RI	3 CMCs deleted

Italy requested to grey-out all Italian CMCs in viscosity. The present situation regarding temporary removal (“greying-out”) of CMCs is available on-line of the [Statistics page of the KCDB](#) and is illustrated in Table 4. **In total 173 CMCs are presently greyed out.** No reinstatements were made during the last six months.

The dates of the greying-out of CMCs are listed in the spreadsheet “Dates of CMCs greying-out” of the EXCEL file “CMCsNumber_2016, available from the [access-restricted JCRB CMC website](#) (see “KCDB statistics”).

Table 4. Number of CMCs temporary removed (“greyed-out”) from the KCDB, by country and by metrology area, as at 1 September 2016.

	AUV	M	PR	EM	T	RI	L	QM	TF	Total
APMP										
AU				27						27
NZ										0
KR								5		5
TH						3				3
ZA		2								2
										Total APMP: 37
COOMET										
KZ								1 partially Cat. 6		0
										Total COOMET: 0
EURAMET										
BE				25					6	31
FI		6								6
FR		3		3						6
IAEA						1				1
IT		29		15						44
PT							1			1
SK	6						2			8
										Total EURAMET: 97
SIM										
MX	16		3					2		21
AR							1			1
CA							0			0
US		3	1	8		1				13
BR								4		4
										Total SIM: 39
										TOTAL: 173

1.4. CMC statistics of RMOs

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

Table 5 summarizes the repartition of CMCs on the different RMOs and international signatories of the CIPM MRA.

Table 5. Information on CMC statistics per RMO

Entity	Total number of CMCs 1 September 2016	Increase/decrease last 12 months
AFRIMETS	521	+16 %
APMP	5615	+5 %
COOMET	2399	+2 %
EURAMET	11001	+2 %
GULFMET ³	0	0 %
SIM	4872	1 %
ESA	0	
IAEA	26	
IRMM	218	
WMO	3	

The AFRIMETS showed the largest increase by 16 % during the last year.

1.5. New CMC services

The CMC service categories for density and fluid flow were revised on 30 March 2016, based on a decision of the 15th meeting in 2015 of the Consultative Committee for Mass and Related Quantities (cf. Appendix 1). CMCs in Mass and Related Quantities were hence simultaneously updated for Brazil, Canada, China, Germany, Hungary, Italy, Japan, Korea, Mexico, Netherlands, New Zealand, Poland, Portugal and Russia.

³ The GULFMET was approved as an RMO on a provisional basis by the CIPM in October 2015.

2. CIPM MRA Appendix B : Key and supplementary comparisons

2.1. Present status

End of August 2016, the KCDB covered **1434 comparisons** distributed as listed in Table 6; 954 key comparisons and 480 supplementary comparisons. In fact, 67 of the 91 BIPM key comparisons are all part of the BIPM.RI(II)-K1 (SIR equivalent activity). On the other side, 22 ongoing BIPM comparisons cover each tens of completed comparisons carried out between the BIPM and different metrology institutes.

Figure 2 shows the evolution of the total number of key (green) and of supplementary (violet) comparisons registered in the KCDB since September 2003. **The annual increase of key comparisons seems to have stabilized to around $+40 \pm 8$ taking into account the history since 2004. However the ratio of Supplementary comparisons, 1 out of 5 in 2006, has progressively increased to 1 out of 3.**

Table 6. Key and Supplementary Comparisons on 1 September 2016.

Entity	KC	SC
BIPM	91	1
CC	470	28
AFRIMETS	4	17
APMP	133	98
COOMET	45	78
EURAMET	152	175
GULFMET ⁴	0	1
SIM	59	82

The number of new key and supplementary comparisons registered in the KCDB over the one-year period ending at the date indicated on the the abscissa is illustrated in Figure 3.

Updated graphs illustrating the participation in [key](#) and [supplementary](#) comparisons were made available from the [Statistics page of the KCDB](#) in May 2016; next update is due in November 2016.

⁴ The GULFMET was approved as an RMO on a provisional basis by the CIPM in October 2015.

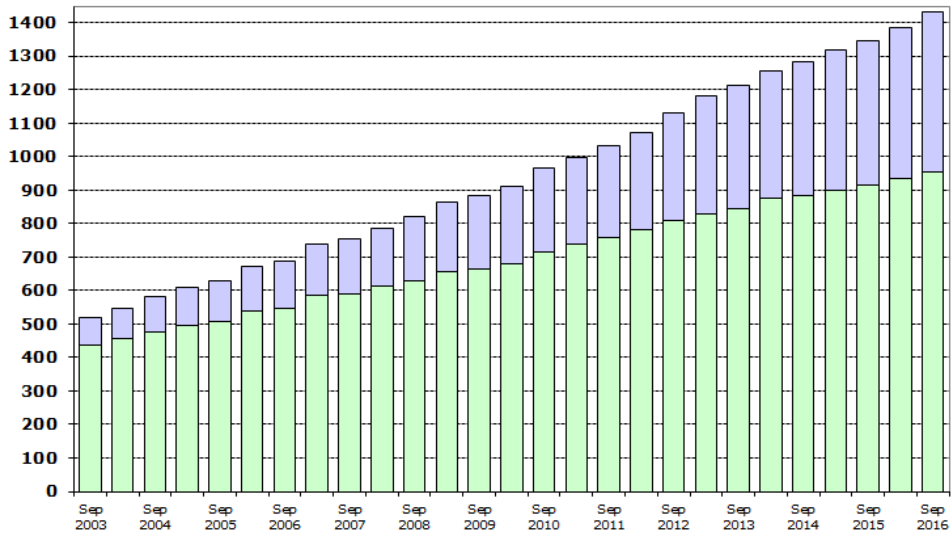


Figure 2. Total number of key comparisons and supplementary comparisons registered in the KCDB: evolution since September 2003

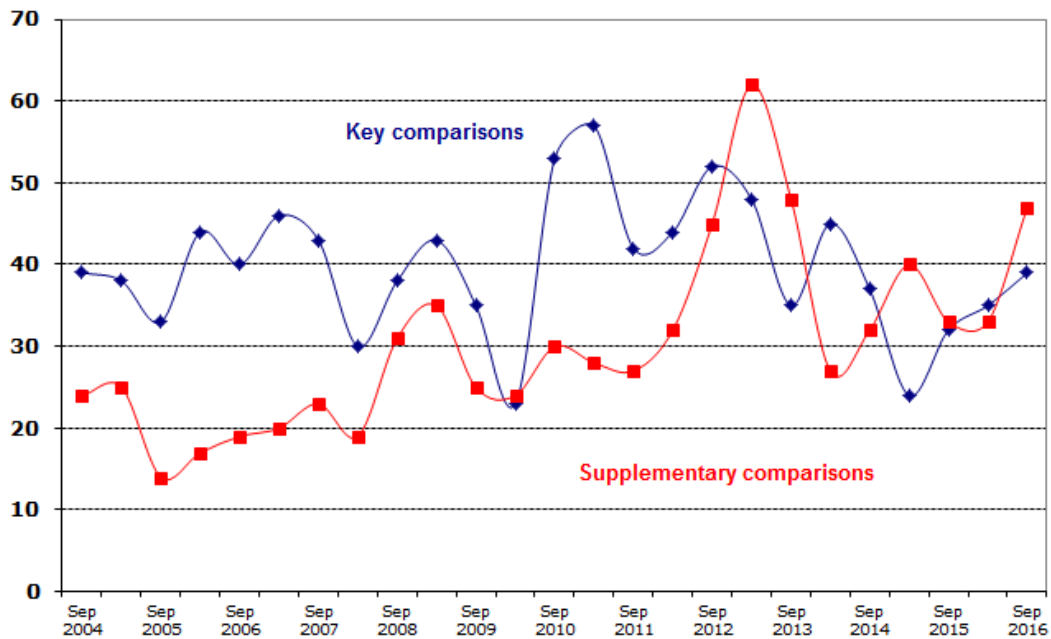


Figure 3. Number of new comparisons registered in the KCDB over the one-year period ending at the date indicated on the abscissa.

2.2. Registrations and modifications of comparisons

From 1 March 2016 the following 57 comparisons were registered as new:

AFRIMETS.AUV.V-S4	CCQM-K134	EURAMET.M.D-S2
APMP.M.F-S2	CCQM-K135	EURAMET.M.D-S3
APMP.M.M-K1.2	CCQM-K141	EURAMET.M.FF-K4.1.2016
APMP.M.M-K4.1	CCQM-K142	EURAMET.M.P-S18
APMP.M.P-K7.3	CCQM-K143	EURAMET.QM-K16
APMP.QM-S10	CCQM-K18.2016	EURAMET.RI(I)-S14
APMP.QM-S11	CCQM-K3.2018	EURAMET.RI(I)-S15
APMP.QM-S12	CCQM-K34.2016	EURAMET.RI(I)-S3.2
APMP.QM-S13	CCQM-K36.2016	EURAMET.T-K7.4
APMP.QM-S14	CCQM-K48.2014	EURAMET.T-K9.1
APMP.RI(I)-K8	CCQM-K55.a.2017	EURAMET.T-S5
APMP.RI(II)-S2.Ho-166m	CCQM-K68.2019	EURAMET.T-S6
APMP.T-S14	COOMET.L-S20	GULFMET.M.M-S1
CCAUUV.V-K4	COOMET.PR-S8	SIM.M.FF-S9
CCM.FF-K1.2015	COOMET.QM-K111	SIM.M.G-K1
CCM.FF-K5.2016	COOMET.RI(I)-S2	SIM.M.M-S15
CCM.M.FF-K3.2011.1	EURAMET.EM-S42	SIM.M.P-S11
CCQM-141	EURAMET.L-S26	SIM.M.T-S1
CCQM-86.c	EURAMET.M.D-K3	SIM.QM-K27

End of August, 42 abandoned or superseded key and supplementary comparisons were kept in the KCDB archives.

Requests for registration of supplementary RMO comparisons have recently been observed for measurands already covered by established KCs. The indicated reason is to give a rapid evidence for CMCs, without calculating the degree of linking. In these cases, the CC concerned is presently communicating with the TC-chair.

2.3. Published results of key and supplementary comparisons

From 1 March 2016 the following 54 reports were published:

APMP.L-S6	BIPM.RI(II)-K1.Sn-113	COOMET.QM-S5
APMP.M.P-S5	BIPM.RI(II)-K1.Th-228	EURAMET.M.D-S1
APMP.M.P-S6	CCEM.RF-K22.W	EURAMET.M.D-S2
APMP.QM-S2.1	CCEM.RF-K23.F	EURAMET.M.F-S3
APMP.QM-S6	CCM.D-K4	EURAMET.M.F-S4
APMP.T-K3.4	CCM.T-K2	EURAMET.M.P-S7
APMP.T-S7	CCPR-S3	EURAMET.M.P-S9
BIPM.EM-K10.b (DMDM)	CCQM-K107	EURAMET.QM-S10
BIPM.EM-K10.b (NIMT)	CCQM-K129	EURAMET.RI(I)-S13
BIPM.EM-K11 a and b (DEFNAT)	CCQM-K94	EURAMET.RI(I)-S4.1
BIPM.EM-K11.b (NSAI NML)	CCQM-K99	SIM.EM-K3
BIPM.QM-R(I) (DMDM)	CCT-S1	SIM.EM-S7
BIPM.RI(I)-K1 (NIM)	COOMET.AUV.A-K5	SIM.M.FF-S7
BIPM.RI(I)-K2 (CMI)	COOMET.AUV.A-K5	SIM.M.M-K4
BIPM.RI(I)-K3 (NRC)	COOMET.L-S17	SIM.M.M-K5
BIPM.RI(I)-K6 (NMIJ)	COOMET.PR-S3	SIM.M.M-S9
BIPM.RI(I)-K7 (CMI)	COOMET.QM-K93	SIM.PR-K4
BIPM.RI(II)-K1.F-18 (LNHB)	COOMET.QM-S3	SIM.T-K6.5

2.4. Follow-up on JCRB Action 33/3

Action 33/3: *The BIPM KCDB office, as part of the KCDB report to the JCRB, to identify Key and Supplementary Comparisons which were started 5 or more years ago and have not reached a conclusion.*

The number of comparison of this category has not changed substantially, as may be observed in Figure 4 where statistics regarding key and supplementary comparisons have been illustrated for the period September 2015 to August 2016. 27 comparisons were removed from the category since September 2015 due to either approval or abandonment, whereas 31 comparisons were added to the category (becoming 5 years old in 2016). A list of the comparisons concerned may be found in Appendix 2.

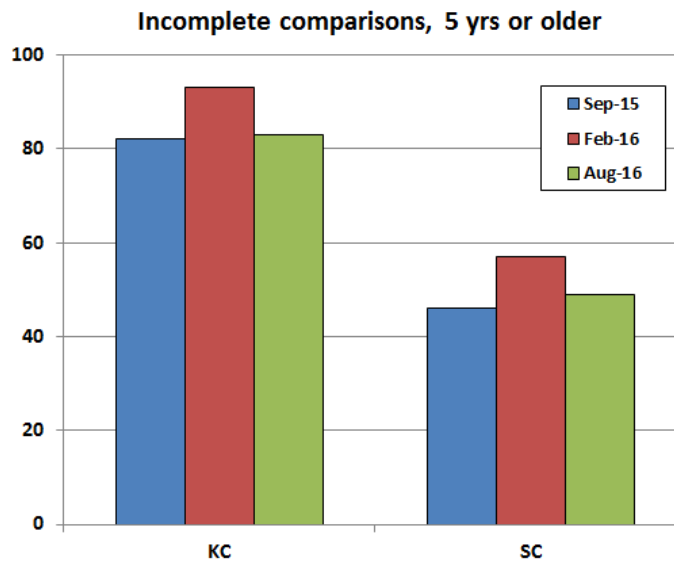


Figure 4. Histogram showing the number of incomplete comparisons that started more than 5 years ago.

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


Table 7 summarizes the participation of the [41 Associates of the CGPM](#) in CIPM MRA activities as at 1 September 2016.

New CMCs have been added by a number of Associates but the result is a total decrease of 256 CMCs (15 %) compared to March 2016; Slovenia became Member of the BIPM during the last period and Costa Rica applied matrices to their CMCs in Electricity and Magnetism.

Qatar became Associate on 10 March 2016, and Sri Lanka reinstated their status as Associate in August 2016. **Bolivia declared their first CMCs** which were in the field of Chemistry, added to the KCDB in July 2016. However, only 22 Associates have CMCs published in the KCDB. The repartition of CMCs among Associates is illustrated in Figure 5. The comparison participation by Associates is illustrated in Figure 6.

Table 7. CIPM MRA activity of the NMIs of Associates of the CGPM: important dates, number of published CMCs and participation in key and supplementary comparisons.^{5,6}

Associates of the CGPM and the KCDB: CMCs and participation in key and supplementary comparisons



Associate of the CGPM	Date of becoming an Associate	Date of signature of the CIPM MRA	Published CMCs	Greyed-out CMCs	Date of publication of the first CMC	Area of the first CMC	Key comparisons	Supplementary comparisons
Albania	10 September 2007	10 October 2007	7	0	05 April 2013	Mass Standards	7	3
Azerbaijan	01 January 2015	28 January 2015	0	0	-	-	1	5
Bangladesh	29 March 2010	25 March 2011	0	0	-	-	0	2
Belarus	05 May 2003	14 October 2003	234	0	07 April 2004	Acoustics, Ultrasound and Vibration	35	41
Bolivia	04 April 2008	16 May 2008	2	0	19 July 2016	Chemistry	5	15
Bosnia and Herzegovina	24 May 2011	15 June 2011	9	0	08 June 2012	Mass Standards	9	5
Botswana	30 May 2012	26 July 2012	0	0	-	-	1	3
CARICOM	10 October 2005	12 October 2005	0	0	-	-	0	0
Chinese Taipei	26 April 2002	04 June 2002	368	0	21 October 2003	Mass Standards, Force, Hardness, Pressure	97	45
Costa Rica	29 January 2004	06 October 2004	67	0	26 November 2008	Mass Standards	18	23
Cuba	19 December 2000	18 June 2001	113	0	02 May 2005	Ionizing radiation (I and II)	6	19
Ecuador	20 November 2000	15 April 2001	20	0	16 September 2011	Mass Standards	5	19
Estonia	27 January 2005	23 March 2005	4	0	05 May 2014	Humidity	7	10
Georgia	01 January 2008	17 June 2008	30	0	20 March 2014	Thermometry	5	10
Ghana	17 September 2009	24 February 2010	0	0	-	-	2	5
Hong Kong, China	08 April 2000	31 May 2000	228	0	13 December 2000	Length (Laser, Dimensional)	75	22
Jamaica	15 September 2003	21 July 2004	22	0	24 August 2006	Mass Standards	8	8
Latvia	11 January 2001	13 March 2001	59	0	23 March 2005	Length (Dimensional)	13	7
Luxembourg	29 January 2014	01 October 2014	0	0	-	-	1	1
Macedonia, the FYR of	10 October 2006	14 November 2007	13	0	02 July 2013	Fluid Flow	6	7
Malta	11 April 2001	20 June 2001	0	0	-	-	4	4
Mauritius	05 October 2010	09 March 2011	0	0	-	-	2	2
Moldova, Republic of	01 January 2007	14 November 2007	40	0	26 September 2013	Thermometry	2	9
Mongolia	07 August 2013	23 October 2013	0	0	-	-	3	2
Montenegro	01 August 2011	19 October 2011	19	0	20 November 2015	Thermometry	5	4
Namibia	10 August 2012	16 October 2012	0	0	-	-	0	2
Oman	08 May 2012	20 November 2014	0	0	-	-	0	0
Panama	03 August 2003	16 September 2003	34	0	11 September 2006	Mass Standards	9	18
Paraguay	06 May 2009	27 October 2009	23	0	31 January 2011	Mass Standards	2	15
Peru	28 May 2009	17 November 2009	106	0	03 August 2010	Mass Standards	17	35
Philippines	01 June 2002	19 December 2002	31	0	18 December 2013	Mass Standards	12	8
Qatar	10 March 2016	16 March 2016	0	0	-	-	0	1
Seychelles	10 September 2010	12 November 2010	0	0	-	-	0	2
Sri Lanka	14 November 2007	14 November 2007	0	0	-	-	4	2
Sudan	26 June 2014	26 June 2014	0	0	-	-	0	1
Syrian Arab Republic	31 May 2012	17 September 2012	0	0	-	-	12	3
Ukraine	19 August 2002	14 October 2003	237	0	10 January 2005	Length (Laser, Dimensional)	53	75
Viet Nam	10 October 2003	16 September 2004	31	0	21 July 2010	Time and Frequency	31	8
Yemen	21 July 2014	17 November 2014	0	0	-	-	0	0
Zambia	10 December 2010	3 February 2011	0	0	-	-	1	5
Zimbabwe	14 September 2010	14 January 2011	0	0	-	-	1	5
Total:			1697	0	Total:		459	451

⁵ These numbers take into account all comparisons registered in the KCDB, disregarding status, for which at least one laboratory of the Associate is listed in the participants list.

⁶ As the numbers on participation in key and supplementary comparisons change comparatively slowly with time, the corresponding KCDB statistics are updated every six months (in May and November of each year). However, the numbers of CMCs published in the KCDB varies more rapidly and are updated in "real-time". The numbers given here show the situation as at 25 August 2016.

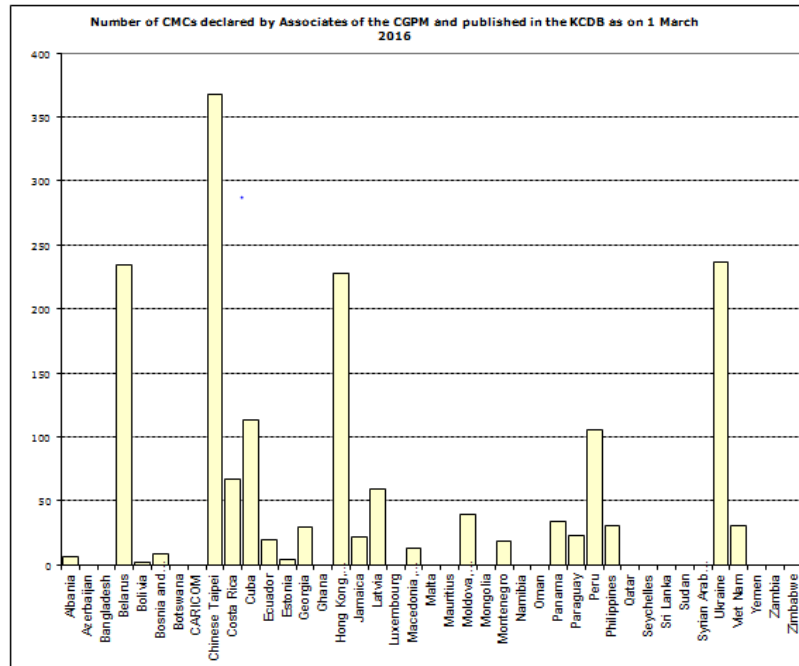


Figure 5. Graph on the number of CMCs declared by Associates of the CGPM

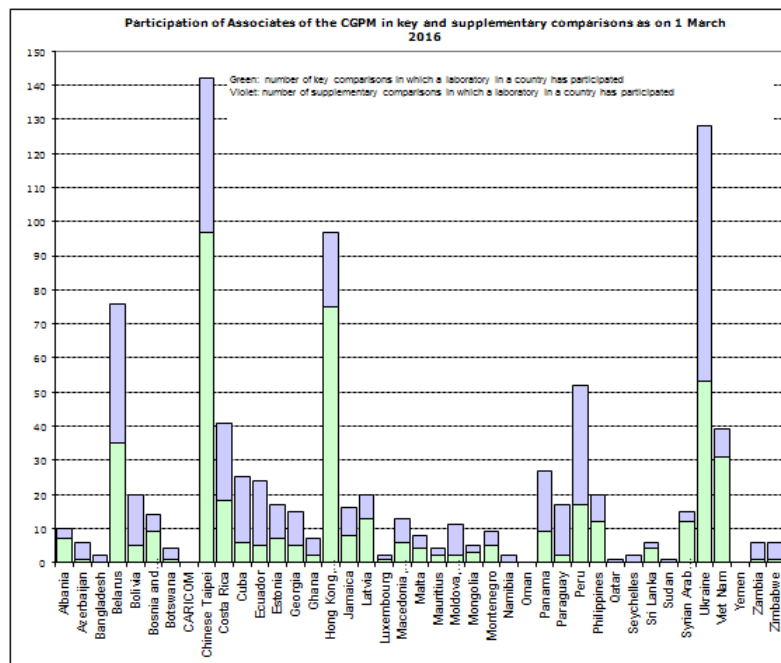


Figure 6. Graph on the participation of Associates of the CGPM in key and supplementary comparisons

4. Future revision of the BIPM KCDB

The scenarios and estimated costs were summarized and presented to the NMI Directors at their meeting at the BIPM on 13 to 14 October 2015

<http://www.bipm.org/utis/common/documents/CIPM-MRA-review/presentations/BIPM-presentation.pdf> .

Feedback such as [Report of the Working Group on the Implementation and Operation of the CIPM MRA](#) (that was open for comments until the end of August 2016) and information received via the CC consultation carried out in 2015 has allowed the KCDB Office to draw an outline for the KCDB revision. The Draft Scope and a work flow schedule concerning CMC data were addressed to the JCRB in form of working document JCRB-36/07.1 and 07.2, respectively.

In brief, **Excel files as work support are suggested to be abandoned and substituted by a web based data platform.** The platform will allow communication between the involved partners. Consultation with the Consultative Committees (CCs) has been initiated to get necessary information on issues to allow the KCDB Office to design the web platform structure and data fields. This needed information concerns notably feedback on the possible limitation of the variety of units, broad-scope CMCs, CMC review protocols (to define needs for review) and simplification of KCDB web contents for comparisons. The CCQM implemented an *ad hoc* Working Group in August 2016 to formulate their needs and the KCDB Office will work closely with them. **Information on the possible design of the future web-platform was communicated to the JCRB and the CCs in August 2016 and feedback from the CCs has been requested for 30 October.**

5. Action originating from the former JCRB meeting

Action 35/01 GULFMET registered their first comparison in the KCDB: [GULFMET.M.M-S1](#).

Action 35/03 Draft scope and flow diagram on KCDB 2.0 were communicated to the JCRB as working documents 36/07.1 and 36/07.2, respectively.

Action 35/08 A “pop-up” survey launched as a reply to the JCRB action 32/3 was terminated on 25 March 2016.

Action 35/10 On 3 May 2016, the BIPM KCDB Office deleted all participating institutes of comparisons carried out within the framework of the CIPM MRA but not being signatories or Designated Institutes. In total 184 participations were removed.

Other actions Access to KCDB newsletters via the KCDB web page, abandoned activity in 2011, was removed.

Acknowledgements

Many thanks to Dr Douglas Olson (JCRB Executive Secretary) and Mr Chingis Kuanbayev (BIPM) for their collaboration and assistance.

APPENDIX 1

New service categories in Mass and Related Quantities



CCM Service Category for Density

Present categories

- 2.1 Density of solid
 - 2.1.1 Density of solid: solid density artefact
 - 2.1.2 Volume of solid: solid artefact
- 2.2 Density of liquid
 - 2.2.1 Density of liquid: density measuring device, **standard volume vessel**

New categories

- 2.1 Density of solid
 - 2.1.1 Density of solid
 - 2.1.2 Volume of solid
- 2.2 Density of liquid
 - 2.2.1 Density measuring device
 - 2.2.2 Density of liquid
- 2.3 Refractive index of liquid (new)
 - 2.3.1 Refractive index of liquid (new)

Fluid Flow
 9.5 Volume of liquid
 9.5.1 Volume of liquid
 Example: CCM.FF-4.2.2011
 Calibration of micropipettes

Instrument Type or Method in CMC table
 hydrometer, oscillation-type density meter, pycnometer, etc.

Instrument Type or Method in CMC table
 hydrostatic weighing, hydrometer, oscillation-type density meter, magnetic suspension density meter, pycnometer, etc.

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Extract of presentation on new service categories made at the CCM 2015.

APPENDIX 2 List of uncompleted comparisons older than 5 years

a) Key Comparisons

KC identifier	Status Aug 2016	Indicated year	Pilot	Note
APMP.AUV.V-K1.1	Report in progress, Draft A	2010	NMIJ AIST	
APMP.EM.BIPM-K11.2	Report in progress, Draft B	2004	Puslit KIM-LIPI	
APMP.EM.BIPM-K11.3	In progress	2009 - 2011	KRISS	
APMP.EM-K2	In progress	2010 - 2011	KRISS	
APMP.EM-K5.1	Report in progress, Draft A	2010 - 2013	NIM	Progress 9/2015 to 2/2016
APMP.L-K3	Report in progress, Draft B	2005 - 2007	NMISA	
APMP.M.D-K4	Report in progress, Draft A	2007 - 2008	KRISS	
APMP.M.FF-K2.a	Report in progress, Draft A	2010	NMIJ AIST	
APMP.M.F-K2	Report in progress, Draft A	2007 - 2013	KRISS	
APMP.M.F-K3.a	In progress	2011 -	NIM	Added in 2016
APMP.M.F-K3.b	In progress	2011 -	NIM	Added in 2016
APMP.M.H-K1.b	Report in progress, Draft A	2003 - 2005	NMIJ AIST	
APMP.M.H-K1.c	Report in progress, Draft A	2003 - 2005	NMIJ AIST	
APMP.M.M-K2.2	In progress	2010	KRISS	
APMP.M.M-K5	Planned		NIM	
APMP.M.P-K7.TRI	Report in progress	2001	NMIJ AIST	
APMP.M.P-K9	Report in progress, Draft A	2009 -	KRISS, NMIA	
APMP.PR-K2.a.1	Measurement completed	2010 - 2012	NMIA	
APMP.PR-K2.b.1	In progress	2010 - 2012	NMIA	
APMP.PR-K3.a.1	Measurement completed	2006	NIM	
APMP.PR-K4	Report in progress, Draft B	2006 - 2007	NIM	Progress 9/2015 to 2/2016
APMP.RI(I)-K1.1	Report in progress, Draft B	2010	ARPANSA	
APMP.RI(I)-K2.B	Report in progress, Draft A	2007	NMIJ AIST	
APMP.RI(I)-K4	Report in progress, Draft A	2009 - 2010	NMIJ AIST	
APMP.T-K3.5	Measurements completed	2011 - 2014	KRISS	Added in 2016
APMP.T-K7.1	Protocol complete	2011 - 2012	NMIJ-AIST	Added in 2016
APMP.T-K8	In progress	2011 - 2013	NMIJ-AIST	Added in 2016
CCL-K1.2011	In progress	2011 - 2014	CENAM, NRC	Added in 2016
CCM.D-K3	Planned	2011 -	NMIJ-AIST	Added in 2016
CCM.F-K3.a	Report in progress, Draft A	2005 - 2007	PTB	
CCM.F-K3.b	Report in progress, Draft A	2005 -	PTB	
CCM.H-K2	Report in progress, Draft A	2003 - 2004	KRISS, NMIJ AIST	
CCM.H-K3	Planned	2011 - 2012	INRIM, NIST, NMIJ, PTB	Added in 2016
CCM.P-K14	Report in progress, Draft A	2010 - 2011	METAS	
CCM.P-K14.1	Protocol complete	2011 - 2012	METAS	Added in 2016
CCQM-K84	Report in progress, Draft A	2011	KRISS	Added in 2016
CCQM-K97	Report in progress, Draft B	2011	NIM, NMIJ	Added in 2016
CCRI(II)-K2.Fe-55	Report in progress, Draft B	2005 - 2006	BIPM	
CCRI(II)-K2.H-3	Report in progress, Draft B	2008 - 2009	BIPM	

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KC identifier	Status Aug 2016	Indicated year	Pilot	Note
CCRI(II)-K2.I-125(2)	Report in progress, Draft B	2004 - 2005	BIPM	Progress 9/2015 to 2/2016
CCRI(II)-K2.Kr-85	Report in progress, Draft B	2008	BIPM	Progress 9/2015 to 2/2016
CCRI(II)-K2.Mn-54	Report in progress, Draft B	2003	BIPM	Progress 9/2015 to 2/2016
CCRI(II)-K2.P-32	Report in progress, Draft B	2002 - 2003	BIPM	
CCRI(II)-K2.P-32.2	Report in progress, Draft A	2005	BIPM	
CCRI(II)-K2.Pu-238	Report in progress, Draft B	2001	BIPM	
CCRI(II)-K2.Sr-89	Report in progress, Draft B	2000 - 2001	BIPM	
CCRI(II)-K2.Sr-90	Report in progress, Draft A	1997 - 1998	BIPM	
CCRI(II)-K2.Tl-204	Report in progress, Draft B	2002 - 2003	BIPM	
CCT-K1.1	Report in progress, Draft A	2006 - 2014	NIST	Progress 9/2015 to 2/2016
CCT-K3.2	Report in progress, Draft A	2010	A*STAR	
CCT-K6.1	Report in progress, Draft A	2008 - 2010	NPL	
CCT-K9	Measurements completed	2011 - 2012	NIST	Added in 2016
COOMET.AUV.V-K1	Report in progress, Draft B	2007 - 2008	VNIIM	
COOMET.EM-K4	Report in progress, Draft B	2006 - 2009	SE Ukraine	
COOMET.L-K3	Report in progress, Draft A	2011 - 2012	VNIIM	Added in 2016
COOMET.M.H-K2	Report in progress, Draft B	2007 - 2010	VNIIFTRI	
COOMET.PR-K3.a	Report in progress, Draft A	2009 - 2011	BelGIM	Progress since 2/2016
EURAMET.L-K3.2009	Report in progress, Draft A	2009 - 2015	PTB	Progress since 2/2016
EURAMET.L-K8	Report in progress, Draft B	2009 - 2010	LNE, NRC	
EURAMET.M.D-K1.1	Report in progress, Draft A	2008 - 2012	PTB	
EURAMET.M.FF-K5.a	Protocol complete	2009	PTB	
EURAMET.M.P-K1.c	In progress	2011 - 2014	FORCE	Added in 2016
EURAMET.M.P-K7	Report in progress, Draft B	2005 - 2007	MIKES	
EURAMET.M.P-K8	Report in progress, Draft B	2009 - 2010	METAS	
EURAMET.PR-K2.a	Measurements completed	2010 - 2012	VSL	Progress 9/2015 to 2/2016
EURAMET.PR-K3.a.1	Report in progress, Draft B	2004 - 2005	LNE-INM	
EURAMET.PR-K5	Measurement completed	2007 -	MKEH	
EURAMET.PR-K6.2	Report in progress, Draft A	2008 - 2009	BIM	
EURAMET.T-K1	Report in progress, Draft A	2008 - 2012	PTB	
EURAMET.T-K3.2	Report in progress, Draft B	2009 - 2010	UME	
EURAMET.T-K3.4	Report in progress, Draft A	2010 - 2011	MIRS/UL-FE/LMK	
EUROMET.M.D-K2	Report in progress, Draft B	2001	PTB	
EUROMET.M.F-K1	Report in progress, Draft B	2002 - 2004	MIKES	
EUROMET.M.F-K3	In progress	2005 -	PTB	
EUROMET.T-K8	In progress	2008 - 2012	PTB	
SIM.AUV.V-K1.1	Report in progress, Draft B	2005	INMETRO	
SIM.M.P-K1	Protocol complete	2008 - 2010	CENAM	
SIM.M.P-K1.c	In progress	2011 - 2013	INDECOPI	Added in 2016
SIM.M.P-K2	In progress	2011 - 2013	INTI	Added in 2016
SIM.M.P-K6	In progress	2008 - 2011	CENAM	
SIM.M.P-K6.1	In progress	2011 - 2013	LACOMET	Added in 2016
SIM.M.P-K7	Report in progress, Draft B	2001	CENAM	
SIM.QM-K1	Report in progress, Draft B	2009	INMETRO	

b) Supplementary Comparisons

SC identifier	Status August 2016	Indicated year	Pilot	Note
AFRIMETS.RI(I)-S1	In progress	2011 - 2013	NMISA	new in 2016
AFRIMETS.T-S1	Report in progress, Draft B	2009 - 2010	NMISA	
APMP.EM-S8	Protocol complete	2011 - 2013	NPLI	new in 2016
APMP.M.H-S4	Report in progress, Draft A	2011	KRISS	
APMP.M.H-S4	Report in progress, Draft A	2011	KRISS	new in 2016
APMP.M.M-S1	Planned	2007	NPSL Pakistan	
APMP.M.P-S1	Measurement completed	2003 - 2005	CMS/ITRI	
APMP.PR-S1.2	Protocol complete	2008	NMC, A*STAR	
APMP.PR-S5	Measurement completed	2008 - 2009	NMIJ AIST	
APMP.RI(I)-S1	Report in progress, Draft B	2010 - 2011	OAP	
APMP.T-S6	Planned	2009	KRISS, NMIA, NML-SIRIM	
APMP.T-S8	In progress	2011 - 2015	NMLPHIL	new in 2016
CCRI(II)-S10	Report in progress, Draft A	2011 - 2012	ENEA-INMRI	new in 2016
CCRI(II)-S6.Co-57	Report in progress, Draft B	2008	IAEA	
CCRI(II)-S6.I-131	Report in progress, Draft B	2006	IAEA	
CCRI(II)-S9	Report in progress, Draft A	2011	KRISS	new in 2016
CCT-S2	Report in progress, Draft B	2007 - 2010	LNE	Progress 9/2015 to 2/2016
CCT-S3	Report in progress, Draft A	2007 - 2008	NMIJ AIST	
COOMET.EM.RF-S1	In progress	2009	VNIIFTRI	
COOMET.EM-S1	Report in progress, Draft B	2004 - 2007	VNIIIM	
COOMET.EM-S10	Report in progress, Draft B	2010 - 2012	VNIIIMS	
COOMET.EM-S4	Report in progress, Draft B	2006 - 2009	SE Ukraine	
COOMET.EM-S6	Report in progress, Draft B	2007 - 2010	VNIIIMS	
COOMET.EM-S7	Report in progress, Draft B	2009 - 2011	VNIIIMS	
COOMET.EM-S9	In progress	2009	VNIIFTRI	
COOMET.M.FF-S2	Report in progress, Draft B	2008 - 2009	PTB	
COOMET.M.FF-S4	Report in progress, Draft B	2009 - 2010	SMU	
COOMET.M.F-S1	Report in progress, Draft B	2008 - 2010	VNIIIM	
COOMET.PR-S2	Report in progress, Draft B	2011 - 2012	VNIIOFI	new in 2016
COOMET.PR-S5	Measurements completed	2008 - 2011	INIMET (Cuba)	Progress 9/2015 to 2/2016
EURAMET.EM-S31	Measurement completed	2009 - 2010	PTB	
EURAMET.EM-S33	In progress	2010 - 2011	LCOE (Spain)	
EURAMET.EM-S34	Protocol complete	2010 - 2011	LCOE (Spain)	
EURAMET.EM-S37	In progress	2011 - 2013	CMI	new in 2016
EURAMET.M.M-S3	Report in progress, Draft B	2011 - 2012	UME	Progress since 2/2016
EURAMET.M.P-S5	Report in progress, Draft B	2007	PTB	
EURAMET.M.T-S2	Report in progress, Draft A	2008	PTB	
EURAMET.T-S4	Report in progress, Draft B	2007 - 2009	NPL	
EUROMET.RI(III)-S1	Report in progress, Draft B	2003 - 2007	IRSN	
SIM.AUV.A-S1	Report in progress, Draft B	2001 - 2002	CENAM	
SIM.M.FF-S4	Report in progress, Draft B	2006	INIMET (Cuba)	
SIM.M.M-S6	Report in progress, Draft B	2009	CESMEC (Chile)	
SIM.M.P-S1	Report in progress, Draft A	2007 - 2008	NIST	
SIM.M.P-S2	In progress	2009 - 2011	INMETRO	
SIM.M.P-S3	Protocol complete	2010	LCPN-P (Chile)	
SIM.M.P-S4	Protocol complete	2010	LCPN-P (Chile)	
SIM.M.P-S5	In progress	2011 - 2013	INMETRO	new in 2016
SIM.T-S3	Report in progress, Draft B	2007 - 2008	CESMEC, INEN	
SIM.T-S4	Report in progress, Draft B	2008	PTB	