

## KCDB REPORT TO THE 35th JCRB MEETING

1 September 2015 to 1 March 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 page<sup>1</sup>.

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 Section 4 gives information on a “**pop-up survey**” on the KCDB web. Information on the possible forthcoming **review of the KCDB**, in the context of the Review in the CIPM MRA, is presented in Section 5.

## 1. CIPM MRA Appendix C : Calibration and Measurement Capabilities

### 1.1. Status of the KCDB CMC database

On 1 March 2016, the KCDB included a total of 24 580 CMCs:

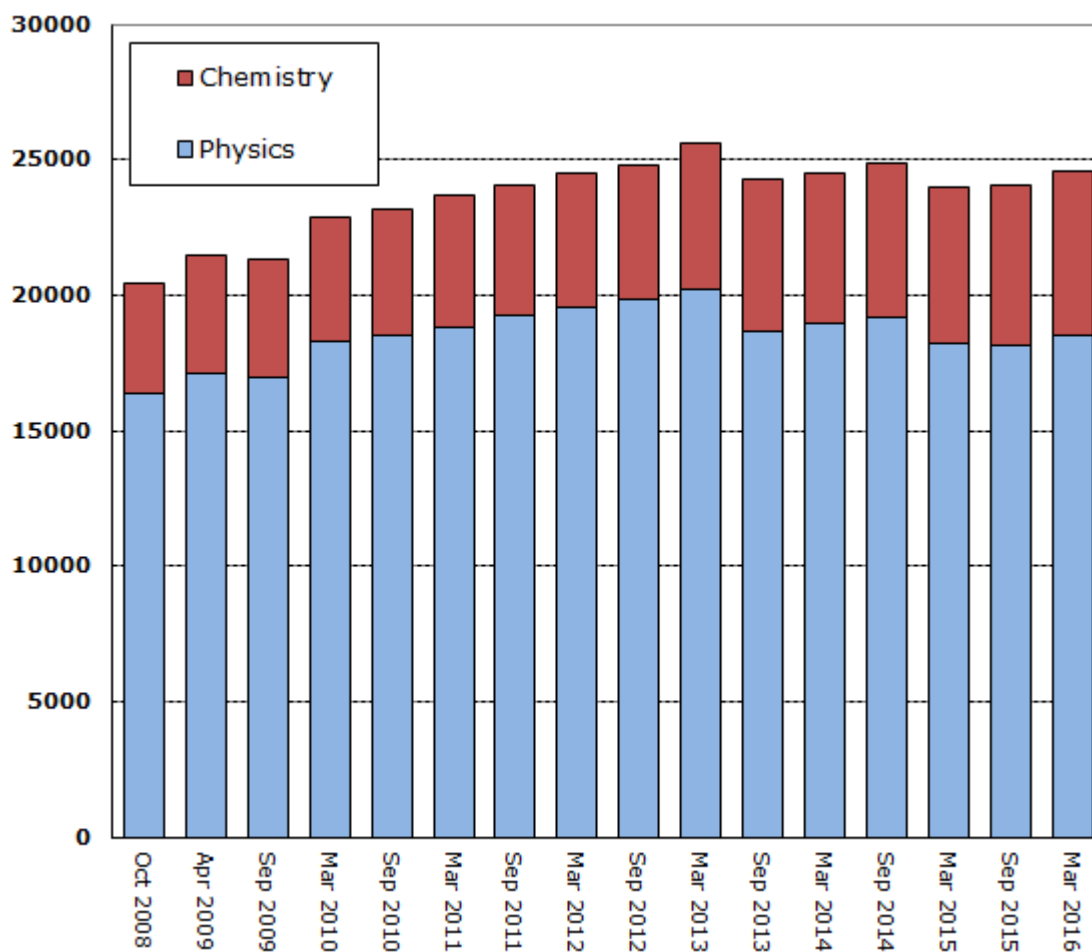
- 18 502 in Physics,
- 6 078 in Chemistry.

Over the last six months 31 countries published CMCs. The total number of CMCs increased by 539 over the last 12 months, corresponding to an increase by 2.2 %. The number of CMCs in Chemistry increased by 5.4 % while CMCs in Physics increased by 1.7 %; none of the figures are particularly large compared to previous.

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<sup>1</sup> 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 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 September 2015 and 1 March 2016 are listed in Table 1<sup>2</sup>

<sup>2</sup> Published CMCs are announced in "[CMCs News](#)".

**Table 1.** Published CMCs from 1 September 2015 until 1 March 2016

|                | RMO / economy                                   | Field               | CMCs  |
|----------------|---|---------------------|-------|
| September 2015 | EURAMET : CH, PT                                | M                   | - 6   |
|                | Slovenia  | QM                  | + 1   |
|                | Netherlands                                     | AUV                 | - 6   |
|                | Bosnia Herzegovina                              | M                   | + 1   |
|                | Argentina                                       | L                   | + 2   |
|                | APMP: CN, TW                                    | L                   | + 49  |
| October 2015   | EURAMET : CH, DE, FI, GB, NL, PL,<br>SK, TR     | L                   | + 33  |
|                | EURAMET : ES, FR                                | AUV                 | + 16  |
|                | November 2015                                   | SIM : BR, US        | QM    |
| November 2015  | Colombia  | T                   | + 37  |
|                | EURAMET : AT, CH, DE, HU, IT,<br>ME, NO, PL, SI | T                   | + 98  |
|                | APMP : CN, ID, PH                               | T                   | + 26  |
|                | Slovenia  | RI                  | + 14  |
|                | December 2015                                   | Italy <sup>A</sup>  | EM    |
| December 2015  | Peru  | M                   | +3    |
|                | Montenegro                                      | M                   | +1    |
|                | Belarus   | L                   | +1    |
|                | January 2016                                    | Mexico <sup>A</sup> | AUV   |
| January 2016   | Slovakia <sup>A</sup>                           | AUV                 | - 6   |
|                | Finland   | L                   | - 3   |
|                | Italy   | QM                  | - 2   |
|                | APMP : AU, CN, HK, JP, SG, IN, KR,<br>TH, TW    | QM                  | +176  |
|                | February 2016                                   | Denmark             | L     |
| February 2016  | Thailand  | QM                  | + 1   |
|                | United States <sup>B</sup>                      | EM                  | + 129 |
|                | Portugal  | L                   | - 2   |
|                | Hungary   | L                   | - 1   |
|                | United Kingdom                                  | L                   | - 4   |

A : result of greying out

B : result of reinstatement

The CMCs in Chemistry declared via APMP and associated with the annual April-meeting of CCQM in 2015 were not published until January 2016 after the evidence for their quality system was provided. The Netherlands deleted all their CMCs in AUV as a consequence of a reorganization of the VSL activities. The Swiss DI "ROTH+CO.AG" and the BMM of Montenegro published their first CMCs in November 2015 that were in thermometry.

### 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 2 lists the CMCs concerned during the last six months.

**Table 2.** Deleted, greyed-out or reinstated CMCs from 1 September 2015 until 1 March 2016

|                   | State/economy | Field | Action   |
|-------------------|---------------|-------|--|
| 1 September 2015  | Netherlands   | AUV   | Deletion of 6 CMC - interrupted service                |
| 28 September 2015 | New Zealand   | EM    | Definitive deletion of 5 CMCs after greying out period |
| 28 September 2015 | Canada        | PR    | Definitive deletion of 4 CMCs after greying out period |
| 9 December 2015   | Italy         | EM    | 15 CMCs greyed out                                     |
| 15 December 2015  | Kazakhstan    | QM    | 1 CMCs partially greyed out                            |
| 6 January 2016    | Mexico        | AUV   | 16 CMCs greyed out                                     |
| 13 January 2016   | Slovakia      | AUV   | 6 CMCs greyed out                                      |
| 22 January 2016   | Canada        | L     | Definitive deletion of 11 CMCs after greying out       |
| 11 February 2016  | United States | EM    | 129 CMCs re-sinstated                                  |
| 12 February 2016  | Portugal      | L     | 1 CMC greyed out                                       |

The present 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](#) , and is illustrated in Table 3. In total 142 CMCs are greyed out.

The dates of the greying-out of CMCs are listed in the spreadsheet “Dates of CMCs greying-out” of the EXCEL file “CMCsNumber\_2015, available from the [access-restricted JCRB CMC website](#) (see “KCDB statistics”).

**Table 3.** Number of CMCs temporary removed (“greyed-out”) from the KCDB, by country and by metrology area, as at 1 March 2016.

|                | AUV | M | PR | EM | T | RI | L | QM                    | TF | Total                    |
|----------------|-----|---|----|----|---|----|---|-----------------------|----|--------------------------|
| <b>APMP</b>    |     |   |    |    |   |    |   |                       |    |                          |
| AU             |     |   |    | 27 |   |    |   |                       |    | 27                       |
| NZ             |     |   |    |    |   |    |   |                       |    | 0                        |
| KR             |     |   |    |    |   |    |   | 5                     |    | 5                        |
| TH             |     |   |    |    |   | 3  |   |                       |    | 3                        |
| ZA             |     | 2 |    |    |   |    |   |                       |    | 2                        |
|                |     |   |    |    |   |    |   |                       |    | <b>Total APMP: 37</b>    |
| <b>COOMET</b>  |     |   |    |    |   |    |   |                       |    |                          |
| KZ             |     |   |    |    |   |    |   | 1 partially<br>Cat. 6 |    | 0                        |
|                |     |   |    |    |   |    |   |                       |    | <b>Total COOMET: 0</b>   |
| <b>EURAMET</b> |     |   |    |    |   |    |   |                       |    |                          |
| BE             |     |   |    | 25 |   |    |   |                       | 6  | 31                       |
| FI             |     | 6 |    |    |   |    |   |                       |    | 6                        |
| FR             |     | 3 |    | 3  |   |    |   |                       |    | 6                        |
| IAEA           |     |   |    |    |   | 1  |   |                       |    | 1                        |
| IT             |     |   |    | 15 |   |    |   |                       |    | 15                       |
| PT             |     |   |    |    |   |    | 1 |                       |    | 1                        |
| SK             | 6   |   |    |    |   |    |   |                       |    | 6                        |
|                |     |   |    |    |   |    |   |                       |    | <b>Total EURAMET: 66</b> |
| <b>SIM</b>     |     |   |    |    |   |    |   |                       |    |                          |
| MX             | 16  |   | 3  |    |   |    |   | 2                     |    | 21                       |
| AR             |     |   |    |    |   |    | 1 |                       |    | 1                        |
| CA             |     |   |    |    |   |    | 0 |                       |    | 0                        |
| US             |     | 3 | 1  | 8  |   | 1  |   |                       |    | 13                       |
| BR             |     |   |    |    |   |    |   | 4                     |    | 4                        |
|                |     |   |    |    |   |    |   |                       |    | <b>Total SIM: 39</b>     |
|                |     |   |    |    |   |    |   |                       |    | <b>TOTAL: 142</b>        |

#### 1.4. CMC statistics according to RMO

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

**Table 4.** information on CMC statistics per RMO

| Entity               | Total number of CMCs on 1 March 2016 |
|----------------------|--------------------------------------|
| AFRIMETS             | 451                                  |
| APMP                 | 5612                                 |
| COOMET               | 2344                                 |
| EURAMET              | 10949                                |
| GULFMET <sup>3</sup> | 0                                    |
| SIM                  | 4974                                 |
| ESA                  | 0                                    |
| IAEA                 | 22                                   |
| IRMM                 | 228                                  |
| WMO                  | 0                                    |

The APMP and SIM represent the largest relative increase by 5 and 4 %, respectively, during the six last months.

## 2. CIPM MRA Appendix B : Key and supplementary comparisons

### 2.1. Present status

On 1 March 2016, the KCDB covered 1387 comparisons distributed as listed in Table 5; 933 key comparisons and 454 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.

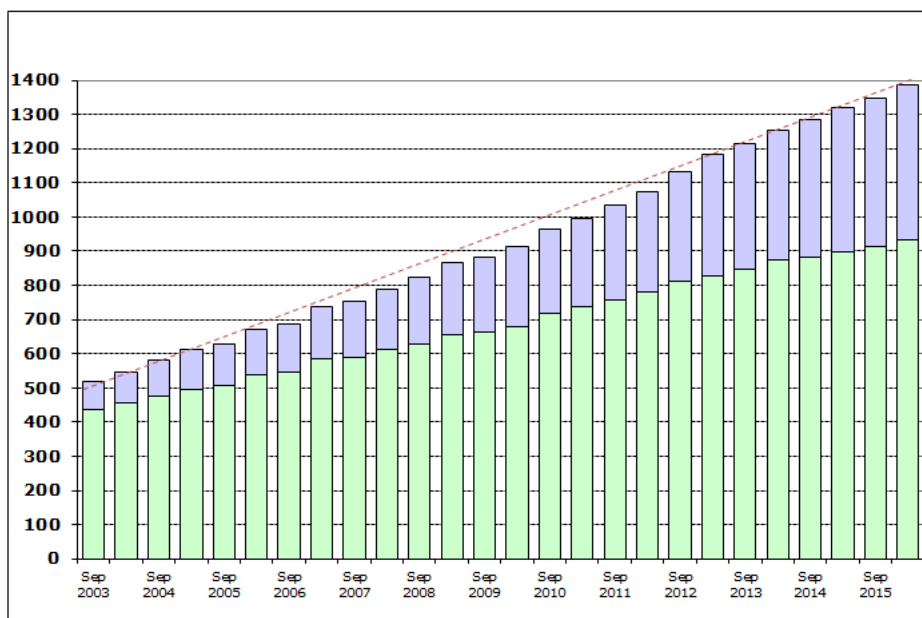
Figure 2 shows the evolution of the total number of key (green) and of supplementary (violet) comparisons registered in the KCDB since September 2003. The added linear red dashed curve puts in evidence a slight increase in added comparisons over 2007 to 2012. However, the annual increase of key comparisons is around  $+40 \pm 8$  per year taking into account the history since 2004.

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

It may be noted that the number of participating institutes at each comparison on average is 35% larger for key comparison than for supplementary comparisons.

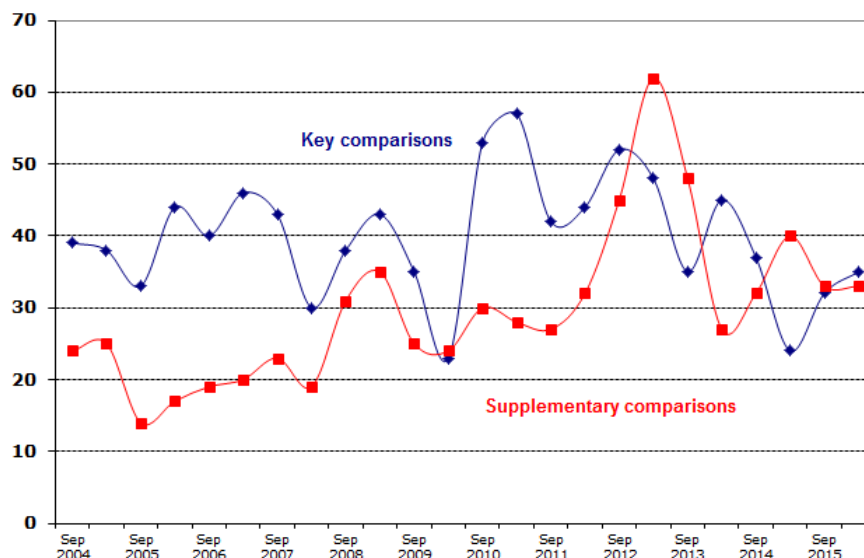
**Table 5.** Key and Supplementary Comparisons on 1 March.

| Entity               | KC  | SC  |
|----------------------|-----|-----|
| BIPM                 | 91  | 1   |
| CC                   | 457 | 28  |
| AFRIMETS             | 4   | 16  |
| APMP                 | 130 | 91  |
| COOMET               | 44  | 75  |
| EURAMET              | 151 | 165 |
| GULFMET <sup>4</sup> | 0   | 0   |
| SIM                  | 56  | 78  |



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

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



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

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 February 2016; next update is due in May 2016.

## 2.2. Registrations and modifications of comparisons

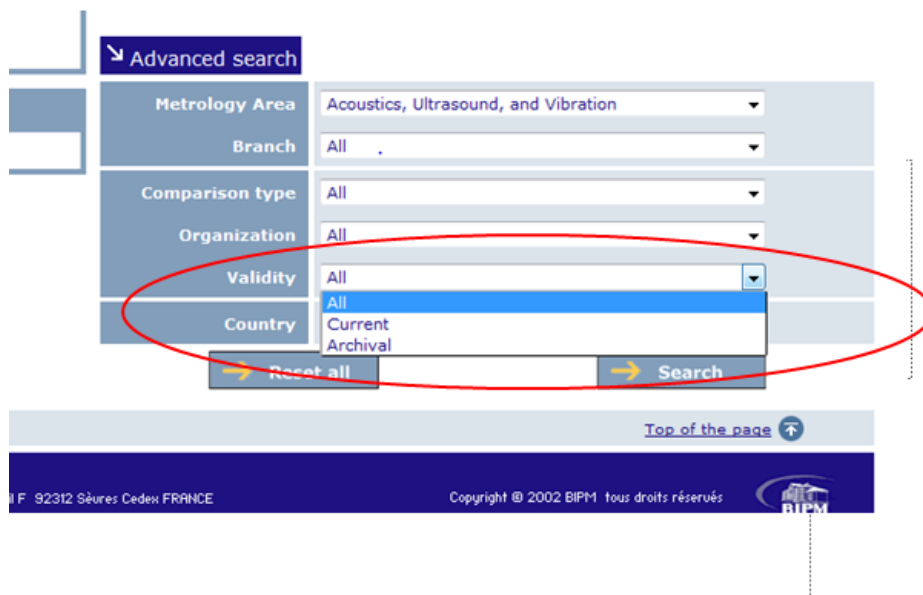
From 1 September 2015 the following were registered as new comparisons:

|                      |                 |                         |
|----------------------|-----------------|-------------------------|
| AFRIMETS.AUV.A-K5    | CCL-K4.2015     | COOMET.L-S19            |
| AFRIMETS.EM-S1       | CCPR-K2.b.2016  | COOMET.M.G-S1           |
| AFRIMETS.T-S5        | CCQM-K108.2014  | COOMET.M.M-S2           |
| APMP.M.FF-S1         | CCQM-K111.1     | COOMET.QM-S3.2015       |
| APMP.M.F-S1          | CCQM-K137       | COOMET.T-S2             |
| APMP.M.H-S5          | CCQM-K138       | EURAMET.L-S25           |
| APMP.M.H-S6          | CCQM-K140       | EURAMET.M.G-K2          |
| APMP.M.P-K7.2        | CCQM-K41.2017   | EURAMET.M.P-S17         |
| APMP.M.P-S9          | CCQM-K74.2017   | EURAMET.QM-S10          |
| APMP.M.T-S1          | CCQM-K86.b      | EURAMET.RI(II)-K2.I-131 |
| APMP.QM-K91          | CCRI(II)-S12    | SIM.QM-S5               |
| BIPM.RI(II)-K1.Ge-68 | COOMET.AUV.A-K5 | SIM.QM-S6               |
| BIPM.RI(II)-K4.Cu-64 | COOMET.L-S18    | SIM.QM-S7               |



There are 88 comparisons completed *before* the implementation of the CIPM MRA which are part of the KCDB. Many of these were reported in the 1980ies and early 90ies. With the objective to present a truer picture of the comparison landscape, the BIPM KCDB Office consulted the CCL, CCPR, CCM and the CCAUV to learn to which extent these comparisons could be placed in the already existing, but until now empty, KCDB archives. This facility allows search on archived comparisons on the KCDB web. The CC feedback resulted in placing 25 superseded key comparisons and 6 superseded supplementary comparisons in the KCDB archives on 6 January 2016.

Five key comparisons, having passed the 20-year limit set by the CCRI, were also archived. Three additional key comparisons – EURAMET.PR-K4.1, EURAMET.PR-K6.3 and CCEM-K3.1 – were added to the archives after having been classified as abandoned by the pilot institute. The 39 archived comparisons on 1 March 2016 are listed in Appendix 1.



**Figure 4.** Cut from the KCDB search on comparisons. “Validity” signifies whether the comparison is used as support or has been archived. The default setting is presently “All” giving access to the entire set of comparisons when doing a search.

### 2.3. Published results of key and supplementary comparisons

From 1 September 2015 the following were published:

|   |                           |                     |
|---|---------------------------|---------------------|
| AFRIMETS.AUV.A-S1                       | BIPM.RI(I)-K8 (NMIJ-AIST) | EURAMET.L-K1.2011   |
| AFRIMETS.L-S3                           | CCAUV.U-K3.1              | EURAMET.L-K3.2009.1 |
| APMP.EM.RF-K3.F                         | CCM.D-K4                  | EURAMET.L-K7.2014   |
| APMP.L-S4                               | CCQM-K94                  | EURAMET.L-K8.2013   |
| APMP.M.P-S5                             | CCQM-K99                  | EURAMET.M.D-K2      |
| BIPM.EM-K10.b (PTB)                     | COOMET.EM-K10.b           | EURAMET.M.M-S8      |
| BIPM.EM-K11.a (JV, NIMT, SMD, NSAI NML) | COOMET.L-S13              | EURAMET.PR-K1.A     |
| BIPM.EM-K11.b (JV, NIMT, SMD, NSAI NML) | COOMET.M.F-S2             | EURAMET.RI(I)-S4.1  |
| BIPM.QM-K1 (DMDM)                       | COOMET.QM-K93             | SIM.EM-S11          |
| BIPM.RI(I)-K1 (ENEA-INMRI)              | COOMET.QM-S3              | SIM.L-K3.2008       |
| BIPM.RI(I)-K1.F-18 (LNE-LNHB)           | COOMET.QM-S5              | SIM.L-S6            |
| BIPM.RI(I)-K3 (NMIJ-AIST)               | COOMET.T-S1               | SIM.M.D-K3          |
| BIPM.RI(I)-K4 (PTB)                     | EURAMET.AUV.V-K3          | SIM.T-6.1           |
| BIPM.RI(I)-K7 (ENEA-INMRI)              |                           |                     |

### 2.4. Follow-up on Action 33/3 from the 33rd JCRB meeting

**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.*

On 1 September 2015, 82 out of 915 KCs registered 2010 and earlier were uncompleted. Similarly, 46 out of 433 registered SCs registered 2010 and earlier remained uncompleted on 1 September 2015.

Out of these, 7 were published during the last 6 months, 2 were declared abandoned and another 11 comparisons had their status updated. On 1 March 2016, there were 31 uncompleted key and supplementary comparisons that had started in 2011. Half of these are in Mass, rather equally distributed amongst the different RMOs (*cf. Presentation by Dr Douglas Olson – JCRB Executive secretary – March 2016*). The comparisons in question are listed in listed in Appendix 2.


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

Table 6 summarizes the participation of the [40 Associates of the CGPM](#) in CIPM MRA activities as at 1 March 2016.

New CMCs have been added by a number of countries where the total decrease of 26 CMCs compared to September 2015 is largely a result of Lithuania being no longer an associate but having become a Member of the BIPM. To be noted are the first CMCs declared by Montenegro that were included into the KCDB in November 2015. However, only 22 states/economies have CMCs published in the KCDB. The repartition of CMCs among Associates is illustrated in Figure 5.

**Table 6.** CIPM MRA activity of the NMIs of Associates of the CGPM: important dates, number of published CMCs and participation in key and supplementary comparisons.<sup>5,6</sup>

**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                   | 226            | 0               | 07 April 2004                        | Acoustics, Ultrasound and Vibration       | 35              | 41                        |
| Bolivia                | 04 April 2008                 | 16 May 2008                       | 0              | 0               | -                                    | -   | 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                   | 105            | 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                   | 16             | 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                  | 99             | 0               | 03 August 2010                       | Mass Standards                            | 17              | 35                        |
| Philippines            | 01 June 2002                  | 19 December 2002                  | 31             | 0               | 18 December 2013                     | Mass Standards                            | 12              | 8                         |
| Seychelles             | 10 September 2010             | 12 November 2010                  | 0              | 0               | -                                    | -   | 0               | 2                         |
| Slovenia               | 02 June 2003                  | 23 June 2003                      | 231            | 0               | 11 May 2004                          | Electricity and Magnetism                 | 45              | 24                        |
| 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                   | 234            | 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                         |

At least one of the declared national metrology institutes of each state/economy participate in a key or supplementary comparison except in three cases, see Figure 6. Over the last 6 months the participation in supplementary comparisons increased by more than 10 %.

<sup>5</sup> 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.

<sup>6</sup> 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 1 March 2016.

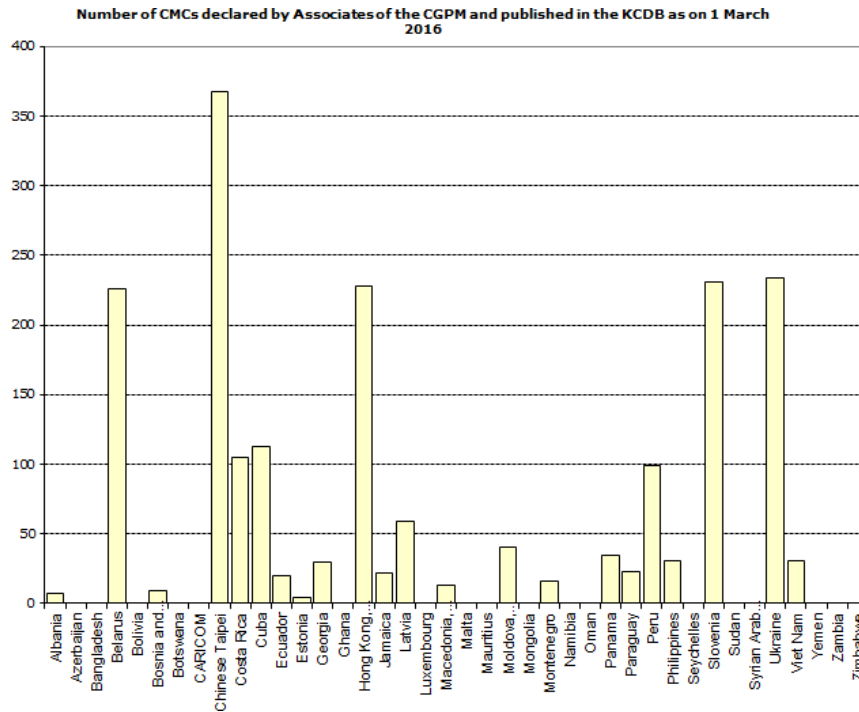


Figure 5. Graph on the number of CMCs declared by Associates of the CGPM

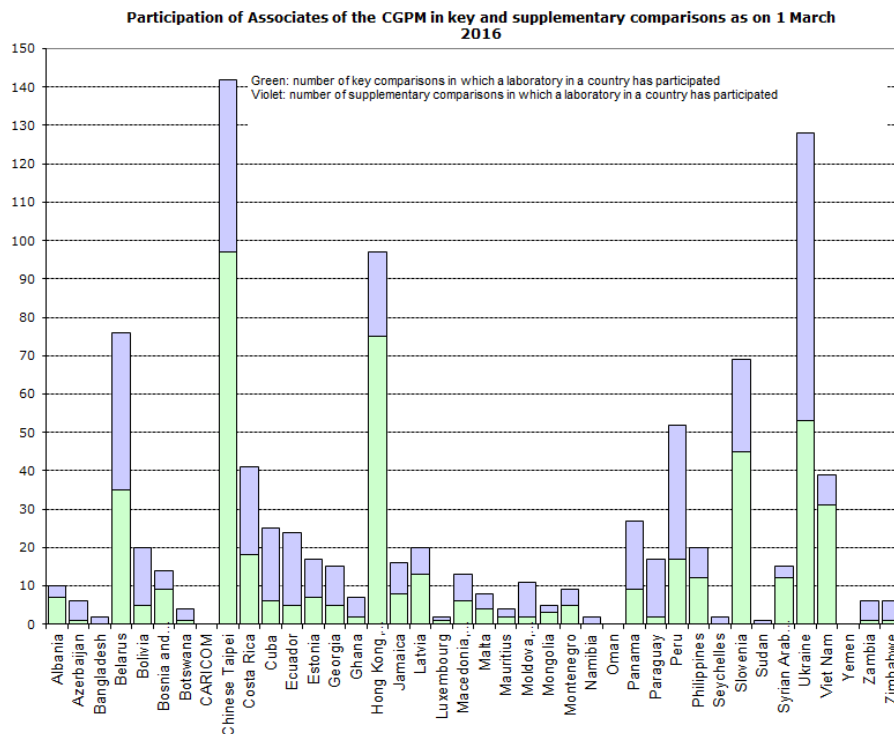


Figure 6. Graph on the participation of Associates of the CGPM in

*key and supplementary comparisons*

#### **4. Pop-up Survey on the KCDB**

A “pop-up” survey, appearing when consulting the KCDB home page, was launched in December 2014. It iterated two questions:

1. What is the purpose of your visit today?
2. How easy was it to find the information?

More than a third of the visits concerned CMCs and calibration, a quarter of the visits were on comparisons and 16% dealt with accreditation. A majority of users who replied found it easy to find the information needed on the KCDB, but it is unclear how many were already acquainted.<sup>7</sup>

**The KCDB Office suggests to the JCRB to stop this survey.** The detailed replies are listed in Appendix 3.

#### **5. Future revision of the BIPM KCDB**

From 1999, the KCDB web system/application has successively been adapted to reply to external demands. At the beginning it seemed convenient to use EXCEL files, available broadly. The KCDB grew rapidly and was equipped with the powerful search engine EXALEAD in 2007, but this engine is no longer maintained. The KCDB was initially developed using a Microsoft ASP language which is no longer supported, preventing future improvements.

Today’s users require modern software tools and advanced search facilities. With the current review of the implementation of the CIPM MRA, requests have been expressed by NMIs and Consultative Committees to also revise the KCDB support. To prepare for the revision of the CIPM MRA the KCDB Office, in collaboration with the JCRB Executive Secretary and the BIPM IT team, studied and drafted possible scenarios for a revised KCDB based on feedback received from the Consultative Committees, RMOs and NMIs. With support by an external company, the KCDB Office carried out a study in September 2015 on possible scenarios and their associated estimated costs.

A web based platform for CMC submission and review is perceived as the most urgent demand. It would allow submitters and reviewers to work on a chosen number of specific CMCs: new, modified, deleted or greyed-out. Collaboration would be simplified and comments and replies could be stored. Modification of vocabulary could be made almost instantaneously. A numerical comparison of capabilities of each country would be made possible and additional information could be made accessible – at least on a restricted basis – such as documents concerning the Quality System.

The KCDB information on comparisons (Appendix B) may be simplified, as well as the generation of statistics.

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<sup>7</sup> One visitor may reply to several questions, therefore the indicated percentage in the Appendix 3 may be misleading.

All modifications would involve changes of both the front office (user side) as well as the back office (technical support to the KCDB office and programming).

The scenarios and 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>.

Referring to the precedent paragraph, in case of a revised version of the KCDB it would be instructive to launch, if not identical, a similar survey to get feedback on possible improvements.

### **Acknowledgements**

Many thanks to Dr Douglas Olson, JCRB Executive Secretary for his assistance.

**APPENDIX 1**

**Archived comparisons on 1 March 2016**

|                            |                      |   |
|----------------------------|----------------------|---|
| BIPM.L-K10                 | Superseded           |   |
| BIPM.L-K11                 | Superseded           |   |
| EUROMET.L-K1.PREV          | Superseded           |   |
| EUROMET.L-K2.PREV          | Superseded           |   |
| EUROMET.L-K4.PREV          | Superseded           |   |
| EUROMET.L-K5.PREV          | Superseded           |   |
| SIM.L-K1.PREV              | Superseded           |   |
| SIM.L-K6.PREV              | Superseded           |   |
| EUROMET.L-S1               | Superseded           |   |
| EUROMET.L-S3               | Superseded           |   |
| EUROMET.L-S13              | Superseded           |   |
| CCPR-K1.PREV(1991)         | Superseded           |   |
| CCPR-K2.PREV(1992)         | Superseded           |   |
| CCPR-K2.PREV(1994)         | Superseded           |   |
| EUROMET.PR-K3.a.PREV(1994) | Superseded           |   |
| EUROMET.PR-K3.a.PREV(1995) | Superseded           |   |
| EUROMET.PR-K6.PREV(1996)   | Superseded           |   |
| SIM.PR-K5.PREV(1997)       | Superseded           |   |
| SIM.PR-K6.PREV(1990)       | Superseded           |   |
| SIM.PR-K6.PREV(1993)       | Superseded           |   |
| CCM.P-K8                   | Superseded           |   |
| CCM.P-K10                  | Superseded           |   |
| CCM.P-K11                  | Superseded           |   |
| CCM.M-K1                   | Superseded           |   |
| CCM.M-K2                   | Superseded           |   |
| SIM.M.V-S1                 | Superseded           |   |
| EUROMET.M.V-S1             | Superseded           |   |
| EUROMET.M.V-S2             | Superseded           |   |
| EUROMET.M.V-S4             | Superseded           |   |
| EUROMET.M.M-K1             | Superseded           |   |
| EUROMET.M.D-K1             | Superseded           |   |
| CCRI(II)-K2.Ba-133         | Passed 20 year limit |   |
| CCRI(II)-K2.Ce-139         | Passed 20 year limit |   |
| CCRI(II)-K2.Cs-134         | Passed 20 year limit |   |
| CCRI(II)-K2.Cs-137         | Passed 20 year limit |   |
| CCRI(II)-K2.I-125          | Passed 20 year limit |   |
| CCEM-K3.1                  | Abandoned            | <i>(destroyed transfer standard)</i>                                      |
| EURAMET.PR-K6.3            | Abandoned            | <i>(will join instead new CC comparison to be organized within short)</i> |
| EURAMET.PR-K4.1            | Abandoned            | <i>(technical issue)</i>  |

**APPENDIX 2**














**List of uncompleted comparisons started in 2011  
as at 1 March 2016**

|                   |             |
|-------------------|-------------|
| AFRIMETS.RI(I)-S1 | 2011 - 2013 |
| APMP.EM-S8        | 2011 - 2013 |
| APMP.M.F-K3.a     | 2011 -      |
| APMP.M.F-K3.b     | 2011 -      |
| APMP.M.H-S4       | 2011        |
| APMP.T-K3.4       | 2011 - 2013 |
| APMP.T-K3.5       | 2011 - 2014 |
| APMP.T-K7.1       | 2011 - 2012 |
| APMP.T-K8         | 2011 - 2013 |
| APMP.T-S8         | 2011 - 2015 |
| CCL-K1.2011       | 2011 - 2014 |
| CCM.D-K3          | 2011 -      |
| CCM.FF-K5.2011    | 2011 - 2012 |
| CCM.H-K3          | 2011 - 2012 |
| CCM.P-K14.1       | 2011 - 2012 |
| CCQM-K84          | 2011        |
| CCQM-K97          | 2011        |
| CCRI(II)-S10      | 2011 - 2012 |
| CCRI(II)-S9       | 2011        |
| CCT-K9            | 2011 - 2012 |
| COOMET.L-K3       | 2011 - 2012 |
| COOMET.PR-S2      | 2011 - 2012 |
| EURAMET.EM-S37    | 2011 - 2013 |
| EURAMET.M.M-S3    | 2011 - 2012 |
| EURAMET.M.P-K1.c  | 2011 - 2014 |
| EURAMET.M.P-S9    | 2011        |
| SIM.M.M-S9        | 2011 - 2012 |
| SIM.M.P-K1.c      | 2011 - 2013 |
| SIM.M.P-K2        | 2011 - 2013 |
| SIM.M.P-K6.1      | 2011 - 2013 |
| SIM.M.P-S5        | 2011 - 2013 |



**APPENDIX 3**                      **Survey replies on 1 March 2016**

**Question 1**











| 1. What is the purpose of your visit today ?                                       |   |                     |                   |
|--|---|---------------------|-------------------|
|  |   | Response<br>Percent | Response<br>Count |
| <b>I need a source for traceability for my laboratory accreditation</b>            |    | <b>15.6%</b>        | <b>38</b>         |
| I am from an accreditation body  |    | 6.6%                | 16                |
| I need to report my activities related to comparisons and or/CMCs to my government |    | 7.8%                | 19                |
| I want to find a specific calibration service                                      |   | 8.6%                | 21                |
| I need traceable data for my research work   |  | 5.3%                | 13                |
| I wish to check results of my laboratory in comparisons                            |  | 9.9%                | 24                |
| I wish to check results of other laboratories in comparisons                       |  | 10.3%               | 25                |
| I need to verify published CMCs of my laboratory                                   |  | 13.2%               | 32                |
| <b>I need to access published CMCs of other laboratories</b>                       |  | <b>15.6%</b>        | <b>38</b>         |
| I need information of the statistics of the KCDB                                   |  | 9.1%                | 22                |
| I wish to access a KCDB Report   |  | 14.8%               | 36                |
| I need to look at the KCDB FAQs  |  | 2.9%                | 7                 |
| <b>Other, please specify</b><br><a href="#">Show replies</a>                       |  | 15.2%               | 37                |
| <b>answered question</b>   |   |                     | <b>243</b>        |
| <b>skipped question</b>  |   |                     | <b>0</b>          |

**Question 1 – Other**

|  |                            |                         |
|--|----------------------------|-------------------------|
| 1. Download KC protocol  | Wed, Feb 24, 2016 1:19 AM  | <a href="#">Find...</a> |
| 2. I need to review the impact of changes to service categories on the CMC database  | Tue, Jan 26, 2016 1:19 AM  | <a href="#">Find...</a> |
| 3. I need to know the status of a country within the MRA   | Tue, Dec 29, 2015 5:12 AM  | <a href="#">Find...</a> |
| 4. I need to access the Appendix A   | Wed, Dec 9, 2015 9:46 AM   | <a href="#">Find...</a> |
| 5. after introduction of KCDB by Dr. Pichard, just looking around  | Wed, Nov 4, 2015 10:33 PM  | <a href="#">Find...</a> |
| 6. Colombia, Thermometry   | Fri, Oct 16, 2015 11:40 AM | <a href="#">Find...</a> |
| 7. I want to check the reliability of someCMCs   | Wed, Oct 7, 2015 3:40 AM   | <a href="#">Find...</a> |
| 8. I need to know if for low ppm NH3 MC's are already declared   | Wed, Oct 7, 2015 12:54 AM  | <a href="#">Find...</a> |
| 9. I am preparing an advisory document on the CIPM MRA for Myanmar   | Tue, Sep 22, 2015 8:35 PM  | <a href="#">Find...</a> |
| 10. looking for a metadata registry of the controlled vocabularies developed and maintained by BIPM for use in open, linked data | Wed, Sep 16, 2015 11:32 AM | <a href="#">Find...</a> |
| 11. curiosity  | Thu, Aug 27, 2015 6:29 AM  | <a href="#">Find...</a> |
| 12. I need equivalence information on length measures outside the S.I.   | Mon, Aug 17, 2015 5:59 AM  | <a href="#">Find...</a> |
| 13. Advice to NMI to be created in Nigeria   | Fri, Jul 10, 2015 5:45 AM  | <a href="#">Find...</a> |
| 14. I need to locate a KC report   | Wed, Jul 1, 2015 2:58 PM   | <a href="#">Find...</a> |
| 15. dissertation work sizes optic sensors and transducers  | Wed, Jun 24, 2015 10:56 PM | <a href="#">Find...</a> |
| 16. 1ST TIME SEARCH  | Tue, Jun 23, 2015 8:57 AM  | <a href="#">Find...</a> |
| 17. I need to check membership status of a country in the Metre Convention   | Thu, Jun 18, 2015 12:34 AM | <a href="#">Find...</a> |
| 18. I need CMCs to check for the intra CMC-review  | Wed, Jun 10, 2015 12:21 AM | <a href="#">Find...</a> |
| 19. pharmaceuticals  | Fri, Jun 5, 2015 7:45 AM   | <a href="#">Find...</a> |
| 20. Check of details of KC   | Wed, Jun 3, 2015 5:43 AM   | <a href="#">Find...</a> |
| 21. I was trying to find information for a non-scientific colleague  | Mon, Jun 1, 2015 9:33 AM   | <a href="#">Find...</a> |
| 22. I want to compare my NMI CMCs with that of other NMIs for customers  | Tue, May 19, 2015 12:26 PM | <a href="#">Find...</a> |

|  |                            |                         |
|--|----------------------------|-------------------------|
| 23. I need to modify CMCs of my laboratory   | Wed, Apr 29, 2015 12:55 PM | <a href="#">Find...</a> |
| 24. Research on benefits of metrology  | Sun, Apr 12, 2015 11:58 PM | <a href="#">Find...</a> |
| 25. want to direct other people to the KCDB  | Mon, Mar 30, 2015 3:09 AM  | <a href="#">Find...</a> |
| 26. I need to check a Key Comparison status  | Sun, Mar 15, 2015 11:57 AM | <a href="#">Find...</a> |
| 27. I need a reference to my results in a published comparison                             | Mon, Mar 9, 2015 7:23 AM   | <a href="#">Find...</a> |
| 28. checking references in scientific publication  | Thu, Mar 5, 2015 2:38 AM   | <a href="#">Find...</a> |
| 29. Planck Temperature and the other Planck Units  | Wed, Feb 18, 2015 7:41 PM  | <a href="#">Find...</a> |
| 30. searching for CMC service categories in the field of CCPR                              | Tue, Feb 17, 2015 5:08 AM  | <a href="#">Find...</a> |
| 31. Locate correct webpage reference for a sectorial pre-normative document                | Sun, Feb 15, 2015 10:19 AM | <a href="#">Find...</a> |
| 32. I need information of the key comparison   | Thu, Feb 5, 2015 12:54 AM  | <a href="#">Find...</a> |
| 33. trying toundersatnd all the acronyms   | Tue, Feb 3, 2015 11:28 PM  | <a href="#">Find...</a> |
| 34. i need to access som comparison report about absorbed dose rate at beta standard field | Tue, Jan 20, 2015 12:59 AM | <a href="#">Find...</a> |
| 35. Looking for official time  | Sun, Jan 11, 2015 5:26 PM  | <a href="#">Find...</a> |
| 36. curiosity  | Fri, Dec 26, 2014 1:14 AM  | <a href="#">Find...</a> |
| 37. I want to properly cite the KCDB   | Sat, Dec 20, 2014 10:38 AM | <a href="#">Find...</a> |

**Question 2**

| 2. How easy it was to find the information?                                |   |                     |                   |
|--|---|---------------------|-------------------|
|  |   | Response<br>Percent | Response<br>Count |
| <b>It was very easy to find information on CMCs</b>                        |    | <b>33.3%</b>        | <b>74</b>         |
| It was quite easy to find information on CMCs                              |    | 27.9%               | 62                |
| It was not easy to find information on CMCs                                |    | 7.2%                | 16                |
| It was very easy to find information on comparisons                        |    | 12.2%               | 27                |
| It was quite easy to find information on comparisons                       |  | 10.8%               | 24                |
| It was not easy to find information on comparisons                         |  | 3.6%                | 8                 |
| I did not find at all the information I needed                             |  | 5.4%                | 12                |
| I needed information in EXCEL or Word format and could only find PDF files |  | 3.2%                | 7                 |
| The KCDB does not include the type of information I needed                 |  | 1.8%                | 4                 |
| <b>Other (please specify)</b><br><a href="#">Show replies</a>              |  | 8.1%                | 18                |
| <b>answered question</b>   |   |                     | <b>222</b>        |
| <b>skipped question</b>  |   |                     | <b>21</b>         |

**Question 2 - Other**

|   |                            |                         |
|---|----------------------------|-------------------------|
| 1. I could not locate where to download the submitted CMC excel files   | Tue, Jan 26, 2016 1:19 AM  | <a href="#">Find...</a> |
| 2. I found the information easily   | Tue, Dec 29, 2015 5:12 AM  | <a href="#">Find...</a> |
| 3. I think I looked in the wrong place for background information on MT   | Wed, Dec 16, 2015 8:51 AM  | <a href="#">Find...</a> |
| 4. The information available was easy to find, but I would have liked to filter on KCs in progress, and easily find the pilot NMIs.                   | Thu, Nov 5, 2015 3:22 AM   | <a href="#">Find...</a> |
| 5. information is good enough, but the UI and UX should be improved   | Wed, Nov 4, 2015 10:33 PM  | <a href="#">Find...</a> |
| 6. My task was unconventional, so that I had to look through a number of CMCs and KCs to find what I was searching. Overall, it was a good experience | Wed, Oct 7, 2015 3:40 AM   | <a href="#">Find...</a> |
| 7. I could not find End standards. Long gauge blocks (steel): central length L, 100 mm to 1000 mm in Chinese Taipei, CMS                              | Wed, Sep 30, 2015 8:53 PM  | <a href="#">Find...</a> |
| 8. I knew in advance how to find the information  | Wed, Sep 16, 2015 12:19 AM | <a href="#">Find...</a> |
| 9. INM Optical Quantities Laboratory Romania  | Wed, Jun 24, 2015 10:56 PM | <a href="#">Find...</a> |
| 10. It was easy to find the information which I needed  | Thu, Jun 18, 2015 12:34 AM | <a href="#">Find...</a> |
| 11. information was difficult to find   | Wed, Apr 29, 2015 12:55 PM | <a href="#">Find...</a> |
| 12. The information was easy to find, but it's obsolete. There are comparisons started in 2005 and there is no published results yet!                 | Wed, Apr 22, 2015 7:42 AM  | <a href="#">Find...</a> |
| 13. The CMC I needed didn't exist but I can pass that on to the customer.   | Sun, Mar 29, 2015 12:36 PM | <a href="#">Find...</a> |
| 14. cf 1  | Tue, Feb 17, 2015 5:08 AM  | <a href="#">Find...</a> |
| 15. The list of participants seem not updated !   | Thu, Feb 5, 2015 12:54 AM  | <a href="#">Find...</a> |
| 16. absolutely no idea whether I have found it or not. the site is so extremely difficult to understand   | Tue, Feb 3, 2015 11:28 PM  | <a href="#">Find...</a> |
| 17. final updated date of KCs/SCs is needed to check our participation performance  | Sun, Jan 4, 2015 9:07 PM   | <a href="#">Find...</a> |
| 18. not searching anything precise  | Fri, Dec 26, 2014 1:14 AM  | <a href="#">Find...</a> |