



Report to WGFF from Consultative Committee on Mass Meeting February, 2013

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New CCM Chairman, Philippe Richard, METAS



CCM chair expectations: annual WG reports with strategies, work plans, milestones, greater emphasis on scientific activities, better coordination between WGs and CCs, reduce unnecessary CMC entries, improve CMC review efficiency.

CCM WG Strategy

New CCM Chairman,
Philippe Richard, METAS



Consultative Committee for Mass and related quantities

CCM WG Strategy 14.01.2013 (updated 01.03.2013)

Strategy 2013-2023

Consultative Committee for Mass and related quantities (CCM)

The audience for this strategy is mainly the CCM, the NMI Directors, the government representatives, the BIPM director and the CIPM. This strategy reflects the present structure of the CCM. Major changes in this structure are expected at the next CCM meeting.

0 Management summary

The CCM has 11 Working Groups and two Task Groups (the number of Working Groups was reduced from 14 to 11 at the 14th CCM meeting in February 2013, further simplification will follow). 47 Key Comparisons were completed during the time from 1999 to 2012. 25 are in progress and 24 planned. The total number of Calibration and Measurement Capabilities is 2785.

The agreed repeat frequency at the CCM level is generally 10 years. The CCM seems to have a sufficient number of KCs to cover the declared CMCs.

The strategy presents the status of activities and achievements of each Working Group as well as future vision of the landscape and consequent requirements and measurement challenges. The possible redefinition of the kilogram will dominate the scene for the next few years, involving new challenges and commitments. The role of the BIPM will be mainly driven by this issue. Most of the other activities traditionally covered by the CCM will continue largely unchanged. Legal metrology and accreditation bodies, as well as mechanical industry, will continue to be important stakeholders. Dynamic measurement of quantities derived from mass, like torque and pressure, is becoming an important topic.

The CCM want to strongly simplify its structure and increase its efficiency.

Finally a summary of resources needed for piloting CCM Key Comparisons is given. The CIPM MRA is a big cost factor for the NMIs but the benefits for global trade are probably higher (a detailed cost benefit analysis was not performed up to now within the CCM).

Each Consultative Committee submitted a report that includes:

- 1) List of Working Groups (restructuring under way)
- 2) Terms of reference
- 3) Report of WG activities
- 4) Stakeholders and end users
- 5) Future scan (cryogenic, micro, transient flows)
- 6) Rationale for activities
- 7) Required KCs until 2023, 10 year repeat frequency
- 8) Resources for piloting comparisons
- 9) Summary table of comparison

WGFF Terms of Reference

The Working Group for Fluid Flow supports the CCM, the CIPM MRA, and NMIs to establish and maintain a validated and robust global measurement system for **flow and related quantities: 1) liquid flow (i.e. water, hydrocarbon liquids, cryogenic liquids), 2) gas flow (air, nitrogen, natural gas, etc.), 3) liquid volume (from microliters to thousands of liters), and 4) the speed of fluids (air speed and water speed).**

Within this objective, its tasks are to:

- Facilitate the **assembly of approved CMCs** in the KCDB, including: 1) ensuring that the general instructions, formatting, and inter-regional review process are followed, 2) developing service categories that cover necessary measurands, 3) ensuring the definitions of CMC uncertainty are clear and consistently applied, and 4) periodically reviewing CMCs for correctness;
- **Conduct comparisons** to demonstrate the proficiency of NMIs and DIs and to verify that CMCs are correct, including: 1) identifying where comparisons are needed, 2) recommending comparisons to the CCM for approval, 3) selecting pilot labs and participants, 4) assisting pilot labs in developing protocols that meet the Guidelines for CIPM KCs, 5) assisting or advising pilot labs with the data analysis and KC report writing, 6) performing the Draft B KC report review process, 7) reviewing regional comparison reports, and 8) submitting comparison reports to the CCM for approval and posting on the KCDB;
- **Provide a forum of exchange between NMIs, DIs, and RMOs**, provide supplementary guidelines and/or interpretations of CIPM and CCM policies for the flow measurement community, advise the CCM and the CIPM on flow related matters, and encourage and support laboratories developing new flow standards.

1.4 Common issues across all CCM WGs

- Expand stakeholders awareness of BIPM efforts and the KCDB. Presently, public knowledge of the work and results of the CCM, including the use of KCDB is too limited.
- Web meetings. Increase participation in WGs by smaller economies by using web meetings or video conference.
- Review and redesign of service categories. In some measurement areas, the existing structure of service categories should be improved (e.g. combine categories for mass flow and volume flow to decrease the number of CMC entries).
- KC efficiency. The **mean time for completion of a CCM KC is >5 years**. For the pilot laboratory, the **labour is >100 man-days** and **equipment and transport costs are > Euro 25,000**. This cost demonstrably decreases when KCs are repeated, especially as we learn which transfer standards offer the best performance. Further efficiency can be gained by developing validated data reduction spreadsheets and protocol and re-report templates.

1.4 Common issues across all CCM WGs

- **KC funding**. Many measurands are having difficulty finding NMIs to volunteer as pilots. Generally, the larger NMIs are repeatedly serving as pilots because small NMIs cannot afford the cost. Some KCs have successfully shared shipping costs. Mechanisms for cost sharing to better distribute the cost of transfer standard equipment should be considered, **perhaps via a general fund administered by the BIPM**.
- **Directives for technical work**. The approach to be followed during review of documents, *mise en pratique*, KCs and CMCs should be documented with structured, consequent actions. The procedures for receiving comments and communicating responses should be clear. WGs should consider using the BIPM discussion forum³ for more transparent communication.
- **Example uncertainty analysis**. The best available uncertainty analysis and recommended papers for various types of reference standards can be validated by WG review and shared with the community as a resource to labs developing new standards. This will also be useful to technical assessors during accreditation.