2005 Report of CCT Working Group 7: Key Comparisons

Membership:
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Since the last CCT meeting, Working Group 7 has been actively involved in the technical review and approval of both CIPM and RMO Key Comparisons in thermometry and humidity. Discussions concerning calculation of degrees of equivalence and linking of RMO results to the CCT Key Comparisons has taken place, with reasonable success. The attached list is a brief summary of the principal issues and their current status.

1. CCT-K1: The final Draft B Report has been submitted, reviewed and approved by majority vote. The formatting and presentation of the Appendix B entry for publication on the KCDB will take place in July.

   One sustained objection to approve this Key Comparison was based on the notion that maintained gas thermometer results, originally used for measuring thermodynamic temperature, should be considered as approximations to the ITS-90, rather than direct realizations of the Scale in this temperature region. Working Group 7 recommends that this question, of what is and what is not to be considered a "realization" of the scale, should be the subject of investigation by another CCT Working Group or Task Group, especially since there are other cases, such as future comparisons of radiation temperature measurements, where a lack of clarity may cause confusion. The task may initially fall to WG4, as part of their mandate to explore differences between T and T_{90}.

2. CCT-K7: The final Draft B Report has been submitted and reviewed. The opinion of WG7 concerning the use of the arithmetic mean as the KCRV, and of the use of the standard deviation of the participants' data values as the uncertainty in the KCRV, was divided.

   A recommendation that further clarification on the choice of KCRV should be made in the text of the Report, and in the appropriate section of the KCDB entry, will be forwarded for consideration by the participants through the Pilot.

   Considering that many of the substantive comments regarding the ambiguity in the definition of the triple point of water as the realization of the kelvin are being addressed by the TPW Task Group, and that it is expected that the CCT will adopt a resolution to clarify the isotopic composition of the water used in such realizations, a further recommendation that the section of text containing the minority opinion be incorporated into the main body of the Report will be passed to the participants via the Pilot.

It is anticipated that with these minor changes, the Draft B Report and KCDB Appendix B entry for CCT-K7 will be approved by WG7 by the end of the summer.

3. CCT-K2.1: This bilateral Key Comparison (VNIIFTRI/NRC) has been approved and published on the KCDB. The WG7 decision was to compute and display the complete and extended table of bilateral degrees of equivalence, linking through the (assumed stable) results of the joint participant (NRC). The decision to include full equivalence calculations, rather than simply determining the equivalence of the new participants to the original KCRV is suggested as a policy for the CCT, since it provides the maximum available information on the KCDB, and conforms to the current BIPM best practice. The pilot of APMP-K3 was requested to compute the full bilateral degrees of equivalence to CCT-K3, using the (assumed stable) average of the joint participants (NMIA and KRISS). The question of completing the "off block diagonal" elements of the bilateral degree of equivalence matrix requires that Pilots of Bilateral or RMO Key Comparisons compute additional quantities beyond the simple table of equivalence for their own participants. The question of linking the linked labs, eg participants in two different RMO Key Comparisons, each linked to the central CCT Key Comparison, will require further attention in the near future. Tools to help simplify this exist within Working Group 7, and it is not expected to be overly burdensome. Discussions with the BIPM KCDB Manager were productive in finalizing the first linked presentation (for CCT-K2.1 and CCT-K2), and it is expected that this relationship will develop as the sophistication of linked comparison grows over time.

4. CCT-K2.2: The protocol for this bilateral Key Comparison (NIM/IMGC) has been approved. It is expected that equivalent protocols for two other Key Comparisons to be linked with CCT-K2 (INTiBS/BNM/NRC and NMIJ/IMGC/NRC) will be submitted shortly.

5. CCT-K5.1: The Draft B Report for this bilateral Key Comparison (NRC/PTB) has been submitted and reviewed. Based on technical comments from one WG7 referee, a change has been propagated to some tables in the Report. The final revised version has been re-submitted for approval and publication in the KCDB in the near future. The linking calculations to relate the results to CCT-K5 will be performed once the latter has been completed and approved.

6. EUROMET.T-K3: The protocol for this Key Comparison has been reviewed and approved. The comparison is in progress.

7. APMP.T-K4 and EUROMET.T-K4: The protocols for these Key Comparisons, to be linked to CCT-K4, have been reviewed and approved. The comparisons are in progress.

8. APMP-K6: The final Draft B Report, including the proposed Appendix B entry, has been approved for publication in the KCDB. The calculations required to link these results with the CCT-K6 Key Comparison in humidity will be performed once the latter has been completed and approved. The Working Group has yet to inform Claudine Thomas on the status of this comparison, to initiate the KCDB publication process. It is expected to be complete later this summer.

9. EUROMET.T-K6: The protocol for this Key Comparison has been reviewed and approved.

The logistics and operation of the Working Group discussions have been greatly simplified thanks to the efforts of Janet Miles and Gerald Petigard, who have created and maintain the BIPM Discussion Forum. This web-based service provides direct benefit to the discussion of specific 'threaded' conversations, and provides an archive of materials, comments, and submitted Key Comparison Reports and other working documents. The Working Group thanks Janet and Gerald for their considerable efforts on our behalf.

Working Groups 7 (Key Comparisons) and 8 (CMCs) will make the JCRB Comparison Form available on the BIPM Forum. This form will be recommended for use with all newly proposed CCT and RMO Key Comparisons, as well as for RMO Supplementary Comparisons, to simplify the administration and registration on the KCDB.