

Report of WG6 on Humidity Measurements to the 24th meeting of the CCT
May 2008

Membership:

P. Huang (NIST) (Chairman), A. Dogan (UME), B. Choi (KRISS), E. Georgin (CETIAT), G. Mamontov (VNIIM), H. Kitano (NMIJ), H. Yi (NIM), J. Lovell-Smith (MSL), L. Lira-Cortes (CENAM), N. Boese (PTB), R. Benyon (INTA), R. Bosma (NMI-VSL), S. Bell (NPL), V. Fericola (INRIM), Wang Li (NMC)

Robert Benyon has attended since the creation of the WG as an invited observer and has requested in 2007 to be accepted as a Member of the WG, now that CEM has achieved the full Member status of the CCT.

Membership has increased by more than double over the last ten years. It has been twelve years since WG6 was established within the CCT in 1996. After twelve years as chair, I feel that someone else should be nominated to take over as chair of WG6 following the conclusion of this meeting. I would like to thank those who supported the efforts of WG6 over the years.

Terms of reference:

The terms of reference are documented in the report of the 23rd meeting of the CCT held in June 2005.

Activities:

In accordance with the terms of reference, the working group is composed of four task forces (TF) in order to facilitate the effectiveness of the group:

TF1 on Terms and Definitions (leader - Peter Huang/NIST); TF2 on CCT K6 (leader - Stephanie Bell/NPL); TF3 on Uncertainty Document (leader - Jeremy Lovell-Smith/MSL); and TF4 on Strategic Planning (leader - Robert Benyon/INTA).

A document of terms and definitions has been completed by the members of TF1. This CCT document is a collective vocabulary relating to humidity measurement of atmospheres with a list of most updated and comprehensive references. In this vocabulary, a set of standard terms and associated definitions is given for a system of general concepts used in hygrometry.

TF2 has focused its effort to date on K6. Thus an international comparison of humidity standard generators is well underway. There are ten participants: MIKES/Finland, VNIIM/Russia, INTA/Spain, NIRIM/Italy, NIST/USA, NMC/Singapore, NMIJ/Japan, NPL/UK, NIM/China, and NMI/Netherlands. NPL is the pilot and NMIJ is the assistant pilot.

The comparison takes the form of a closed circulation in two consecutive loops. There is one pair of hygrometers, which are at all times measured simultaneously. Measurements

started in the pilot laboratory in March, 2003. The assistant performed the measurements next. The other participants in Loop 1 then made comparison measurements at the dew/frost-point temperatures required. After loop 1, the transfer standards returned to the Pilot for checks mid-way through the comparison. The comparison is currently proceeding through loop 2, and the last participant will then return the transfer standards to the pilot to carry out final measurements to monitor drift. The assistant pilot will also carry out repeat measurements following those of the pilot. Measurements have been completed at NIM. The two transfer standards will go to VNIIM, then back to NPL.

In the meantime, regional comparisons in SIM and EUROMET will be followed by one in which the RMOs are fully linked to a CIPM/CCT key comparison. In SIM, a bilateral comparison between INMETRO/Brazil and NIST/USA started last year. This year, a bilateral comparison between CENAM/Mexico and NIST/USA has been initiated. In EUROMET, a key comparison (Project 621), coordinated by MIKES, has been completed with a total of 24 participants. The draft A results of the project was recently presented at the meeting of EUREMET TC THERM in March, 2008. A bilateral comparison between MSL/New Zealand and NPL/UK is also in progress.

A document on uncertainty in the generation of humidity is being prepared by the members of TF3. It is expected to be completed soon.

TF4 on strategic planning is intended to establish a plan on the future direction of WG6: (1) To determine activities in support of the CIPM MRA in the field of humidity, such as criteria for CMC reviews and strategy on key comparisons to cover the full range in a reasonable time frame; (2) To develop common research interests that can support new experimental data for improved humidity measurement and standards; and (3) To promote collaboration in joint projects by sharing common facilities.

All the Working Group members contributed to the organization and technical program of ISHM 2006 held the first time in South America in the city of Rio de Janeiro, Brazil. It attracted approximately 180 participants from fifteen countries. A total of 100 papers were presented in three parallel sessions.