

Report of Working Group 2 to the Comité Consultatif de Thermométrie: April 2003

WG2 met in conjunction with the 8th Symposium on Temperature, Its Measurement and Control in Science and Industry held in Chicago during 21-24 October 2003. This report summarizes the progress achieved since the last meeting of the CCT within the following areas of responsibility:

Secondary fixed points

- WG2 **recommends** that the most recent list of secondary reference points (*Metrologia*, 1996, **33**, 133-154) be made available on the BIPM web site. Additions and amendments to this list can be made by WG2 as soon as the necessary information is available, rather than waiting for an updated publication in *Metrologia*.
- *Metal-carbon Eutectics*
Particularly of interest to WG2 is the determination of thermodynamic (or ITS-90) temperatures for these fixed points. While no action is required of WG2 at the moment, we are following the developments with interest with a view to updating the list of secondary reference points once it is appropriate to do so.

Secondary approximations to the ITS-90:

- *Thermocouples* - WG2 **recommends** that the CCT endorse use of the NIST Au/Pt reference function and the NIST/IMGC Pt/Pd reference function. Both functions are included in ASTM standard E 1751-00. Dr. Gotoh, a member of IEC sub-committee 65B Working Group 5, indicated that a recommendation from the CCT would aid the IEC process of defining international standards for these important thermocouple types.
- *IPRTs* - WG2 encourages use of the ITS-90 interpolation scheme with IPRTs, particularly since many of the electronic readouts (digital thermometers) already support this capability. The use of IEC-751 is satisfactory if an uncertainty of ± 0.2 K is sufficient. However, the ITS-90 interpolation scheme has been shown to afford interpolation accuracies within 10 mK when applied to IPRTs and this result appears to be independent of alpha (sensitivity).
- *Heat Pipes* – WG2 notes with interest the development of the “temperature amplifier” configuration of heat pipes. The temperature of one heat pipe (i.e. mercury heat pipe) is maintained constant using an SPRT as the sensing element in a control loop. This stabilizes the pressure of both the control heat pipe and the secondary one (i.e. sodium heat pipe) as well since they are connected to a common manifold. The method offers a novel technique to generate secondary reference temperatures with stability approaching, or comparable, to that obtained with conventional fixed points.

Updating the document “Techniques for Approximating the ITS-90”

WG2 **recommends** that the newly created electronic version of the current (1990) document be made available on the BIPM web site as an interim measure while the revision is in progress.

A plan to produce the revision has been agreed by the members. Drafts of the following chapters are in circulation: “Thermistors”, “Thermocouples”, “The propagation of uncertainty with calibration equations”, “Radiation Thermometry”, and “Industrial Platinum Resistance Thermometers”. It is general recognized that the members have experienced difficulty in allocating sufficient time to the task. The Working Group hopes that significant progress will occur in advance of TEMPMEKO 2004.

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