

## **Proposal and terms of reference for the creation of a Tsk Group on air temperature measurements (TG-Env-AirT) within the CCT Working Group Environment**

### **Background – need**

Air temperature is measured for a multitude of purposes. Atmospheric air temperature is the key variable in indoor climatisation, in meteorological observations and climate studies. It is also critical to precision dimensional and mass measurements. Understanding and fully evaluating measurement uncertainty for air temperature measurements is an open scientific and technical issue motivating growing collaborative efforts.

A practical definition of air temperature is also missing as well as standardized methods and prescriptions about the evaluation of the various quantities of influence, such as radiation, convection (air speed), gas-sensor coupling and others. Theoretical and practical aspects require study and prescriptions of standardized practices and a unique practical definition.

The calibration of thermometers in air still requires definition of procedures and prescription including calibration uncertainty evaluations, being this last a significant component of the overall measurement uncertainty. While calibration of temperature sensors in liquid is well characterised, the calibration of thermometers in air still requires definition of procedures and guidelines. A project is ongoing within Euramet (EURAMET P1459) tasked to (a) perform a research comparison of methods for the calibration in air of different typologies of contact thermometers and (b) based on a pro-&-cons analysis about the methods adopted by different participants during the comparison, develop a guide for the calibration of thermometers in air. At the 2020 meeting of the WG Env, the proposal to extend this initiative to other RMOs was discussed and agreed, in order to align the future guidelines to a worldwide level.

The analysis of the air temperature measurement procedures and uncertainty evaluation, including the aspects and contributions due to the calibration of sensors is also included in the Strategy Document for Rolling Programme Development for 2018 to 2027 of CCT.

### **Proposal**

The creation of a Task Group to study issues related to air temperature measurements (TG-Air) within the Working Group Environment is therefore recommended. The group should be formed by metrologists, with the addition and inclusion of expert members coming from the user community: meteorology and climate (with representatives of WMO), industry, dimensional metrology. A co-opted member from the CCT TG-ET is also recommended, to contribute on the emerging non-contact systems, now bringing expectation in the reduction of quantities of influence, with respect to the contact thermometers.

### **Terms of reference for the Task Group on air temperature measurements (TG-Air)**

- Propose a practical definition of air temperature (also through the preparation and publication of a “position paper” on the subject)
- Promote and overview studies on understanding and evaluating the uncertainty contributions in air temperature measurement
- To develop guidelines for the calibration of thermometers in air

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