

VTT MIKES

ACTIVITY REPORT TO CCT

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Version 1

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1. ORGANISATION

Since 2015, the National Metrology Institute VTT MIKES has been a part of the VTT Technical Research Centre of Finland Ltd. On the behalf of VTT, MIKES is carrying out the tasks of the National Metrology Insitute.

At VTT MIKES, there are five research teams performing all the operations of the institute. The Process Metrology team is responsible of metrology activities in the fields of temperature, humidity and thermophysical properties. Dr Richard Högström is the leader of this team. Dr Shahin Tabandeh is the head of thermometry and Dr Richard Högström is the head of humidity. In total 7 metrologists work in the field.

2. MAINTENANCE AND DISSEMINATION OF SI UNITS 2017 – 2020

Temperature

No changes in the range of ITS-90 realisation or calibrations for customers have been introduced.

Fixed point cells have been compared to each other according to an internal calibration programme.

VTT MIKES has been participating in the following EURAMET comparisons:

- EURAMET.T-S3 (Pt/Pd thermocouples up to 1500 °C)
- EURAMET.T-K9 (ITS-90 SPRT calibration from the Ar TP to the Zn FP)
- EURAMET P1149 (Surface temperature calibrations)
- EURAMET P1459 (Air Temperature Comparison -80 °C...+60 °C).

Humidity

No changes in the range of humidity scale realisations and calibrations have been introduced.

VTT MIKES has been participating in the following EURAMET comparisons:

- EURAMET P1189 comparison (relative humidity, -10 °C to 70 °C)
- EURAMET.T-K8 (Comparison in high dew-point temperatures)
- EURAMET P1352 (Comparison of the realisations of the relative humidity in the range from 10% to 95% at temperatures -40 °C to 20 °C).
- EURAMET P1434 (Bilateral comparison of dew-point temperatures -80 °C to 10 °C)

3. RESEARCH 2017 – 2020

Within the field of CCT, VTT MIKES has been carrying out research in the following European Metrology Research Programme (EMRP/EMPIR) projects:

15SIB02 InK2 (Implementing the new kelvin 2)

- Further development of Coulomb Blockade Thermometry for primary thermometry

18SIB02 Real-K (Realising the redefined kelvin)

- Development of Coulomb Blockade Thermometry for primary thermometry up to 25 K
- Impact work package lead

17FUN05 PhotOQuant (Photonic and Optomechanical Sensors for Nanoscaled and Quantum Thermometry)

- VTT MIKES builds, characterises and validates a setup for temperature measurements using photonic sensors and develops calibration procedures.

ENV58 MeteoMet2 (Metrology for essential climate variables)

- Extending the pressure range of the calibration facility for reference radiosondes (temp. down to -80 °C) down to 10 hPa
- Feasibility study in soil moisture measurements

ENG54 Biogas (Metrology for biogas)

- Investigation of water vapour enhancement factor in methane

14IND11 HIT (Metrology for humidity at high temperatures and transient conditions)

- VTT MIKES is the coordinator
- Development of a humidity calibration method based on non-static measurements
- Development of a field humidity calibrator.

Furthermore, VTT MIKES has been carrying out research on high-temperature primary Doppler broadening thermometry within a project funded by Academy of Finland.

4. ACTIVITIES FOR CREATING IMPACT 2017 – 2020

Metrology organisations

CCT:

WG-Hu
WG-Env
TG-CTh-ET

EURAMET:

Technical Committee for Thermometry (TC-T)
TC-T WG Strategy

Accreditation organisations

MIKES experts have carried out technical assessments for FINAS, UKAS, SWEDAC and SANAS

Conferences and workshops

Presentations in the following conferences:

CIM 2017, Paris, France, September 2017
TEMPMEKO 2019, Chengu, China, June 2019

Other organisations

Host organisation for the Kelvin club of Finland
IMEKO TC12

Universities:

- Adj. professorship at University of Oulu
- Lectures at Aalto University
- Supervision for doctoral students at Aalto University, University of Politecnico di Torino

Industry:

- Calibration service
- Tailored training courses
- Projects exploiting metrology expertise of VTT MIKES

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