

Gulf Association for Metrology

GULFMET...

Technical Committee for Thermometry

Miltiadis Anagnostou

TC-T Report

CCT June 2017

Gulfmet Members



- **Kingdom of Bahrain:**
Bahrain Standards and Metrology Directorate (**BSMD**)
- **State of Kuwait:**
Public Authority for Industry (**PAI**)
- **Sultanate of Oman:**
Directorate General for Specifications and Measurements (**DGSM**)
- **State of Qatar:**
Qatar General Organization for Standards and Standardization (**QGOSM**)
- **Kingdom of Saudi Arabia:**
Directorate General for Specifications and Measurements (**SASO-NMCC**)
- **United Arab Emirates:**
Emirates Authority for Standardization and Metrology (**ESMA**)
Emirates Metrology Institute (**EMI**) (appointed on 9th of May to be the NMI)
- **Republic of Yemen:**
Yemen Standardization, Metrology and Quality Control Organization (**YSMO**)

Gulfmet established in June 2010 under the Gulf Standardization Organization (GSO)

CIPM in its 104 meeting granted provisional acceptance as a RMO in October 2015

Gulfmet Associate Members

- **Bosnia and Herzegovina:**
Institute of Metrology of Bosnia and Herzegovina (**IMBIH**)
- **Egypt:**
National Institute for Standards (**NIS**)
- **Hong Kong:**
Standards and Calibration Laboratory (**SCL**)
Government Laboratory (**GL**)
- **Korea**
Korea Research Institute of Standards and Science (**KRISS**)
- **Turkey:**
National Metrology Institute/TÜBITAK Ulusal Metroloji Enstitüsü (**UME**)

TC-T committee



Established on the 22nd of November 2015 during the Riyadh meeting of the joint committee of TC-L&T

- TC Chair: Dr. Miltiadis Anagnostou, Head of Temperature & Humidity Lab, EMI, UAE
- TC Secretary is Eng. Ahmed Al Breiki, Senior Metrologist in Temperature & Humidity Lab, EMI, UAE

TC meets in April and November:

- First meeting: 22nd of November 2015, Riyadh
- Second meeting: 24th of April 2016, Dubai
- Third meeting: 21st of November 2016, Dubai
- Fourth meeting: 16th of April 2017, Abu Dhabi

Main tasks of TC-T

- The CMCs of NMIs in GULFMET in Thermometry to be prepared, reviewed and finally published in KCDB
-
- Organize interlaboratory comparisons to support these CMCs
-
- Enhance technical capabilities of the member states through training programs.
-
- Interact with other RMOs TCs and BIPM committees

CMCs



- Working group for review of CMCs:
 - Dr. Miltiadis Anagnostou (TC-chair, EMI)
 - Dr. Murat Kalemci (UME)
 - Eng. Abdulaziz Alzahrani (SASO-NMCC)
- Requirements for reviewing:
 - Submission of CMC tables to the working group
 - Description of Measurements, list of equipment
 - Uncertainty Evaluation Sheets, supporting data for uncertainty terms
 - Lab environmental conditions
 - ISO 17025 Quality System covering the services under review
 - Interlaboratory comparison results
 - Possibly peer reviews

CMCs



Calibration Capabilities:

- SPRTs: Hg to Al fixed points
- PRTs: -80 to 250 °C
- Temperature Sensors with Display Unit : -80 to 400 °C
- Block Calibrators: -30 to 400 °C
- Climatic Chambers -40 to 140 °C and 10 to 90%rh
- Air Temperature Sensors: 10 to 70 °C
- Relative Humidity Sensors: 10 to 95 %rh

- Thermocouples: -80 to 1100 °C
- Thermocouples at fixed points: Zn, Al, Ag, Cu



CMCs



Calibration Capabilities:

- SPRTs: Hg to Ag fixed points
- Thermocouples: -60 to 1000 °C
- Thermocouples at fixed points:
Sn, Zn, Al, Ag
- Radiation Thermometers: -30 to 1600 °C
- Relative Humidity Sensors: 10 to 95 %rh



الهيئة السعودية للمواصفات والمقاييس والجودة
Saudi Standards, Metrology and Quality Org.

Interlaboratory comparisons

EURAMET.T-K7-4

Water Triple Point Comparison

Pilot lab: UME

Loop 1:

- Bosnia and Herzegovina
- Montenegro
- Serbia
- Albania
- Jordan

Loop 2:

- EMI
- SASO-NMCC
- Jordan

- EMI and SASO-NMCC have finished their measurements.

Interlaboratory comparisons

GULFMET.T-K9

SPRT Calibration at Hg, H₂O, Ga, In, Sn, Zn

Pilot lab: UME

Participants: EMI, SASO-NMCC

Protocol:

- Has been submitted to WG-Key Comparisons of CCT
- Comments from reviewers have been received
- Corrections to the protocol have been made
- Resubmitted to WG-KC for final approval

Time Table:

- Transfer Standards Sent to the pilot: June 2017
- Transfer Standards Returned to NMIs: July 2017
- Transfer Standards Re-Measured by NMIs: Sept. 2017
- Draft A Report Completed: December 2017

Interlaboratory comparisons

- **Gulfmet.T-S1: Supplementary Comparison of Relative Humidity Realizations**

Range: 11 %rh to 95 %rh at 23 °C, 70 °C, 0 °C air temperature

Pilot lab: UME Participants: SASO-NMCC, EMI

Protocol submitted to WG-KC for final approval

- **Comparison on Radiation Thermometer Calibration**

Pilot lab: UME Participants: SASO-NMCC

Declared as a Pilot Study

- **Comparison of the realizations of the ITS-90 at the freezing points of Al (660.323 °C) and Ag (961.78 °C)**

Pilot lab: UME Participants: SASO-NMCC

Declared as a Pilot Study

Thank you!

