



# AFRIMETS TECHNICAL COMMITTEE FOR THERMOMETRY (TC-T) activities

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*Your measure of excellence*

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# INTRODUCTION

- It is an AFRIMETS forum for scientific and technical cooperation in thermometry
- Is responsible for organising and executing key and supplementary comparison in thermometry
- Working towards the improvements of Calibration and measurement capabilities (CMCs) of AFRIMETS thermometry.
- Working towards AFRIMETS thermometry capacity development through manpower and facilities development

# TC-T MEMBER COUNTRIES



# TC-T MEMBER LABORATORIES

Country	Measurement Range	Fixed Point Cells	Sensors	Maintenance media
Kenya	-40° - 1300° -80° - 1600°	Hg, wtp, Ga, Sn, Zn, Ar, and Al	SPRT-25 Ω, PRT-100 Ω, TC Type S, IR	Alcohol, ice, water, oil, sand, furnace, High temperature Black body Source
Tunisia	-80° - 1200°	Hg, wtp, Ga, In, Sn, Zn, Al	SPRT-25 Ω, SPRT-100 Ω, TC Type S	Alcohol, ice, water, oil, furnace
Morocco	-80° - 1100°	Hg, wtp, Ga, In, Sn,	SPRT-25 Ω, SPRT-100 Ω, TC Type S	Alcohol, ice, water, oil, furnace
Ghana	-80° - 1200°	None Hg, wtp, Ga, Sn, Zn, Ar, and Al	SPRT-25 Ω, PRT-100 Ω, TC Type S, Type B	Alcohol, ice, water, oil, furnace
Ethiopia	-40° - 1600° -80° - 1200° (October 2014)	Hg, wtp, Ga, Sn, Zn, Al Ar, and Getting accreditation	SPRT-25 Ω, SPRT-100 Ω, TC Type S, Type B	Alcohol, ice, water, oil, sand, furnace, Black body Source

# TC-T MEMBER LABORATORIES cont....

Country	Measurement Range	Fixed Point Cells	Sensors	Maintenance media
Tanzania	-40° - 1200°	None	SPRT-25 Ω, PRT-100 Ω, TC Type S	Alcohol, ice, water, oil, furnace
Zambia	-80° - 1300°	Hg, wtp, Ga, In, Sn, Zn, Al, Ag, Cu	SPRT-25 Ω, SPRT-100 Ω, TC Type S, Type R	Alcohol, ice, water, oil, furnace
Seychelles	-30° - 250°	None	PRT-100 Ω	ice, water, oil
Zimbabwe	-40° - 1200°	Hg, wtp, Sn, Al	SPRT-25 Ω, PRT-100 Ω, TC Type S	ice, water, oil, furnace
Namibia	-40° - 280°	None	SPRT-100 Ω, PRT-100 Ω, TC Type S, Type R	Alcohol, ice, water, oil, Dry block
Botswana	-40° - 1100°	None Hg, wtp, Ga, Sn, Zn, Ar, and Al	SPRT-25 Ω, SPRT-100 Ω, TC Type S, Type R	Alcohol, ice, water, oil, furnace

# AFRIMETS INTER COMPARISON

- AFRIMETS. T-S1

- Supplementary comparison of Industrial PRT calibration capability
- Range: -50 °C to 450 °C
- Started: March 2008
- Addressing comments on Draft B from WG KC
- NMI result anomalies at some temperature values, Equipment details, traceability of reference SPRT, etc..
- Participants are requested to provide information on the commented issues
- Status: To prepare final report
- Participating NMIs
  - South Africa, Egypt, Ethiopia, Kenya, Thailand, Uganda, Tanzania, Seychelles, and Mauritius.

- AFRIMETS. T-S2

- Supplementary comparison of Industrial PRT calibration capability
- Range: -50 °C to 450 °C
- Started: May 2012
- Participating NMIs
  - South Africa, Tunisia, Egypt, Morocco, Ghana, Burkinfaso, Benin
- Status: Under circulation (in Morocco)

# CONT...

- AFRIMETS. T-S3

- Supplementary comparison of Industrial PRT calibration capability
- Range: -50 °C to 450 °C
- Started: May 2012
- Status: Under circulation
- Participating NMIs:
  - South Africa, Zambia, Zimbabwe, Botswana, Namibia, Mozambique, Uganda, Rwanda, Democratic Republic of the Congo

- AFRIMETS. T-S4

- Supplementary comparison of Relative humidity calibrations
- Range: 10 %rh to 95 %rh (5 °C to 55 °C)
- Started: July 2012
- Status: Preparing a report
- Participating NMIs:
  - South Africa, MIRS/UL-FE/LMK (MIRS/University of Ljubljana, Faculty of Electrical Engineering/Laboratory of Metrology and Quality) {NMI of Slovenia}



# S-RMO INTER COMPARISONS

- EAMET (East African Metrology)

- i. Industrial PRT comparison  
Pilot :Uganda
- ii. Thermocouple comparison

- MAGMET (Maghreb Metrology)

- i. SPRT inter comparison  
Reference Lab: NMI of France  
Pilot: Tunisia  
Participants:
- ii. FIXED POINTS (Hg – Sn)

# CONT...

- SADC MET (Southern Africa Metrology)

- i. PRT inter comparison

- Reference Lab: South Africa

- Pilot: Zimbabwe

- Participants: Namibia, Zambia, Botswana

- Status: Under circulation (in Botswana)

- ii. Thermocouple inter comparison

- Reference Lab: South Africa

- Pilot: Zimbabwe

- Participants: Namibia, Zambia, Botswana

- iii. Electrical Simulation inter comparison

- Reference Lab: South Africa

- Pilot: Zimbabwe

- Participants: Namibia, Zambia, Botswana

# TC-T FUTURE PLAN

- Future plan objective includes:
  - CMC publication into BIPM database
    - To get more members into the CC-T
    - To encourage more member countries to seek BIPM membership
  - Capacity building
    - Training workshop/seminars/courses
    - Laboratory attachment/internship
    - Equipment and facilities
    - Accreditation/peer review
- Detail Plan
  - Key and supplementary comparison
    - i. To finalize AFRIMETS TS-2 and AFRIMETS TS-3
    - ii. Noble metals thermocouple
      - Pilot: Egypt
      - Draft protocol is to be ready
    - iii. Electrical simulation
      - Range: 4-20 mA
      - Pilot: Tunisia
    - iv. Radiation Thermometers
      - Pilot: Morocco
      - Participants: Zambia, Tanzania, Morocco, Ethiopia, Tunisia, Kenya

# CONT...

- v. SPRTs at fixed points
    - Artefact: 25  $\Omega$  SPRT
    - Range: Hg – Zn
    - Participants: South Africa, Egypt, Zambia, Morocco, Ethiopia, Tunisia, Zimbabwe. Kenya
    - Pilot: South Africa
  - vi. Liquid in glass thermometers
    - Artefact: Alcohol LIG
    - Range: -20 °C – 110 °C
    - Pilot: Kenya
  - vii. Dial gauge temperature indicators
    - Artefact: Dial Gauge Temperature Indicators
    - Range: -40 °C – 110 °C
    - Pilot: Namibia
- Training and work shop
- Fixed point cells training symposium by FLUKE (Introductory Level)
    - » Date: August 2013
    - » Place: Kenya.
    - » Participants: Uganda, Tanzania, Rwanda
  - Fixed point training at NMIE
    - » Date: August 2013
    - » Place: Addis Ababa
    - » Participant: NMIE staff
  - Humidity measurement
    - » Date: not decided
    - » Place: South Africa

# CONT...

- **Electrical simulation**
  - » Date: April 2014
  - » Place: Kenya.
  - » Participants: Botswana
- **Internship/Attachment**
  - ❖ MOU to be sought for industrial attachments on bilateral/regional basis to NMI's such as KRISS, NMISA, NIM etc...
- **Equipment and Facilities**
  - Sourcing of donor funding for equipment and facilities. Project proposal to be drafted
- **Accreditation**
  - Training of more technical assessors
  - Technical assessors from an NMI of different S-RMO to the institute being assessed to be encouraged.
- **Peer review**
  - Conduct work shop on preparation of CMCs
  - Practical peer review exercise
  - Preparatory assessment by peers using other tried and tested models

# BIPM membership

- Ethiopia is in the process of obtaining BIPM membership
- Ghana is planning to get full BIPM membership

# CMC Submission

- Kenya planning CMC submission based on AFRIMETS-TS1
- Ethiopia is planning to submit CMC based on AFRIMETS-TS1 after obtaining BIPM membership
- Ghana is planning to submit CMC based on AFRIMETS-TS2 after obtaining full membership and completion of AFRIMETS-TS2.

# CONSTRAINTS

- Lack of sufficient fund
  - Inter RMO and intra SRMO comparison
  - Equipment and facilities improvement
  - Thermometry skill development
- Capacity gap in traceability maintenance
- Small number of TC-T members
- Customs problems
- Lack of commitment from governments to step in and assist when fund is exhausted and artefacts are held at customs



THANK YOU



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Intra-Africa Metrology System  
Système Intra-Africain de Métrologie

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