Gulf Association for Metrology

GULFMET ...

GULFMET Technical Committee for Mass and Related Quantities

TC–Mass Report

CCM & WGD-kg meetings
BIPM-Paris
May 2017

TC-Mass

Introduction

The GULF Association for Metrology (***GULFMET***) was granted provisional acceptance as an RMO at the 34th meeting of the JCRB in September 2015.

Current Capabilities in Mechanical Measurements

- Saudi Arabia and UAE currently have capability in Mass, Pressure (l+g), Force and Torque, Density (s+l), Liquid Volume.
- SASO-NMCC, Saudi Arabia has recently upgraded capability through a development and training project with UME, Turkey.
- Other member countries mainly have basic capability in Mass, but are planning for upgrade.

TC Details

- TC covers Mass, Pressure, Force, Torque, Density, Volume
- TC meets in April and November each year

GULFMET Members

Kingdom of Bahrain
Kingdom of Saudi Arabia
Republic of Yemen
State of Kuwait
State of Qatar
Sultanate of Oman
United Arab Emirates

Associate Members

Bosnia & Herzegovina
Egypt
Hong Kong
South Korea
Turkey

Mass & related quantities capabilities

- Mass
  - 1 mg to 500 kg
- Pressure
  - -100 kPa to 7000 kPa (gas)
  - 0.2 MPa to 100 MPa (liquid)
- Force
  - 20 N to 5MN
- Hardness (Brinell, Vickers, Rockwell)
  - HBW 1/5 to 10/3000
  - HV0.05 - HV100
  - HRA, HRC, HR-N, HRBW, HRTW
- Kinematic viscosity
  - 0.9 mm^2/s to 10^5 mm^2/s
- Liquid Density/Hydrometers
  - 600 kg/m^3 to 2000 kg/m^3
- Density/Volume of Solids
  - 1 g to 50 kg (weights)
- Volume of Liquids
  - 10 µl to 50 l

- Mass
  - 1 mg to 500 kg
- Pressure
  - -90 kPa to 7000 kPa (gas)
  - 0.1 MPa to 500 MPa (liquid)
- Force
  - 50 kN to 5MN
- Torque
  - 0.5 Nm to 1000 Nm
- Density/Volume of Solids
  - 1 g to 1 kg (weights)
- Liquid Density
  - 800 kg/m^3 to 1200 kg/m^3
- Volume of Liquids
  - 10 µl to 50 l
- Flow (volumetric)
  - 0.06 m^3/h to 65 m^3/h (liquids)
  - $3x10^{-4}$ m^3/h to 72 m^3/h (gas)

Current Intercomparisons

- ***GULFMET.M.M-S1*** *Multiples and submultiples of the kg (10 kg, 500 g, 20 g, 2 g, 100mg)*
  - *Pilot: UME (Turkey)*
  - *Status: In progress (Draft B)*
  - *BDSM (Bahrain), PAI (Kuwait), QGOSM (Qatar), SASO-NMCC (Saudi Arabia), QCC-EMI (UAE)*

- ***EURAMET .M.P-S13*** *Comparison in the range of 10 MPa to 100 MPa of liquid pressure*
  - *Pilot: UME (Turkey)*
  - *Status: In progress (Draft A)*
  - *QGOSM (Qatar), SASO-NMCC (Saudi Arabia), QCC-EMI (UAE)*

Bilateral Intercomparisons between UME and SASO-NMCC in progress

- ***GULFMET.M.M-S2*** *Multiples and submultiples of the kg (5 mg, 2 g, 50 g, 1 kg and 5 kg)*
- ***GULFMET .M.F-S2*** *Comparison in Force 400 N to 100 kN*
- ***GULFMET.M.D-P1*** Liquid density 980 kg/m³ to 1000 kg/m³ @ 20 °C
- ***GULFMET.M.V-P1*** Kinematic viscosity 5 mm²/s and 2000 mm²/s at 20 °C and 500 mm²/s at 40 °C
- ***GULFMET.M.FF-P1*** Calibration of 100 ml volumetric flask using the gravimetric method
- ***GULFMET.M.FF-P2*** Calibration of 1000 µL micropipette using the gravimetric method

Planned Intercomparisons

- ***GULFMET M.P-S1****: Supplementary Comparison in the range of 0.7 MPa to 7 MPa of Gas Pressure*
  - *Status: Agreed*
  - *PAI (Kuwait), QGOSM (Qatar), SASO-NMCC (Saudi Arabia),* ***UME (Turkey)****, QCC-EMI (UAE)*

- ***GULFMET M.F.-S1****: Force measurements in the range 100 kN to 1 MN*
  - *Status: Agreed*
  - *KRISS (S. Korea)(?),* ***UME (Turkey)****, QCC-EMI (UAE)*

- ***GULFMET M.M.-K4*** *: Comparison of 1 kg stainless steel mass standards*
  - *Status: Agreed*
  - *BDSM (Bahrain), INRIM (Italy), PAI (Kuwait), QGOSM (Qatar), SASO-NMCC (Saudi Arabia), METAS (Switzerland),* ***UME (Turkey)****, QCC-EMI (UAE)*

Future Intercomparisons (Proposed)

- *Multiples and submultiples of the kg (5 kg, 100 g, 10 g, 5 g, 500 mg) (GULFMET.M.M-K7)*
- *Calibration of piston operated micro-pipette 100 µl*
- *Comparison in solid density (stainless steel weights)*

•*Thanks to our Associate Members (particularly UME) without whose participation GULFMET intercomparisons would not be considered credible.*

•*INRIM and METAS participation in GULFMET KC's is gratefully acknowledged.*


Thank you!
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