Report of the CCM Working Group on Fluid Flow

Bodo Mickan
18th CCM meeting, 20-21 May 2021
WG Meetings held since last CCM

- June 24 and 25, 2019 in Lisbon, Portugal (FLOMEKO 2019).

- April 22, 2021 Zoom
WG Meetings planned

- Follow-up meetings via Zoom
  * End of June, focus on key comparisons
  * End of September, focus on Guideline revision (WGFF CMC revision protocol)
  * further online-meetings if needed

- Next meeting in presence:
  17th / 18th October 2022 Chongqing/China (FLOMEKO 2022)
Main actions taken and main achievements

- **AFRIMET**
  - 2021 AFRIMETS TC-M&RQ (Mass & Related Quantities)
  - Sub-Working Group: Flow
  - scheduled for July, online
  - Deona Jonker (NMISA)
  - [Mpilo Dlamini (NMISA) will take over this year]

- **APMP**

- **COOMET**

- **EURAMET**

- **SIM**

  Volume of liquid (AFRIMETS.M.FF-K4.2.2015)
  - Micro-pipettes 100 µL
  - Completed, published

  Volume Gas Flow Rate (AFRIMETS.M.FF-S1)
  - 50 ml/min to 5 000 ml/min
  - Measurements in progress

www.bipm.org
Main actions taken and main achievements

- **AFRIMET**
- **APMP**
- **COOMET**
- **EURAMET**
- **SIM**

Technical Committee for Fluid Flow TCFF
Chair: Chunhi Li (NIM)

- Annual meetings (last 9\textsuperscript{th}+10\textsuperscript{th} Nov 2020 online) 2021 also planned to be online
- 4 running RMO-comparisons and 3 comparison planned
Main actions taken and main achievements

- AFRIMET
- APMP
- COOMET
- EURAMET
- SIM

Technical Committee 1.4
Chair: NN (Victor Fafurin / VNIIR left recently)

- last meeting 24\textsuperscript{th} March 2021 online
- 2 completed RMO-comparisons (published) and 2 comparison in progress
Main actions taken and main achievements

- AFRIMET
- APMP
- COOMET
- EURAMET
- SIM

Technical Committee for Flow TC-F
Chair: Isabelle Care (LNE-Cetiat)

- last meeting 3\textsuperscript{rd} + 4\textsuperscript{th} March 2020 online

- EURAMET Projects in progress:
Main actions taken and main achievements

- AFRIMET
- APMP
- COOMET
- EURAMET
- SIM

Technical Committee for Flow TC-F
Chair: Isabelle Care (LNE-Cetiat)

- EMPIR Research Projects in progress:

<table>
<thead>
<tr>
<th>Number</th>
<th>Short name</th>
<th>Full name</th>
<th>Coordination</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>17IND13</td>
<td>Metrowamet</td>
<td>Metrology for real-world domestic water metering</td>
<td>PTB</td>
<td>2018-2021</td>
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<tr>
<td>18HLT08</td>
<td>MeDDII</td>
<td>Metrology for drug delivery</td>
<td>IPQ</td>
<td>2019-2022</td>
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<tr>
<td>18NRM06</td>
<td>NEWGASMET</td>
<td>Flow metering of renewable gases</td>
<td>LNE</td>
<td>2019-2022</td>
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<td>18NET01</td>
<td>Energy Gases</td>
<td>Support for a European Metrology Network for energy gases</td>
<td>VSL</td>
<td>2019-2023</td>
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<td>19ENG04</td>
<td>MetroHyVe 2</td>
<td>Metrology for hydrogen vehicles 2</td>
<td>NPL</td>
<td>2020-2023</td>
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</table>
Main actions taken and main achievements

- AFRIMET
- APMP
- COOMET
- EURAMET
- SIM

Technical Committee for Flow TC-F
Chair: Hernán Brenta (INTI / Argentinia)

- no activities in 2020
Progressing the state of the art

The further development of CMCs and related WGFF work will reflect the challenges in metering technologies:

- De-carbonisation of energy supply:
  - Hydrogen (production, distribution and consumption)
  - Hydrogen converted to synthetic fuels and their usage

- Extension of application fields and sensor technologies:
  - Micro flow
  - Multiphase flows
  - Waste water
  - Meter diagnostics and sensor networks
Liaison & stakeholders

- Communication with RMOs is improved, meanwhile we have also regular contribution from COOMET and AFRIMET.
- The WG chair travels to one RMO meeting annually.
- stakeholders: IMEKO TC9
  - ISO TC 48 ([micro] pipettes)
  - Legal Metrology (OIML / notified bodies)
  - Accreditation Organizations
### KCs completed and underway

<table>
<thead>
<tr>
<th>Key Comparison</th>
<th>Measurand</th>
<th>Pilot Lab</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCM.FF-K1.2015</td>
<td>Water flow</td>
<td>PTB</td>
<td>Draft B</td>
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<tr>
<td>CCM.FF-K2.2011.1</td>
<td>Hydrocarbon liquid flow</td>
<td>VSL</td>
<td>Draft B</td>
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<tr>
<td>CCM.FF-K6.2017</td>
<td>Low pressure gas flow</td>
<td>ITRI</td>
<td>Draft B</td>
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### KCs planned

<table>
<thead>
<tr>
<th>Key Comparison</th>
<th>Measurand</th>
<th>Pilot Lab</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCM.FF-K5.2016</td>
<td>High pressure gas flow</td>
<td>PTB</td>
<td>to be re-organised</td>
</tr>
</tbody>
</table>

**CCM.FF-K5.2016:**

- will be re-organised to avoid technical risks of equipment and to reduce (financial) effort for the comparison loop.
- The reduction of the comparison loop can be achieved if the regular repeated comparison of EuReGa (EURAMET-Project [F1301](#)) can be accepted as an RMO-KC with link to CCM.FF-K5.
- This subject has been forwarded to the KCDB coordinator.
Program of work for the next 5 years

- Continue effort to objectively apply KC results to CMC reviews.
- Improving efforts to WGFF and RMO comparisons to keep the 10 year cycle in 2020-2030 ongoing.
- Increase participation by developing economies, strengthen coordination and linkage with RMOs, encourage different labs to serve as Pilots of key comparisons.
- Solve KC transport and cost sharing problems.
- Share more validated uncertainty spreadsheet templates.
- Taking the chance of recent experience to establish of additional online-meetings to enhance efficiency in document work and in progress of KCs.
Proposed changes (membership, chairmanship, ToRs)

- In WGFF there is no request at the moment.
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