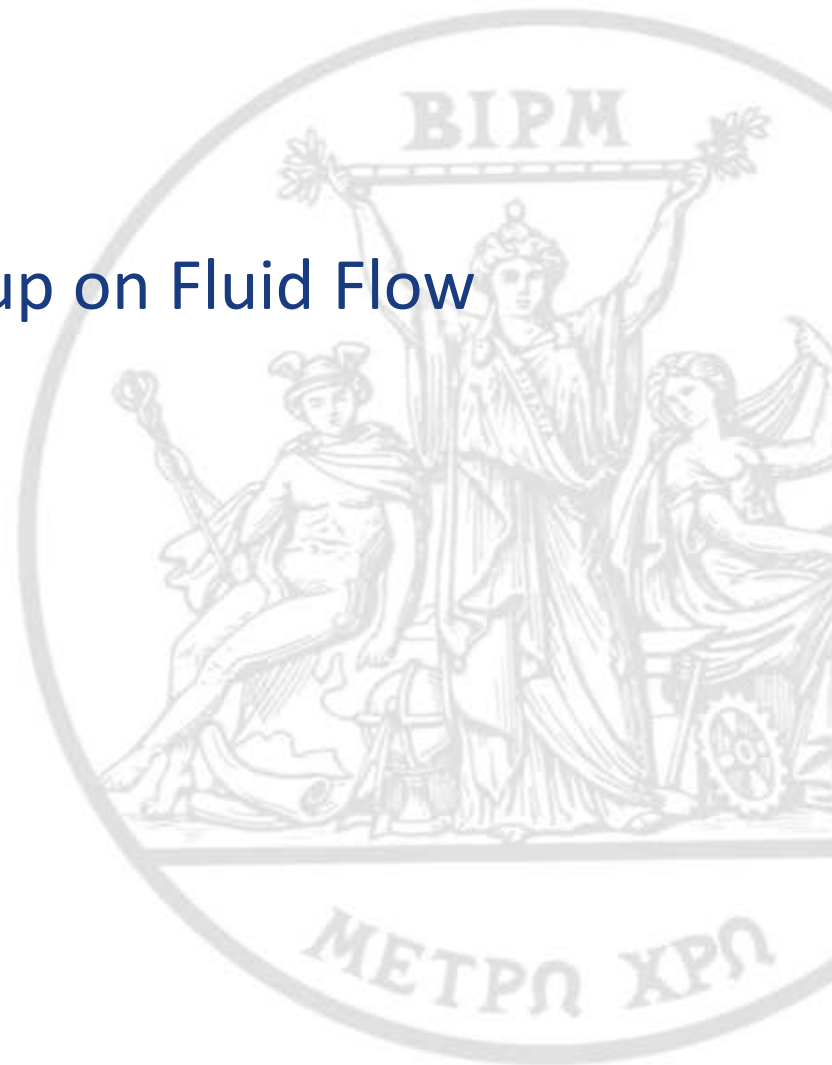


Report of the CCM Working Group on Fluid Flow

Bodo Mickan

18th CCM meeting, 20-21 May 2021

Bureau
+ **I**nternational des
+ **P**oids et
+ **M**esures

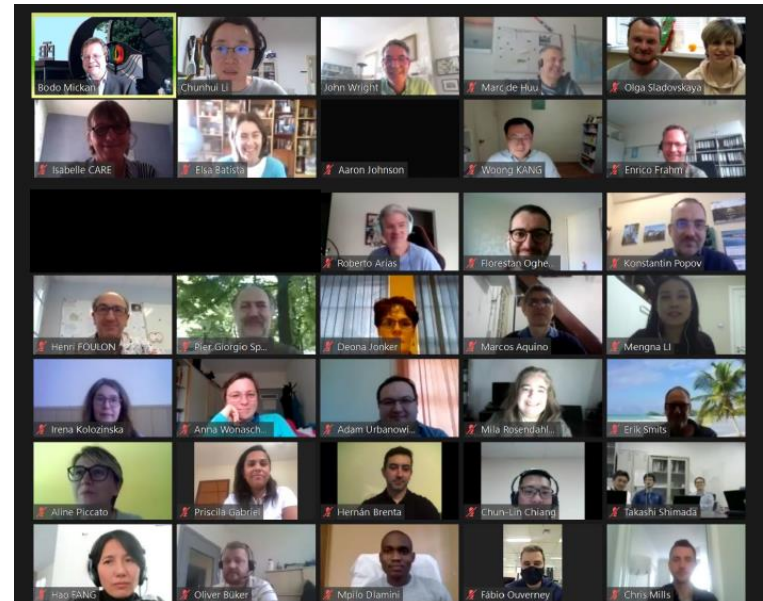


WG Meetings held since last CCM

- ◆ 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)**
 - ◆ APMP **Sub-Working Group: Flow**
 - ◆ COOMET scheduled for July, online
 - ◆ EURAMET Deona Jonker (NMISA)
 - ◆ SIM [Mpilo Dlamini (NMISA) will take over this year]
- Volume of liquid (AFRIMETS.M.FF-K4.2.2015)
- Micro-pipettes 100 μ L
 - Completed, published
- Volume Gas Flow Rate (AFRIMETS.M.FF-S1)
- 50 ml/min to 5 000 ml/min
 - Measurements in progress

Main actions taken and main achievements

- ◆ AFRIMET
 - ◆ **APMP**
 - ◆ COOMET
 - ◆ EURAMET
 - ◆ SIM
- Technical Committee for Fluid Flow TCFF**
Chair: Chunhi Li (NIM)
- Annual meetings (last 9th+10th 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**
 - last meeting 24th March 2021 online)
- ◆ EURAMET
 - 2 completed RMO-comparisons (published)
and 2 comparison in progress
- ◆ SIM

Technical Committee 1.4

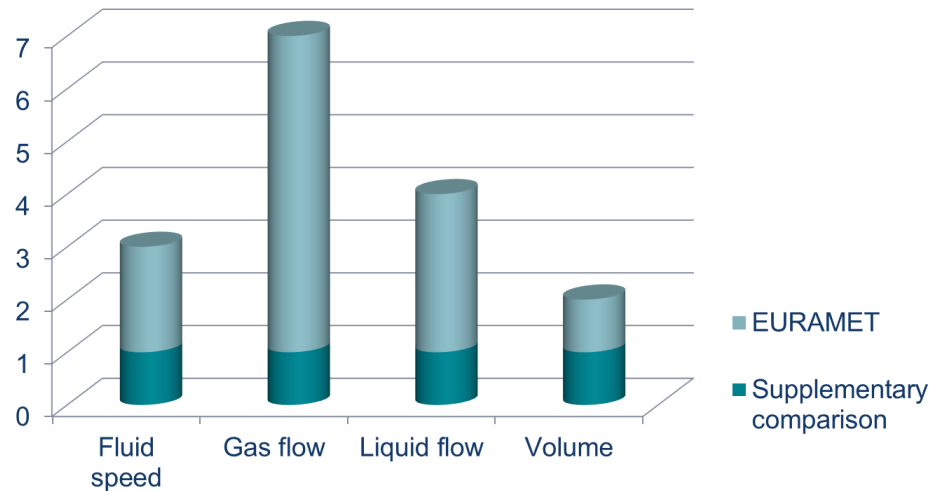
Chair: NN (Victor Fafurin / VNIIR left recently)

Main actions taken and main achievements

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

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

- last meeting 3rd + 4th 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:

Number	Short name	Full name	Coordination	Duration
17IND13	Metrowamet	Metrology for real-world domestic water metering	PTB	2018-2021
18HLT08	MeDDII	Metrology for drug delivery	IPQ	2019-2022
18NRM06	NEWGASMET	Flow metering of renewable gases	LNE	2019-2022
18NET01	Energy Gases	Support for a European Metrology Network for energy gases	VSL	2019-2023
19ENG04	MetroHyVe 2	Metrology for hydrogen vehicles 2	NPL	2020-2023



Main actions taken and main achievements

- ◆ AFRIMET
 - ◆ APMP
 - ◆ COOMET
 - ◆ EURAMET
 - ◆ **SIM**
- Technical Committee for Flow TC-F**
Chair: Hernán Brenta (INTI / Argentina)
- 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

Key Comparison	Measurand	Pilot Lab	Status
CCM.FF-K1.2015	Water flow	PTB	Draft B
CCM.FF-K2.2011.1	Hydrocarbon liquid flow	VSL	Draft B
CCM.FF-K6.2017	Low pressure gas flow	ITRI	Draft B

KCs planed

Key Comparison	Measurand	Pilot Lab	Status
CCM.FF-K5.2016	High pressure gas flow	PTB	to be re-organised
CCM.FF-K1.2019	Microflow of water	METAS / NMIT	Protocol in preparation

CCM.FF-K5.2016:

- will be re-organised to avoid technical risks of equipement 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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