

TC-Chair 1st semester Report 2014 TC-F

2014-05-30



1. General Aspects

The Technical Committee for Flow (TC-F) is concerned with issues that are relevant to industry, regulation and trade involving the measurement of fluid quantity and fluid speed and related measurements derived from it (e.g. energy). The measurement of fluid quantities focuses on the measures of water, hydrocarbon liquids, air and natural gas but also includes all other fluids and mixtures of fluids.

The first TC-F meeting was held in East Kilbride in 1988 with less than 10 participants. In Turin, on March 2014, 38 delegates from 23 countries attended the last TC-F meeting. The TC-F community increases and, at the moment, there are 29 contact persons and 60 flow experts involved.

The TC-F members are very active in the developments of flow research facilities but also in facilities for the type approval and support for legal metrology in the respective countries. Routine work for industrial and laboratory costumers is also a big part of these community activities.

2. Projects and comparisons

There is a total of 82 EURAMET projects in the Technical Committee for Flow, where 79% of these projects are comparisons, 18 % are research and 3% consultation. As of the date of this report 56 projects are completed, 5 cancelled and 21 active projects (14 comparisons and 7 research).

In 2014, so far, nine EURAMET projects were proposed: 1325 - Comparison for gas flow range 5 ml/min to 30 l/min, 1322- Volume comparison at 100 microliter – Calibration of micropipettes, 1312 - Development of a guide on air speed calibration of solid anemometers, 1308 - Comparison of air speed facilities using LDAs as reference standards, 1301 - EUREGA-1, 1297 - Comparison of a 50 ml pycnometer and 500 ml flask, 1296 - Inter-laboratory calibration comparison of a rotary piston gas meter G650, 1295 - Guide on the calibration, operation and handling of micropipettes and 1291 - Comparison between recently developed primary standards.

One EURAMET project was completed: 800 - The Harmonization of Reference Values for High-Pressure Natural Gas Volume (VSL).

Detailed information about the TC-F projects can be consulted in the EURAMET website.

3. Key Comparisons

The EURAMET TC-F members are very active at within the BIPM key comparison (KC) level field, where 5 of 6 KCs were organized by EURAMET TC-F members and the European participation was also relevant significant.

A second round of KC is now running. There are 4 ongoing KCs in the subfield of flow at the BIPM/KCDB:

- CCM.FF-K1 – Water flow
- CCM.FF-K2 – Liquid hydrocarbon Flow
- CCM.FF-K3 – Air Speed
- CCM.FF-K5 – High pressure gas flow

And two KCs were concluded in 2013/2014:

- CCM.FF-K4 – Liquid Volume
- CCM.FF-K6 – Low pressure gas flow

There are 6 BIPM/EURAMET supplementary comparisons in the field of fluid flow:

- EUROMET.FF.M.S1 - Comparison of piston and bell provers (2008)

- EURAMET.FF.M.S2 - Comparison of water flow calibration (2013)
- EUROMET.FF.M.S3 - Low pressure gas flow (pressure < 4 105 Pa)(2008)
- EUROMET.FF.M.S4 - Air Speed (2008)
- EUROMET.FF.M.S5 - LDA-based intercomparison of anemometers (2013)

There are 4 BIPM/EURAMET key comparisons in the field of fluid flow:

- EURAMET.M.FF-K4 – Liquid Volume 100 mL
- EURAMET.M.FF-K4b – Liquid Volume 20 L
- EURAMET.M.FF-K5a – High pressure gas flow
- EURAMET.M.FF-K6 – Low pressure gas flow

A new EURAMET KC in micropipette calibration was proposed to the CCM but not yet approved.

4. CMCs

A CMC revision group and procedure was created during the 2012 TC-F meeting. This new CMC revision procedure is up and running and is giving good results in terms of efficiency and organization. One set of CMCs were posted in the JCRB for RMO revision in 2014, EURAMET.M.27.2014.

CMCs from other RMOs were reviewed, namely SIM.M.26.2013.

By proposal of EURAMET a Guideline on harmonization of evaluation criteria of CMCs is under development by the WGFF.

5. Activities of the Sub-Committees

The TC-F group is divided in four subgroups, Gas flow, Liquid flow, Volume and Fluid speed.

The subgroup meetings are held separately during the TC-F meeting. Each subgroup convenor decides the agenda and the subjects to be debated based on participants input.

- **Gas Flow subgroup** – Convenor – Bodo Mickan from PTB

The main topics of discussion were the status of the current project in the field of gas flow and the harmonization of comparison result templates. There was also a discussion on uncertainties in comparisons in relation to CMC evaluation.

- **Liquid Flow subgroup** – Convenor – Petra Milota from BEV

In the liquid flow subgroup meeting, results of EURAMET projects and KCs were discussed. Also a new guide on harmonization of the uncertainty budgets and calibration methods for liquid flow standards was proposed.

- **Volume and liquid properties** – Convenor – past Zoe Metaxiotou from EIM, new convenor Miroslava Benkova from CMI

In the volume and liquid properties subgroup meeting, the results of the running comparisons were presented. A new EURAMET Guide on calibration of micropipettes was proposed. A new regional comparison in the field of micropipettes was also proposed. A discussion on ISO cooperation in standard development was undertaken within the group. A new convenor was elected – Miroslava Benkova from CMI.

- **Fluid speed** – Convenor – Pier Giorgio Spazzini from INRIM

The group started to be formed in the second semester of 2013 after approval at the 2013 EURAMET GA. The main topics of discussion were the development of guidelines and organization of comparisons.

6. EMRP/EMPIR

Since 2012 that PRTs are developed within the TC-F group, following the EMRP/EMPIR task force web meeting.

In January 2014 the EMRP/EMPIR task force organized by Peter Lucas had a new web-meeting and several ideas for PRTs within the 2014 call were proposed:

- Gas flow metrology for industry (VSL)
- Liquid flow metrology for industry (NEL)
- Steam metrology for industry (CMI)
- Metrology for waste water – sensor development (LNE)
- Metrology for small and midscale flow regulators (VSL)
- Traceability for on-site flow measurement with clamp-on USM (PTB)

Participants from the TC-F are involved in several EMRP projects: ENG03 - Metrology for Liquefied Natural Gas, ENG09 – Metrology for Biofuels, ENG06 -Metrology for Improved Power Plant Efficiency and HLT07 - Metrology for drug delivery, ENG54 – Biogas, ENG58 – MultiFlowMet, ENG60 – LNG, ENV60 – IMPRESS and to a lesser extent there is a TC-F members participation in ENV56 - KEY-VOCs, ENG59 – NonNewtonianLiquids, ENV07 – METEOMET (Metrology for Meteorology) and NEW04 (development of uncertainty methods and computations).

7. Roadmap 2012-2020 and inquiries

A group web meeting was organized in May 2014 to discuss the publication of the TC-F roadmap and the development of a stakeholder inquiry on research needs/ideas for the future of flow in Europe.

It was also decided to send an inquiry to the NMIs that are involved in research and method developments in order to create a data base. The purpose of this database is to find overlapping R&D efforts and investments within EURAMET TC-F. The shared information will be helpful for future cooperation in the framework of EMRP/ EMPIR or outside it. It will also help to prevent from wasting our limited (national) R&D budgets in duplicating research activities.

8. Guides

Three new guides are now under development:

- Guide on air speed calibration of Pitot tube anemometers (expected to be extended to other types of anemometers in the future)
- Guide on the calibration, operation and handling of micropipettes
- Guide on harmonization of the uncertainty budgets and calibration methods for liquid flow standards

9. Meetings

The annual meeting of the TC-F was held in Turin, Italy from 11th to 13th of March 2014. The meeting was hosted by the INRIM, the National Metrology Institute of Italy.

In the meeting several issues were discussed, mainly:

- Results from comparisons
- Development of calibration guides
- WGFF group and KCs
- CMCs and DUT uncertainties
- EMRP and EMPIR projects, proposals and funding
- New facilities, developments and projects
- EUREGA

The next TC-F meeting will be in Borås, Sweden, from 5th to 7th of May 2015 and be hosted by SP.

10. Strategic planning

It was decided to involve NMI and stakeholders in the development of the research topics of TC-F and therefore inquiries are under development.

The EMRP/EMPIR task force will continue to meet every year to help with the development of PRTs.

The harmonization of CMC revision criteria within the WGFF group has started with the development of new procedure that is now under discussion within the WGFF group.

The CMC revision is now stabilized and every year the NMIs have a chance to submit new CMCs.

A new protocol on EURAMET TC-F comparison organization is now under development.

A new template for evaluation of comparison results and comparison reports will be developed in order to harmonize reports and result calculations.

11. Outlook for 2014

- New JRP proposals for EMRP/EMPIR based on the TC-F roadmap and task force web-meeting discussions
- One new EURAMET KC comparison was proposed for 2014, calibration of micropipettes
- Submission of new EURAMET projects
- Development of a result and report template for flow comparisons;
- Development of three new guides
- Responses from stakeholders inquiry on research needs/ideas available by the end of the year
- A record of past meetings will be concluded based on interviews with senior TC-F participants

30th of May 2014

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