



## 1. General Aspects

In the EURAMET technical committee for Metrology in Chemistry (TC-MC) 28 EURAMET member countries are represented. The associate member JRC Geel (former JRC IRMM) terminated its associate membership at the end of 2016. National standards in chemistry or biology are held by 22 National Metrology Institutes (NMI) and 21 Designated Institutes (DI).

The technical committee is chaired by Dr. Hanspeter Andres (METAS, Switzerland). He will finish his first mandate and is proposed by the technical committee for a second mandate. The TC-MC committee has four technical subcommittees. The convenors of the subcommittees are Janneke von Wjik (VSL, Netherland) for gas analysis, Dr. John Warren (LGC, Great Britain) for organic analysis, Dr. Rainer Stosch (PTB, Germany) for inorganic analysis and Dr. Daniel Stoica (LNE, France) for electrochemical analysis. Dr. John Warren took over from Dr. Béatrice Lalère (LNE, France), who finished her second mandate as convenor. Dr. Daniela Stoica succeeds Dr. Pia Jakobsen (DFM, Denmark), who left DFM.

At their annual meeting the committee decided to implement a strategy working group with the following tasks:

- advice to TC-Chair and subcommittee convenors
- strategic planning of comparisons, support actions, coordination
- organisation of workshops (e.g. EMPIR and MP4).

Members of the group are the current TC-Chair (chair), subcommittee convenors, past TC-Chair and up to four committed additional members.

In response to the growing bio-metrology community within EURAMET the technical committee organic analysis will be renamed at the occasion of the next regular subcommittee structure review to bio and organic analysis. This name change will provide more visibility than the actual platform within the technical committee organic analysis.

## 2. Projects

The following TC-MC pilot studies were completed or are ongoing during the reporting period 2016/2017:

- EURAMET 708 VSL-NIST bilateral,
- EURAMET 1220 Hydrogen purity,
- EURAMET 1255 Coal mine methane,
- EURAMET 1280 EETGRAC,
- EURAMET 1293 C<sub>6</sub>-C<sub>10</sub> hydrocarbons in methane,
- EURAMET 1305 NPL-VSL bilateral,
- EURAMET 1329 100 nmol/mol SO<sub>2</sub> in synthetic air (completed),
- EURAMET 1370 Comparison on gold jewellery alloy (completed),
- EURAMET 1377 Comparison measurement for Al and Mo (completed).

The six ongoing comparisons are currently run by the subcommittee on gas analysis. The bilateral projects EURAMET 708 and 1305 were established to inform the other NMIs on a regular basis on bilateral comparisons between VSL and NIST and NPL and VSL, respectively.

### 3. Comparisons

The following EURAMET key and supplementary comparisons in the metrology area “Amount of Substance” are registered in the key comparison database (KCDB) of the BIPM:

Comparison type	Name	Status	field
SC	EUROMET.QM-S1	completed	gas analysis
SC	EUROMET.QM-S2	completed	inorganic analysis
SC	EUROMET.QM-S3	completed	gas analysis
SC	EURAMET.QM-S4	completed	gas analysis
SC	EURAMET.QM-S5	completed	gas analysis
SC	EURAMET.QM-S6	completed	gas analysis
SC	EURAMET.QM-S7	completed	electroanalysis
SC	EURAMET.QM-S8	completed	gas analysis
SC	EURAMET.QM-S9	completed	gas analysis
SC	EURAMET.QM-S10	completed	gas analysis
KC	EUROMET.QM-K1.c	completed	gas analysis
KC	EUROMET.QM-K3	completed	gas analysis
KC	EUROMET.QM-K4	completed	gas analysis
KC	EURAMET.QM-K4.1	completed	gas analysis
KC	EURAMET.QM-K12	completed	organic analysis
KC	EUROMET.QM-K17	completed	electroanalysis
KC	EURAMET.QM-K26.a	completed	gas analysis
KC	EURAMET.QM-K111	Draft B	gas analysis

In the reporting period no new key or supplementary comparisons were started or completed. For the key comparison EURAMET.QM-K111 the draft B report has been circulated among the participants.

### 4. CMCs

In the CMC cycle XVIII 206 new or revised and 170 to be withdrawn or greyed-out CMCs were submitted by 18 member countries and JRC Geel. In this cycle Category 13 (sediments, soils, ores and particulates) and Category 4 (core gases) were re-reviewed. The technical review was done at the subcommittee meetings held on 1<sup>st</sup> February 2017 after a pre-review by appointed technical experts. The submitted bio-CMC had already been technically reviewed at a dedicated meeting of the bioanalysis CMC review group. The intra-regional review was done according to EURAMET Guide No. 8, based on JCRB criteria. Relevant and valid Key Comparisons, Pilot Studies and further evidence such as peer reviewed papers and technical reports were considered as supporting evidence. All CMCs were accompanied by a TC-Q approved self-declaration on the underlying quality management system. In the review 92 (45 %) of the submitted claims were approved without changes, 102 (58 %) were approved after changes and 12 (6 %) were rejected or greyed-out. Claims were rejected respectively greyed-out on technical reasons only. The remaining 366 CMCs (107 new, 89 revised, 148 withdrawn and 22 greyed-out) were subsequently forwarded to the chairperson of the CCQM KCWG on 20 February 2016 for the inter-regional review according to CCQM rules. This review is still ongoing.

## 5. Activities of the Subcommittees

The technical subcommittees reconvened ahead of the annual TC-MC plenary meeting on 1st February 2017. Topics of the meetings were running and new projects/comparisons, the intra-RMO review of the CMC cycle XVIII, technical presentations and strategic discussions.

Subcommittee on gas analysis:

- 6 running projects were discussed; 1 project was completed
- 91 new or revised CMC Cycle XVIII were discussed, 89 approved and 2 rejected
- in the review of the core components the flexible scheme was for the first time applied
- the EMRP project METNH<sub>3</sub> was presented
- 5 potential research topics for the EMPIR call 2017 were discussed

Subcommittee on organic analysis:

- 49 new or revised CMC Cycle XVIII were discussed, 44 approved and 5 rejected
- 4 of the 44 approved CMCs are from the bio-area
- 2 new EMPIR project (ALCOREF, ENVCRM) were presented
- Dr. Sophie Vaselein-Reimann reported on water issues

Subcommittee on inorganic analysis:

- 2 projects were completed, 2 new projects proposed
- 66 new or revised CMC Cycle XVIII were discussed, 61 approved and 5 rejected
- the applicability of the core capability approach for CMC review was discussed
- 2 potential research topics for the EMPIR call 2017 were discussed
- Dr. Michael Mariassy presented "Coulometry and Purity of Inorganic Salts"

Subcommittee on electrochemical analysis:

- challenges in electrochemical analysis were discussed
- Dr. Ivo Leito presented the research topic new unified pH for the EMPIR call 2017
- Dr. Timo Naykki presented new tools to estimate the measurement uncertainty
- Dr. Nathan Lawrance presented an industrial view on voltammetric pH sensing
- Dr. Steffen Seitz presented SI traceable conductivity measurements in ultrapure water

The subcommittees on organic, inorganic analysis and electrochemical analysis had a common afternoon session about ideas for the EMPIR call 2017.

## 6. Participation in EMRP/ EMPIR

The members of the TC-MC are very active in running and planned EMRP / EMPIR projects

EMRP 2013 TP Environment:

- ENV51-MeTra "Traceability for mercury measurements"
- ENV52-HIGHGAS "Metrology for high impact greenhouse gases"
- ENV55-MetNH<sub>3</sub> "Metrology for ammonia in ambient air"
- ENV56-KEY-VOCs "Metrology for VOC indicators in air pollution and climate change"
- ENV59-atmoz "Traceability for atmospheric total column ozone"

EMRP 2013 TP Energy:

- ENG54-Biogas "Metrology for biogas"

EMPIR 2014 TP Industry

- 14IND01 3D MetChemIT «Advanced 3D chemical metrology for innovative technologies»
- 14IND12 Innanopart - Metrology for innovative nanoparticles<

EMPIR 2014 TP Research potential

- 14RPT03 ENVCRM "Matrix reference materials for environmental analysis"<

EMPIR 2015 TP Health

- 15HLT01 MetVBadBugs "Quantitative measurement and imaging of drug-uptake by bacteria with antimicrobial resistance"
- 15HLT02 ReMIND "Role of metals and metal containing biomolecules in neurodegenerative diseases such as Alzheimer's disease"
- 15HLT04 NeuroMet "Innovative measurements for improved diagnosis and management of neurodegenerative diseases"
- 15HLT07 AntiMicroResist "Novel materials and methods for the detection, traceable monitoring and evaluation of antimicrobial resistance"

EMPIR 2015 Normative

- 15NRM01 SulfNorm "Metrology for sampling and conditioning SO<sub>2</sub> emissions from stacks"
- 15NRM03 Hydrogen "Metrology for sustainable hydrogen energy applications"

EMPIR 2016 TP Environment

- 16ENV01 MercOx "Metrology for oxidised mercury"
- 16ENV02 Black Carbon "Metrology for light absorption by atmospheric aerosols"
- 16ENV05 MetNO2 "Metrology for nitrogen dioxide"
- 16ENV06 SIRS "Metrology for stable isotope reference standards"
- 16ENV07 AEROMET "Aerosol metrology for atmospheric science and air quality"
- 16ENV08 IMPRESS 2 "Metrology for air pollutant emissions"

EMPIR 2016 TP Energy

- JRP-g07 MetroHyVe "Metrology for hydrogen vehicles"
- JRP-g03 Biomethane "Metrology for biomethane"
- JRP-g15 LNG III "Metrological support for LNG and LBG as a transport fuel"

The projects cover all the grand challenges of the EMRP/EMPIR targeted programs, thus indicating the cross-disciplinary nature of the TC-MC itself.

At the plenary meeting two dedicated EMPIR sessions were organised. In the first session non-succesfull PRTs / JRPs from earlier calls were presented and possible better consortia and proposals discussed. In the second session PRTs for the EMPIR call 2018 were presented. As the schedule of the EMPIR calls for PRTs has been moved forward by two weeks the annual meeting of the TC-MC is rather late to discuss needs and opportunities for the chemical community. The TC therefore decided to organise in the future a dedicated EMPIR meeting late october to allow sufficient time for preparing joint PRTs.

## 7. Capacity Building: Activities of the last year and future needs

A dedicated workshop for DIs without CMCs five years after designation was organised. The goal of the workshop was to understand the needs of the concerned DIs and define together appropriate actions. Four of the five concerned DIs participated in the workshop. After an introduction on CIPM MRA issues DI representatives introduced their institutes and shared their needs. All needs and requirements were discussed in depth.

- The Norwegian DI NILU plans to have a CMC for ozone measurements. They plan to participate soon in the comparison BIPM.QM.K1 for the necessary evidence. The TC offered help with the uncertainty budget.
- The Finnish DI MIKES/SYPE plans to have CMCs for lead and mercury in water. They have already participated in the comparison SIM.QM-S7. The report will soon be approved and the DI will then apply for CMCs in the next round.

- The Slovenian DI MIRS/ZAG plans for CMC for  $\text{Cl}^-$  and  $\text{SO}_4^{2-}$  in cement. Clear need to participate in a key or supplementary comparison of a similar compound in a similar matrix. Need for national reflection of cost/benefit of designation.
- The Slovenian MIRS/UP-ZRS/LPO plans for CMC alpha-tocopherol in plant oils. Clear need to participate in a key or supplementary comparison of a similar compound in a similar matrix. Need for national reflection of cost/benefit of designation.

The workshop was well received and will be repeated in the future as two more DIs will reach five years of designation without CMCs in two years.

## 8. Meetings

The annual meeting of the TC-MC was held from 31<sup>st</sup> January to the 3<sup>rd</sup> February 2017 and was hosted by GUM, Poland. The first day was reserved for the convenors meeting and the above mentioned support workshop. The second day the four technical subcommittees on gas analysis, organic analysis, inorganic analysis and electrochemical analysis convened. The plenary meeting took place the 2<sup>nd</sup> and 3<sup>rd</sup> February 2017.

At the first day of the plenary meeting, Dr. Włodzimierz Lewandowski, President of the GUM, gave an overview of GUM. Subsequently, activities of EURAMET (Wolfgang Schmid from EURAMET), activities of the TC-MC (TC chair), activities of the TC-MC subcommittees (subcommittee convenor), the CCQM strategy (TC chair on behalf of Dr. Robert Wielgosz from BIPM), activities of GAWG (Dr. Paul Brewer from NPL), activities of EAWG (Dr. Michal Mariassy from SMU), activities of OAWG (Dr. Beatrice Lalère from LNE), activities of IAWG (Dr. Mike Sarget from LGC), calibration versus validation in gas metrology (Dr. Richard Brown from NPL), Moisture metrology development, EURACHEM (Dr. Michela Segal from INRIM), Education activities in MiC (Dr. Ivo Leito from University of Tartu) and the new SI promotion group (Dr. Bernd Güttler from PTB) were presented.

The second day started with a session on TC management. The TC-Chair as well as two new subcommittee convenors were elected. The TC chair's propositions for renaming the subcommittee organic analysis at the next occasion to subcommittee bio and organic analysis and extend the terms of the subcommittee convenors in line with EURAMET rules from 2 to 5 years were accepted. Also his proposition to install a strategy working group replacing the ad-hoc working group on EMC was approved.

The last two sessions of the plenary meeting were dedicated to past, present and future EMPIR calls. During the discussion it was decided to hold a dedicated EMPIR workshop in late October at METAS in Bern, Switzerland.

The next annual TC-MC meeting is scheduled from the 5<sup>th</sup> to the 7<sup>th</sup> February 2018 at BEV in Vienna, Austria

## 9. Issues

There are no particular issues to be reported.

The TC took note of JRC Geels decision to terminate its associate membership and forwarded its concerns on the impact of this decision to the wider chemical metrology community to the BoD.

The TC also took note of the change of interaction with EURACHEM. As other organisations EURACHEM is a liaison organisation of EURAMET. The ToR of the joint EURACHEM/EURAMET TC Metrology in Chemistry were subsequently removed from the TC-MC internet page.

## **10. Strategic Planning**

As agreed at the last plenary meeting the subcommittee organic analysis will be renamed to bio and organic analysis at the next reevaluation of the subcommittee structure in 2018.

The strategy working group will review the EURAMET TC-MC perspective on EMC, revise the document and publish it on the TC-MC webpage.

In line with the revision of the CCQM strategy a more strategic approach to the planning of EURAMET TC-MC supplementary and pilot studies is required. First ideas were discussed at the last plenary meeting and will be continued in the strategic planning working group.

## **11. Outlook for 2018/2019**

Organization of a dedicated EMPIR call 2018 workshop.

Organization of the CMC cycle XIX.

Organization of the next TC-MC plenary meeting.

Organization of a joint workshop with the TC-IR.