TC Chair Annual Report 2021 - 2022

TC for Metrology in Chemistry (TC-MC)
TC Chair: Sophie Vaslin-Reimann
Version 1.0, 2022-01-04

1. General Aspects

In the EURAMET technical committee for Metrology in Chemistry (TC-MC) 29 contact persons and 3 observers are represented. 25 European members (NMIs) and 10 associate members (DIs) have national standards in chemistry or biology and take part in TC-MC activities.

The TC-MC committee has four technical subcommittees. The conveners of the subcommittees are Janneke von Wjik (VSL, Netherland) for gas analysis, Mine Bilsel (UME, Turkey) for bio and organic analysis, Rainer Stosch (PTB, Germany) for inorganic analysis and Daniela Stoica (LNE, France) for electrochemical analysis.

2. Projects

The following TC-MC study was completed:

- EURAMET 1462 Electrolytic conductivity at pure water level: The comparison has been completed and results are published in the KCDB.

The following TC-MC studies are agreed or in progress at the time of this report:

- EURAMET 708 VSL-NIST bilateral,
- EURAMET 1424 Determination of Elements in River Water
- EURAMET 1455 Comparison on determination of gold content in white alloy
- EURAMET 1470 Measurement capabilities for the quantification of ethanol in water
- EURAMET 1471 Value assigned forensic alcohol in water reference materials
- EURAMET 1480 Comparison for particle number concentration
- EURAMET 1503 Automotive exhaust gases
- EURAMET 1521 Supplementary comparison of "Measurement of PAHs in Protein Matrix"

3 comparisons are run by the subcommittee gas analysis. The subcommittee for inorganic analysis runs two and the subcommittee electrochemical analysis runs one comparison. The subcommittee organic analysis runs 3 comparisons.

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	completed	gas analysis
KC	EURAMET.QM-S11	in progress	inorganic analysis
KC	EURAMET.QM-S12	in progress	electroanalysis
KC	EURAMET. QM-S13	in progress	organic analysis
KC	EURAMET. QM-S14	in progress	organic analysis
KC	EURAMET. QM-K3.2019	in progress	gas analysis

4. CMCs

In the completed CMC cycle XXII, CMCs were submitted for the first time within the BIPM KCDB 2.0.
162 [148 new & 14 revised] CMCs were submitted for intra-EURAMET by 14 NMI/Dis from 12 countries and reviewed by EURAMET SC convenors and experts.
The claims cover 10 categories (1, 2, 3, 4,5,7,8,9,10 & 11). The cycle included no mandatory re-review of CMCs to facilitate the uptake of KCDB 2.0.
Several broad scope claims were submitted in the inorganic and organic analysis subcommittees.
During the intra-EURAMET review, 152 CMCs were accepted & 10 CMCs were withdrawn:
152 CMCs were forwarded to inter-RMO review.
The inter-RMO review took place through several virtual meetings between March and September 2021.
End of 2021,148 EURAMET CMCs were published in the KCDB 2.0 (1 CMC withdrawn and 3 CMCs refused).

In the new CMC cycle XXIII, 178 CMCs were submitted: 80 new, 86 modified, 12 greyed out CMCs, proposed by 17 NMI/Dis from 16 countries.
The claims cover 7 working groups (EAWG; GAWG; IAWG; IRWG; OAWG; NAWG and PAWG).

The cycle included mandatory re-review of certain Gas CMCs: Claims that will be re-reviewed in 2022 would cover all existing claims made in 2001- 2010 covering all environmental, forensic, medical, and "other" claims. Claims re-reviewed in 2023 will cover all fuel and high purity claims.

No broad scope claims were submitted in this cycle.

The technical review was done at the subcommittee meetings held on 1st February 2022 after a pre-review by appointed technical experts. The intra-regional review was done according to EURAMET Guide No. 3, based on JCRB criteria. Relevant and valid Key Comparisons, Pilot Studies and further evidences such as peer reviewed papers and technical reports were considered as supporting evidences. All CMCs were accompanied by a EURAMET TC-Q approved self-declaration on the underlying quality management system.

19 CMCs of the submitted claims were rejected during the intra-regional review (withdrawn or not accepted).

Thus, on the 11th of February 2022, 159 CMCs were subsequently forwarded for review to the JCRB. The interregional review started quick after and is still ongoing.

74 Russian CMCs were reviewed by EURAMET experts before and shortly after the start of the war between Russia and Ukraine:
On 23 March, TC MC decided to adopt EURAMET's position regarding collaboration with federal or public institutions from Russia or Belarus as consequence of the Russian invasion of Ukraine:
EURAMET being deeply concerned about the Russian invasion of Ukraine and its implications, the Board of Directors recommended that all EURAMET projects and activities involving federal or public institutions from Russia or Belarus are to be terminated, suspended, or concluded without Russian or Belarussian participation.
With regard to CMCs, EURAMET's policy is to refrain from reviewing CMC submitted by Russia or Belarus. As a consequence, although the review of 74 CMCs from Russia has been carried out, no further action will be taken for the time being.

- **JRC situation and its impact on CMC s submission:**

As a result of the EURAMET JRC release, CMCs from JRC were greyed out in 2018 (82 QM CMCs) and could **no longer be used as source of traceability.**
During the EURAMET General Assembly in May 2020, the renewal of JRC membership was agreed and in October 2021, a EURAMET peer-review was organised for the Chemistry and the Ionisation Radiation domains.
As a conclusion, the QMS (quality management system) of JRC was approved by TC-Q.

Nevertheless, JRC CMCs will **remain greyed out** and can only be re-instated if submitted for review within the relevant TCs (TC-MC & TC-IR).
Therefore, TC-MC recommended early December 2021 to all TC-MC members to post pone CMC submissions with traceability to JRC till the re-instatement of JRC's CMCs.

JRC submitted only 2 CMCs for review in Cycle XXIII: 1 CMC in NAWG and 1 CMC in IRWG.

In CMCs cycle XXIII, IJS submitted 7 CMCs with traceability to IRMM-530R whose certificate expired.

We also discovered in parallel to the greyed out situation, that the claimed source of traceability (IRMM-530R) has never been linked to a CMC:

- SI-Traceability according to CIPM MRA-G-13 is not demonstrated.

During the intra-regional review for Cycle XXIII, TC-MC/EURAMET decided to postpone these CMCs for KCWG decision:
A request was made to KCWG to ensure the decision regarding SI-Traceability based on JRC RMs is accepted at international level even if JRC RM is **not linked to a CMC.**

6. Participation in EMPIR

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

EMPIR 2018 [TP Health, Normative] with following projects that should have ended Mid-2022: those projects with an "*" have been rescheduled and postponed due to the health crisis (end Mid-2023).

EMPIR 2018 TP Health

• 18HLT02 Aerotox "Measurements for mitigating adverse health effects from atmospheric particulate pollutants"
• 18HLT03 SEPTIMET* "Metrology to enable rapid and accurate clinical measurements in acute management of sepsis"
• 18HLT09 NeuroMet2* "Metrology and innovation for early diagnosis and accurate stratification of patients with neurodegenerative diseases"
• 18HLT10 CardioMET* "Providing the measurement infrastructure to allow quantitative diagnostic methods for biomarkers of coronary heart diseases"

EMPIR 2018 TP Normative

• 18NRM01 EDC-WFD* "Metrology for monitoring endocrine disrupting compounds under the Water Framework Directive"
• 18NRM04 Heroes "Determining new uncertainty requirements for increasingly stringent legislative HCl industrial emission limits"

EMPIR 2018 Networks

• 18NET01 Energy Gases "Support for a European Metrology Network for energy gases
• 18NET02 TraceLabMed "Traceability in Laboratory Medicine"
• **18NET04** ForClimateOcean "Climate and Ocean Observation"

EMPIR 2019 TP Environment

- 19 ENV 01 MetClimVOC "Metrology for Climate relevant Volatile Organic Compounds"
- 19 ENV 07 METROPEMS "Improved vehicle exhaust quantification by portable emission measurement systems metrology"
- 19 ENV 05 STELLAR "Stable Isotope Metrology to enable Climate Action and Regulation"

EMPIR 2019 TP Energy

- 19 ENG 04 MetroHyve II "EMPIR Metrology for Hydrogen Vehicles 2"
- 19 ENG 03 MEPHYSTO "Metrology for Advanced Hydrogen Storage Solutions"

EMPIR 2019 Normative

- 19 PRN 03 SI-HG "Metrology for traceable protocols for elemental and oxidised mercury concentrations"

EMPIR 2020 Industry

- 20IND13 Decarb „Metrology for Decarbonising the Gas Grid »
- 20IND 14 MetroCycleEU « Metrology for the recycling of Technology Critical Elements to support Europe's circular economy agenda »

EMPIR 2020 Normative

- 20NRM04 MetrIAQ "Metrology for the determination of emissions of dangerous substances from building materials into indoor air »
- 20NRM08 SapHTies "Metrology for standardized seawater pHT measurements in support of international and European climate strategies"

EMPIR 2020 Joint Network Project

- JNP-W01 Clean Energy „Support for a European Metrology Network for clean energy"

- JNP-W04 Food-MetNet "European Metrology Network on Food Safety"
- JNP-W03 POLMO "European Metrology Network on Pollution Monitoring"

EPM 2021 Green Deal

- JRP-V01 MetCCUS "Metrology support for carbon capture utilisation and storage"
- JRP-V03 MetPOEM "Metrology for the harmonisation of measurements of environmental pollutants in Europe"
- JRP-V06 PlasticTrace "Metrological traceability of measurement data from nano to small-microplastics for a greener environment and food safety"
- JRP-V09 Met4H2 "Metrology for the hydrogen supply chain"
  The projects cover all the grand challenges of the EMPIR/EPM targeted program, thus indicating the cross-disciplinary nature of the TC-MC itself.

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

- In 2021, 3 workshops to prepare the ongoing 2022 EMP calls was organised:
  - 13th, October: TC-MC brainstorm for the next DIT call
  - 4th, November: Joined EMN TraceLabMed/TC-MC brainstorm for next Health Call "Workshop on Pandemics"
  - 10, November: Joined EMN TraceLabMed/TC-MC brainstorm for next Health Call "Workshop on Laboratory"
- TC MC has 3 contact persons with observer status: Robert Wielgosz (BIPM), Abdulrahman R. Alaskar (SA) and since 2022 Holger Gerwig (UBA/ Germany) attending SCGA.
- TC MC welcomed Zuzana Durisova (SMU / Slovakia) & Noham Sebaihi (FPS Economy-SMD / Belgium) as new contact persons.
- TC-MC SCBOA welcomed Mojca Milavec (MIRS (Slovenia)) & Carmen Sanchez Blaya (CEM/Spain) as new SC contact persons,
- TC MC SCIA welcomed Zuzana Hankova (SMU / Slovakia) as new SC contact persons,
- TC MC SCGA welcomed Urska Turnsek (MIRS/Slovenia), Andrés Rojo (CEM/Spain) & Volker Ebert (PTB/ Germany) as new SC contact persons,
- TC MC SC EA welcomed Zuzana Hankova (SMU / Slovakia) & Juyeon Park (NPL/UKas new SC contact persons,

8. Meetings

Due to the pandemic, since April 2020, most of the international meetings were scheduled virtually, so the annual TC MC meeting in February 2022 (31th January and 1st to 2rd February 2022).

The first day was reserved for the meeting of the strategy working group.

On the second day, the four technical subcommittees on gas analysis, bio and organic analysis, inorganic analysis and electrochemical analysis convened simultaneously. This was followed during the afternoon by a brainstorming session for next EPM call with 7 presentations of draft PRTs by TC MC Members. 85 participants attended this workshop.

The plenary meeting took place the 2rd February 2022. Activities and Capacity Building of EURAMET (Julien Vuillemin & Tanasco Tasic from EURAMET), of the TC-MC (TC chair activities), of CCQM and the BIPM chemistry department (Dr. Robert Wielgosz from BIPM) as well as from the Liaison Organisation Eurachem (Teemu Naykki) were presented. Highlights from the TC-MC subcommittee activities by the subcommittee convenors closed the morning session.

After lunch, activities of GAWG (Dr. Paul Brewer from NPL), of EAWG (Dr. Steffen Seitz from PTB), of OAWG (Dr. Mine Bilsen from UME), of IAWG (Dr. Paola Fisicaro from LNE) as well as of the three bio-WGs (Dr. Claudia Swart from PTB) were presented.
Before coffee break, TC-MC management was presented by the TC MC chair.

Then we had a cession dedicated to recent outcomes of 3 running EMNs [COO (Paola Fisicaro & Céline Pascal); Trace LabMed (David Auerbach) & Energy gases (Annarita Baldan)] and 2 future EMNs [Polmo (Sophie Lardy-Fontan) & Food (Andrea Rossi)].

We had then a final talk from the EURAMET chair, Jörn Stenger who presented some « News from the European Partnership in Metrology and EMNs ».

The next annual TC-MC meeting is scheduled hopefully face to face with following proposed dates:
- 30 January 2023 for the SWG meeting
- 31 January for the SCs meeting
- 1st full day and 2 nd February in the morning for the plenary.

If it's not possible to organize a face-to-face meeting, then the proposal is to organise a virtual meeting in February 2023 and a face-to-face intermediate, supplementary meeting around summer 2023…..Localisation to be decided in the next months.

5. Activities of the Subcommittees

The technical subcommittees reconvened ahead of the annual TC-MC plenary meeting on 1st February 2022 (virtual meetings). Topics of the meetings were in progress and new projects/comparisons, the intra-RMO review of the CMC cycle XXIII, technical presentations and strategic discussions.

<u>Subcommittee on gas analysis:</u>
- 31 participants from 25 different institutes attended the meeting
- The results from 3 ongoing comparisons were presented and discussed.
- New projects
    - The analytical comparison NO_2 100 – 500 nmol/mol presented in 2021 is still of interest for the group: Currently NPL (Dave Worton) is looking into stability of the travelling standards. The intention is to give an update at the next meeting and to issue a protocol at that time.
    - Repetition of project 1480 High particle counting comparison (Volker Ebert) Measurements are planned for the summer of 2022.
- 139 new, revised or greyed out to be reinstated CMCs for Cycle XXIII were discussed.
- 1 running EMPIR project: 18HLT02 AeroTox "Towards standardisation of black carbon monitoring instruments: traceability and measurement challenges" was presented by Konstantina Vasilatou and its results discussed.
- An up-dated presentation of EMN "Energy Gases" was done by Karine Arrhenius
- A new Austrian Primary Standard „ Fundamental Representation of the Amount of Substance Fraction CO_2 „ was presented by Dietmar Pachinger from BEV/E+E. It is a designated institute (DI) for CO_2 primary standards based on dynamic volumetric principles. The method was explained including uncertainty budget. Participation of BEV/E+E in the ongoing K2 comparison, coordinated by BIPM, is an option for them to compare themselves with other NMIs.

Subcommittee on bio- and organic analysis:

- 33 participants from 19 different institutes attended the meeting. Still predominantly organic in nature, each year more discussion on bio than in previous years (increasing participation level).
- 8 organic- & 4 bio-CMCs were submitted in cycle XXIII for review from 4 countries [6 new and 6 revised CMCs]
- The proposed comparison by METAS on PAH in whey proteins was discussed as well as the results of the 2 comparisons EURAMET 1470 & 1471 by LNE & BAM.
- Finally the 2 future EMNs on "Food Safety" and "Pollution Monitoring" that will be presented in next EURAMET GA were presented and discussed as well as the on-going JRPs CardioMet and EDC-WFD.
- 3 PRTs for the Health call 2022 were presented and discussed:
    - Traceable T-cell quantification for immune status monitoring (Jonathan Campbell – LGC)
    - Standardisation of neurodegenerative diseases biomarkers (Milena Quaglia – LGC)
    - Standardization of food allergens protein extracts use for the diagnosis and therapy of allergy disease (Andrea Rossi – INRIM)

Subcommittee on inorganic analysis:

- 27 participants from 21 different countries attended the meeting.
- The status of 2 EURAMET ongoing projects (1424 & 1455) were presented and discussed.
- The JRC Geel issue was discussed and it was suggested that new CMC submissions with traceability to JRC have to be postponed till JRC has re-instated their CMCs.
- 14 new CMCs from 3 NMIs (EXHM, JRC & JRC) belonging to 2 categories (11 & 13) were submitted in cycle XXIII and discussed. Among these CMCs, 9 IJS CMCs are subject to further discussion at CCQM-KCWG level, as their traceability is based on JRC IRMM-530R, not linked to a CMC.
- 2 PRTs for the Health call 2022 were presented and discussed:
    - Metrology for Biomarkers of Metal Metabolism Disorders (Heidi Goenaga-Infante (LGC)).
    - Metrology for Innovative Nanotherapeutics (Fanny Caputo (LNE)).

Subcommittee on electrochemical analysis:

- 21 participants from 16 different countries attended the meeting.
- 2 new comparisons were discussed:
    - A bilateral comparison [PTB – LNE (2022)] on calibration of conductivity probe in low conductivity range (20 µS/cm and 100 µS/cm). This comparison would be similar to EURAMET 1462
    - A comparison measurement of a commercial Li-ion battery cell as outcome from EMPIR project **LiBforSecUse**. Organiser would be PTB [Schedule: 2022-2023 -> report 2024]

12 new (2), revised (5) and greyed-out (5) CMCs from 3 countries (Bulgaria, Hungry and Slovakia) were submitted and discussed

9. Issues

In the next EPM programme, great importance will be given to partnerships, encouraged by the EC. The collaborations of TC-MC with PARC (European Partnership for the Assessment of Risks

from Chemicals) & Eurolab (the European Federation of National Associations of Measurement, Testing and Analytical Laboratories) is foreseen in the next future.

10. Strategic Planning

- CCQM comparisons are covering most of the need for all EURAMET members in the specific area. There is no serious limitation to the number of participants, as CRM can be shipped worldwide easily.
- EURAMET comparisons are mainly SCs or pilot studies, to cover new and additional regional needs outside the CCQM core competencies approach. They are also often performed in the scope of JRPs projects.
- The 2012 Roadmaps have been revised in 2020 and completed and they were put onto the Euramet web page (section TC-MC). A 6th roadmap on Food safety has been prepared, agreed and put onto the web page in 2021.
- Feedbacks from TC MC to 2 consultations published by the European Commission:
    - A consultation about *Bathing water quality – review of EU rules (before 18 January 2022)*
    - *A consultation about Consultation on the revision of Regulation (EU) 2019/1242 setting CO2 emission Contact performance standards for new heavy-duty vehicles (12 January - 14 March 2022)*

11. Outlook for 2023/2024

- Change of the TC MC chair: Näykki Teemu from SYKE-Finland will take over after next EURAMET GA in June 2022,
- The mandates of 2 SC convenors come to an End in 2022 (SCGA & SGIA). Both convenors (Janneke von Wijk from VSL and Rainer Stosch from PTB) accepted to renew their terms,
- Pursuit of strategic plan of comparisons,
- Success of the CMC cycle XXIV within KCDB 2.0.,
- Preparation of the EPM calls 2023,
- Organisation of the next TC-MC plenary meeting in February 2023 (location TBD),
- To set up a share point for TC MC,
- Contribution to the Communication Group of EURAMET to improve the visibility of TCs.