

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, Netherlands) for gas analysis, Mine Bilsel (UME, Turkey) for bio and organic analysis succeeding John Warren, Rainer Stosch (PTB, Germany) for inorganic analysis and Daniela Stoica (LNE, France) for electrochemical analysis.

2. Projects

The following TC-MC studies were completed:

- EURAMET 1498: Comparison of 100 $\mu\text{mol/mol}$ HCl in N₂: the final report with all partners was prepared by PTB and colleagues and will be sent to Euramet secretariat End of April 2021.

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 1462 Electrolytic conductivity at pure water level
- 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

3 comparisons are run by the subcommittee gas analysis. The bilateral project EURAMET 708 was established to inform the other NMIs on a regular basis on bilateral comparisons between VSL and NIST respectively. The subcommittee for inorganic analysis runs two and the subcommittee electrochemical analysis runs one comparison. The subcommittee organic analysis runs 2 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	EURAMET.QM-S1	completed	gas analysis
SC	EURAMET.QM-S2	completed	inorganic analysis
SC	EURAMET.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

4. CMCs

In the completed CMC cycle XXI, 234 EURAMET CMCs were accepted fast-tracked & 35 CMC accepted non-fast tracked. This result underlines the good quality of the intra-RMO review. During this cycle, the first CMC in gas for DHMZ-SOUL (Croatian Meteorological and hydrological Service) was submitted and accepted.

In the new CMC cycle XXII, CMCs were submitted for the first time within the BIPM KCDB 2.0.: 138 new, 14 revised, 10 withdrawn CMCs were proposed by 14 NMI/Dis from 11 countries. 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.

The technical review was done at the subcommittee meetings held on 2nd February 2021 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.

30 CMCs of the new submitted claims did not change during the intra-regional review; most of the remaining CMCs have been only little modified during the intra-regional review.

No submitted CMCs were rejected. Thus, on the 20th of February 2021, all 152 CMCs were subsequently forwarded for review to the JCRB. The interregional review started quick after and is still ongoing.

- **JRC situation and it's 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**.

In 2019, EURAMET TC-MC analysed impact on SI-traceability of JRC RMs on its own CMCs:

- **6 CMCs from IJS** were affected due to expiry of certification of IRMM-530R
- **IJS was asked to prepare an action plan** for the actions they will take to ensure they will meet the traceability requirements.
- IJS has reported on the 2021 TC-MC meeting the progress made:
 - IJS demonstrated good progress in their actions regarding
 - substitution: NIST SRM 3121 Au standard solution
 - re-certification: Analysis of IRMM-530R (IJS recertification based on NIST analysis on an IRMM-530 R sample -postponed due to the sanitary crisis-)
 - It has been decided during the **TC MC meeting in February 2021**, that IJS continues its action plan to get a continued delay in the greying out of their CMCs with traceability to IRMM-530R

During EURAMET GA last May 2020, the **renewal of JRC membership was agreed**.

Nevertheless, JRC CMCs will **remain greyed out** for the time being, until acceptance of their QMS (quality management system). This should occur in 2021.

TC-MC recommended in February 2021 that new Euramet CMC submissions with traceability to JRC have to be postponed to cycle XXIII (Cycle XXII: **IJS**: 6 CMCs; **LNE**: 1 CMC, **BAM**: 1 CMC)

5. Activities of the Subcommittees

The technical subcommittees reconvened ahead of the annual TC-MC plenary meeting on 2nd February 2021 (virtual meetings). Topics of the meetings were in progress and new projects/comparisons, the intra-RMO review of the CMC cycle XXI, technical presentations and strategic discussions.

Subcommittee on gas analysis:

- The results from 5 ongoing comparisons were presented and discussed.
- *A new project was proposed "Analytical comparison on 100-500 nmol/mol NO₂ in N₂" was proposed by NPL.
- 75 new or revised CMC Cycle XXII were discussed.
- 2 running EMPIR MetClimVOC (19ENV07) & MEPHYSTO (19ENG03) were presented and their results discussed.
- The EMNs "Climate and Ocean Observation" and "Energy Gases" as well as the future EMN on "Pollution Monitoring" were presented.
- *2 new EMPIR projects starting in 2021 (20IND13 Decarb and 20NRM04 MetriAQ) were presented.

Subcommittee on bio- and organic analysis:

- 30 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).
- 21 new CMCs were submitted in cycle XXII for review from 4 countries in 4 categories (1, 3, 9, 11), 1 was greyed out.
- The results of the 2 comparisons EURAMET 1470 & 1471 were presented as well as a new proposal by Metas on PAH in whey proteins.
- * Finally the 2 Joint Research projects on "Food Safety" and "Pollution Monitoring" that will start in June 2021 were presented and discussed.
- * 2 PRTs for the Green Deal call 2021 were presented and discussed:

- “Metrology for standardised innovative alternative and validated measuring tools for water quality monitoring” (LNE)
- “Metrology supported solutions to understand, prevent and control antimicrobial resistance” (LNE)

Subcommittee on inorganic analysis:

- 21 participants from 14 different countries attended the meeting.
- The status of 2 EURAMET ongoing projects (1424 – draft B will be available End of April 2021- & 1455) were presented and discussed.
- 53 new CMCs and 1 modified CMC from 7 NMIs/Dis belonging to 5 categories (1, 2,5,10 & 11) were submitted in cycle XXII and discussed. Among these CMCs, 24 LGC CMCs are meant to give 2 Broad Scope CMCs.
- The CCQM IAWG core competency approach and its implementation in the matrix table was presented.
- The JRC Geel issue was discussed and it was suggested that new CMC submissions with traceability to JRC have to be postponed to cycle XXIII (Cycle XXII: IJS: 6 CMCs; LNE: 1 CMC, BAM: 1 CMC).

Subcommittee on electrochemical analysis:

- The status of the supplementary comparison EURAMET 1462 (EURAMET.QM-S12) was presented.
- 8 new CMCs from 2 countries were submitted and discussed. 1 was approved, 7 were returned for revision.
- The results of 2 ongoing EMPIR projects “LiBforSecUse” “UnipHied” were presented, as well as the new pre-normative project “Metrology for standardized seawater PhT measurements in support of international and European climate strategies”.

6. Participation in EMPIR

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

EMPIR 2017 [TP Industry, Fundamental] with following projects that ended Mid-2021:

EMPIR 2017 TP Industry

- SRT-i17 **MetAMCII** “Metrology for airborne molecular contaminants II”
- SRT-i25 **LiBforSecUse** “Quality assessment of electric vehicle Li-ion batteries for second use applications”

EMPIR 2017 TP Fundamental

- SRT-f09 **UnipHied** “Realisation of a unified pH scale”

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 PRM 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 pH measurements in support of international and European climate strategies"

EMPIR 2020 Joint Research 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"

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

The joint network projects POLMO on environmental monitoring as well as Food-MetNet on Food have been selected this year.

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

- In 2021, no dedicated workshop for DIs without CMCs after 5 year of associate EURAMET status has been organized.
- **TC MC** has 3 contact persons with observer status: Robert Wielgosz (BIPM), Abdulrahman R. Alaskar (SA) and since 2021, Pilar Morillo Gomez from ISCII – Instituto de Salud Carlos III (Spain), attending SCGA.
- **TC MC** welcomed Marina Ricci (JRC-Geel), Enida Llaka (DPM /Albania) and Boryana Koleva (BIM /Bulgaria) 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 Veronika Ivanova (BIM /Bulgaria) & Carla Palma (CH-LQPM/ Portugal) as new SC contact persons,
- **TC MC SCGA** welcomed Teresa Fernandez Vicente (CEM/Spain) & Miroslava Valkova (SMU/ Slovak Institute of Metrology) as new SC contact persons,
- **TC MC SC EA** welcomed Lisa Deleebeeck (DFM / Denmark) & Raquel Quendera (IPQ / Portugal) as 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 2021 (1st to 3rd February 2021).

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 9 presentations of draft PRTs by TC MC Members. 75 participants attended this workshop.

The plenary meeting took place the 3rd February 2021. Activities of EURAMET (Julien Vuillemin from EURAMET), of the TC-MC (TC chair activities of CCQM and the BIPM chemistry department (Dr. Robert Wielgosz from BIPM), presentations of the TC-MC subcommittee activities by the subcommittee convenors were done. A short presentation on “Redefining method validation – ValChrom online tool” by Dr. Ivo Leito from University of Tartu closed the morning session.

After lunch, activities of GAWG (Dr. Paul Brewer from NPL), activities of EAWG (Dr. Steffen Seitz from PTB), activities of OAWG (Dr. Mine Bilsen from UME), activities of IAWG (Dr. Paola Fisicaro from LNE) as well as activities of the three bio-WGs (Dr. Claudia Swart from PTB) were presented. Then we had the luck to welcome Dr Sascha Eichstaedt from PTB, chair of the WG M4D (Metrology for Digitalisation) of TC IM who gave an overview of this ongoing project.

The last presentation of the plenary meeting concerned TC-MC management by the TC MC chair.

The next annual TC-MC meeting is scheduled from the 2nd to the 5th February 2022 at RISE in BORAS, Sweden.

9. Issues

There are no particular issues to be reported.

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 JRP's 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 is circulating actually among the TC-MC.
- Feedbacks from TC MC to 3 consultations published by the European Commission:
 - EU rules (Directive 86/278) aim to ensure that the use of **sewage sludge in farming** does not harm the environment, animals and humans (16 June 2020 - 25 August 2020)
 - A consultation about **persistent organic pollutants** (01 September 2020 - 29 September 2020)
 - A consultation about **chemical pollutants** (new limits for pentachlorophenol) (01 September 2020 - 29 September 2020).

11. Outlook for 2021/2022

- Change of the TC MC chair in the Euramet GA (May 2022), identification and choice of successor in 2021,
- Changes in TC-MC experts for the KCWG meeting of April 2021 (for electrochemistry)
- Pursuit of strategic plan of comparisons,
- Success of the CMC cycle XXII within KCDB 2.0.,
- Preparation of the EPM (European Partnership for Metrology) calls, starting in 2022,
- Organisation of the next TC-MC plenary meeting in 2022 in Borås (Rise/Sweden).