



1. General Aspects

In the EURAMET technical committee for Metrology in Chemistry (TC-MC) 28 contact persons and 2 observers are represented. 25 European members (NMIs) and 9 associate members (DIs) have national standards in chemistry or biology and take part in TC-MC activities. In the reporting period, the designated institute Instituto Hidrográfico from Portugal became a new associate member.

Dr. Hanspeter Andres (METAS, Switzerland) finished his second two-year mandate in Mai 2019 and Dr. Sophie Vaslin-Reimann (LNE, France) started her first two-year mandate. The TC-MC committee has four technical subcommittees. The conveners of the subcommittees are Janneke von Wjik (VSL, Netherland) for gas analysis, John Warren (LGC, Great Britain) 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 studies were completed:

- EURAMET 1220 Hydrogen purity: the final report with all partners was published as NPL report (NPL REPORT ENV 16).
- EURAMET 1453 Comparison for particle number concentration up to $2P/cm^3$: the final report was sent to the Euramet secretariat.

The project EURAMET 1293 on C_6 - C_{10} hydrocarbons in methane was concluded.

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 1498 Comparison of 100 $\mu\text{mol/mol}$ HCl in N_2

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 / NIST respectively. The subcommittee 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	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

In the reporting period the 2 supplementary comparisons EURAMET.QM-S13 & QM.S14 started. The comparisons run in parallel to the aforementioned EURAMET 1471 & 1470 comparisons.

4. CMCs

In the completed CMC cycle XX, 134 new & revised of the 155 submitted EURAMET CMCs to the inter-regional review were accepted fast-track. This result underlines the good quality of the intra-RMO review.

In the new CMC cycle XXI 49 new, 212 revised and 63 to be withdrawn CMCs were submitted by 21 members or associate members in 4 categories (1, 3, 4 & 11). The cycle included a mandatory re-review of all Cat. 3 organic solutions and a sub group of Cat. 4: the review covered the components and implementation of the track A scheme. For those not adopting it, the review has included any CMCs that relate to SO₂, CO₂, CO, C₃H₈, O₂, CH₄ and C₂H₆.

The technical review was done at the subcommittee meetings held on 5th February 2020 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. In the review 116 (55 %) of the submitted claims were approved without changes, 96 (45 %) were approved after changes. No submitted CMCs were rejected. Thus, all 212 CMCs were subsequently forwarded to the chairperson of the CCQM KCWG on 16 February 2020 for the inter-regional review according to CCQM rules. This review is still ongoing.

On the 5th of July 2018 all CMCs from JRC Geel (formally IRMM, 82 in QM) were greyed out. The initiated re-review of CMCs with traceability to JRC Geel revealed 11 CMCs in inorganic analysis. Particularly traceability to IRMM-530R for neutron activation analysis by MRS-IJS is an issue, as the CRM shelf life has expired 26. Feb. 2020. IJS was advised to find other sources of traceability to the SI within the CIPM MRA.

During last CCQM SPWG meeting, held in Torino in October 2019, the group recommended to implement following process for all CMCs with traceability to greyed out JRC claims at the next (2020) CMC review process.

The following process was suggested:

- To prepare a written plan and timeline for the actions the concerned NMI will take to ensure they will meet the traceability requirements of the CIPM-MRA for the CMCs in question,
- To present this plan to EURAMET meeting in February 2020 and seek agreement that the RMO supports this.
- EURAMET will present this to the KCWG meeting April 2020 and seek agreement of all RMOs to a delay in greying out (of IJS) CMCs based on an action plan and implementation date.
- The KCWG can present this to the CCQM, and seek approval for this.

IJS presented during our EURAMET meeting (4-7 Feb 2020) their action plan and timeline to ensure they will meet the traceability requirements, taking into account the fact that the Sub Committee on Inorganic Analysis and its convenor, Rainer Stosch, agreed that there is no technical reason to doubt the stability of the solid Al-0.1%Au alloy.

- IJS will check the stability of the JRC IRMM-530R by means of two routes by end of 2020:
 - 1) internal comparison of IRMM-530R against new CRM ERM-EB530A (same composition) done by IJS
 - 2) Independent analysis of IRMM-530R made by NIST (NIST agreed to do it)

Also many bio-CMCs use a CRM of JRC Geel as source of traceability. The issue will be tackled by the concerned CCQM WGs.

On 21 of February, TC chairs received a message from the Euramet chairperson, explaining that JRC wanted to become again a Euramet member. This will impact both TC_MC & TC_IR in the next future. We are expecting more information during next GA in May 2020.

5. Activities of the Subcommittees

The technical subcommittees reconvened ahead of the annual TC-MC plenary meeting on 5th February 2020. Topics of the meetings were in progress and new projects/comparisons, the intra-RMO review of the CMC cycle XX, technical presentations and strategic discussions.

Subcommittee on gas analysis:

- The results from 5 ongoing comparisons were presented and discussed
- A new pilot study on hydrogen chloride in nitrogen gas was proposed by PTB
- 185 new or revised CMC Cycle XXI were discussed and 4 of them were withdrawn
- 5 starting EMPIR "MetroHyve" (19ENG04), STELLAR (19ENV05); MetClimVOC (19ENV07); MetroPems (19ENV09); MEPHYSTO (19ENG03) & SI-HG (19NRM03) projects were presented.
- The EMNs "Climate and Ocean Observation" and "Energy Gases" as well as a potential EMN on "Pollution Monitoring" were presented.

Subcommittee on bio and organic analysis:

- Still predominantly organic in nature, each year more discussion on bio than in previous year (increasing participation level).
- 65 new and revised CMCs as well as 5 new and revised bio CMCs were submitted for review and 2 CMCs were withdrawn
- The EMPIR project "Alcoref" was presented
- 2 potential EMNs on "Food Safety" and "Pollution Monitoring" were presented as well as a PRT "Fundamental Protein Metrology".

Subcommittee on inorganic analysis:

- The status of 2 EURAMET ongoing projects (1424 & 1455) were presented and discussed
- No new/revised CMCs were submitted in cycle XXI
- The CCQM IAWG core competency approach and its implementation in the matrix table was presented
- The inorganic CMCs with traceability to JRC Geel were discussed in order to analyze impact on SI-traceability on their CMCs and to inform other RMOs about this issue (presentation & discussion at 2019 IAWG meetings)
- 3 new proposal for EMPIR call 2020 were presented and discussed („Metrology for the recycling of technologically critical elements“; „Metrology for nanotechnology-enhanced products under manufacturing regulation“ & „Absolute SI-traceable isotope ratio measurements“).

Subcommittee on electrochemical analysis:

- The status of the supplementary comparison EURAMET 1462 (EURAMET.QM-S12) was presented,
- 2 CMCs submitted (1 revised and 1 new) in category 1 were discussed and approved after minor modifications,
- The results of 2 ongoing EMPIR projects "LiBforSecUse" "UnipHied" were presented,
- 2 Seawater related topics were presented and discussed,
- A new Strand 2 prenormative proposal for the EMPIR call 2020 was presented "Metrology for standardized seawater pH_T measurements in support of international and European climate strategies".

6. Participation EMPIR

The members of the TC-MC are very active in running and planned EMPIR projects: EMPIR 2016 TP Environment, Energy & TP Research potential with following projects that ended Mid-2020:

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

- 16ENG01 MetroHyve "Metrology for hydrogen vehicles"
- 16ENG05 Biomethane "Metrology for biomethane"
- 16ENG09 LNG III "Metrological support for LNG and LBG as a transport fuel"

EMPIR 2016 TP RPOT

- 16RPT01 ChemMet-Cap "Development of scientific and technical capabilities in the field of chemical analysis"
- 16RPT02 ALCOREF "Certified forensic alcohol reference materials"

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
- 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 Normativ

19 PRM 03 SI-HG “Metrology for traceable protocols for elemental and oxidised mercury concentrations”

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 not been selected this year.

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

In 2020, no dedicated workshop for DIs without CMCs after 5 year of associate EURAMET status has been organized.

For the time being, there is no contact person from the newly nominated Instituto Hidrográfico from Portugal.

8. Meetings

The annual meeting of the TC-MC took place from 5th February to the 7th February 2020 and was hosted by METAS, Switzerland.

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 by a mini workshop on isotope ratio analysis.

After the subcommittee meetings, a mini workshop on isotope ratio analysis was organized to inform TC-MC members of this new CCQM area of interest with a new IRWG being created in 2018.

After the workshop, interested participants had the possibility to visit the laboratories of METAS in Bern.

The plenary meeting took place the 6th and 7th February 2020. At the beginning of the plenary meeting, Philippe Richard, Director of METAS, welcomed participants to METAS and Bern. Subsequently, activities of EURAMET (Julien Vuillemin from EURAMET), activities of the TC-MC (TC chair activities of CCQM and the BIPM chemistry department (Dr. Robert Wielgosz from BIPM), 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 Fiscaro from LNE), activities of the three bio-WGs (Dr. Helen Parkes from LGC) were presented. A proposal was done by Dr. Ivo Leito from University of Tartu to organize future meetings by web.

During the second part of the afternoon, a workshop was organized on EMNs and their interactions with TC-MC. Aim of this working session was to build an action plan for future cooperation among the 3 EMNs and the TC-MC members.

The second day of the plenary meeting started with presentations of the TC-MC subcommittee activities by the subcommittee convenors, a session on TC-MC management by Dr. Sophie-Vaslin Reimann, including a comparison strategy. Conclusions of the 2 workshops were also presented. No changes are anticipated in the TC-MC management until 2021.

The next annual TC-MC meeting is scheduled from the 2nd to the 5th February 2021 at RISE in BORAS, Sweden.

9. Issues

There are no particular issues to be reported.

10. Strategic Planning

According to the guiding principles of G-TCG-PRC-001 a strategic approach has been established in the TC MC and discussed during the SWG meeting in February 2020 at Metas.

Last year, based on the CMCs re-review strategy decided by the KCWG chair for cycle XX, Cat. 1 "High purity chemicals" was taken as a pilot analysis.

This year the same approach was taken and extended to 2 other mature areas, such as organic solutions and gases (categories 3 & 4) by the strategy working group of the TC.

- 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.

Next steps:

- Next year in accordance to the CCQM KCWG strategy, additional strategic plannings will be added to the former, highlighting the need for complementary Euramet comparisons in the next 5 years.
- The 2012 Roadmaps will be revised and completed.

11. Outlook for 2020/2021

A new SCBOA convenor was elected during the plenary 2020,
Changes in TC-MC experts for the KCWG meeting of April 2020,
Pursuit of strategic plan of comparisons,
Organisation of the CMC cycle XXII within KCDB 2.0.,
Preparation of the new EMPIR/EMP calls, starting in 2021,
Organisation of the next TC-MC plenary meeting in 2021.