ANNUAL REPORT
OF COOMET TC 1.10 "THERMOMETRY AND THERMAL PHYSICS" for 2022

1. GENERAL CHARACTERISTICS OF COOPERATION IN THE SUBJECT FIELD

COOMET TC 1.10 includes representatives of 18 COOMET member countries: Azerbaijan, Armenia, Belarus, Bulgaria, Bosnia and Herzegovina, Germany, Georgia, Kazakhstan, Kyrgyzstan, Cuba, Lithuania, Moldova, Russia, Slovakia, Tajikistan, Turkey, Uzbekistan and Ukraine.

Note – in October 2022 a notification was received from the Ministry of Economy of Ukraine of the suspension of participation in CSBs; in December 2022 a notification was received from the Ministry of the Economy and Innovation of the Republic of Lithuania of the termination of participation of Lithuanian institutes in COOMET.

The main task of the TC is to implement cooperation of COOMET member countries in the field of "Thermometry and Thermal Physics", including such areas of activity as:

- organization of key and supplementary comparisons of national measurement standards of COOMET member countries to support CMCs, which are currently submitted or will be submitted by COOMET member countries in the near future;
- preparation and regional review of data on calibration and measurement capabilities (CMC) of COOMET member countries;
- cooperation with the relevant technical committees of other regional metrology organizations, participation in interregional reviews of CMCs of other RMOs.

For the effective organization of work within the TC it was agreed that Coordinators of permanent fields of activities by the types of measurements should be appointed:

- Thermometry – Viktor Fuksov (FGUP "D.I. Mendeleev Institute for Metrology (VNIIM), Russia);
- Thermophysical quantities (thermal conductivity, heat capacity, thermal diffusivity etc.) – Sergey Kondratyev (FGUP "D.I. Mendeleev Institute for Metrology (VNIIM), Russia);
- Moisture metering – Mikhail Vinge (East-Siberian branch of FGUP "VNIIFTRI", Russia).

Information about the progress of works on COOMET projects:

1. COOMET project 851/RU/21 "Supplementary comparisons of dew point temperature standards" (coordinator – M.Vinge, East-Siberian branch of VNIIFTRI, Russia)

Participants: NMIs of Belarus, Moldova, Kazakhstan. A draft technical protocol was prepared. The comparisons will be carried out according to the "star" principle. There are some problems with the logistics of the comparisons, and correspondingly with the timeframes of works. The comparison pilot should finalize negotiations with the comparison participants regarding the technical protocol and logistics of the comparisons based on the requirements of the legislation in the expected participating countries of the comparisons, and to register the comparisons in the KCDB and draw up a form of the agreed COOMET project.

2. COOMET project 826/MD-a/21 (COOMET.T-S5) "Supplementary comparisons of standards of the unit of relative humidity" (coordinator - K. Bordianu, INM, Moldova)

Participants: NMIs of Moldova, Belarus and Finland. Measurements have been taken and the results processed. Draft A has been agreed upon. The comparison pilot should finalize agreeing on Draft B, after that the report on the comparisons will be sent for approval to CCT.

3. COOMET project 744/RU/18 (COOMET.T-S4) "Comparisons in the field of measurements of combustion energy of coals with different sulphur content" (coordinator – E.Korchagina, VNIIM, Russia).

Participants – NMIs of Russia, Belarus, Romania, China, Germany and Turkey. Measurements have been taken and the results processed. Draft B has been sent to the participants. There are some problems with feedback from the participants. The comparison pilot should finalize agreeing on Draft B (a request will be sent to NMIs though the COOMET Secretariat or CCT Secretary, if required).

4. COOMET project 704/RU-a/16 (COOMET.T-K9.1) "Comparisons of temperature national standards at the triple point of mercury" (coordinator – Y.Razhba, VNIIFTRI, Russia)

Participants - NMIs of Russia, Belarus, Georgia, Kazahstan, Moldova and Germany. To date measurements have been carried out by the NMIs of Russia, Belarus, Georgia, Kazakhstan and Moldova. There is no information from PTB (Germany) – a request has been sent regarding their intent to further participate in the comparisons. The comparison pilot should prepare Draft A after the receipt of the information from PTB (Germany) and submit Draft B for approval to the TC when it is agreed with the comparison participants.

5. COOMET project 787/UZ-a/19 "Pilot comparisons in the field of calibration of platinum resistance thermometers" (coordinator – B.Yusupov, UzNIM, Uzbekistan).

Participants – NMIs of Uzbekistan and Moldova. Measurements have been taken and the results processed. Draft A has been agreed upon. The pilot should finalize the preparation and negotiation of draft B.

6. COOMET project 780/RU/19 "Pilot comparisons of national reference gas calorimeters on samples of gas mixtures" (coordinator - E.Korchagina, VNIIM, Russia)

Participants – NMIs of Russia, Turkey and France. Measurements have been taken and the results processed. Draft A has been drawn up and sent to the participants. A reply was received from UME (Turkey), agreement from LME (France) is expected. The comparison pilot should organize preparation and negotiation of draft B.

7. COOMET project 771/MD-a/18 "Pilot comparisons in the area of platinum resistance thermometers calibration in fixed points from triple point of mercury (-38.8344 °C) to melting point of gallium (29.7646 °C)" (coordinator – K. Bordianu, INM, Moldova)

Participants – NMIs of Moldova and Kazakhstan. Measurements have been taken and the results processed. Draft B is under preparation.

2. RESULTS OF THE LATEST MEETING OF TC 1.10

The 19th meeting of TC 1.10 "Thermometry and Thermal Physics" was held online on 15 to 16 November 2022. Specialists from 10 COOMET member countries (Azerbaijan, Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russian Federation, Tajikistan, and Uzbekistan) took part in the meeting.

During the meeting, the results of TC 1.10 activities in 2022 and development plans for 2023 were discussed.

A detailed discussion of the progress in implementing all COOMET comparisons within TC 1.10 took place. The meeting participants supported the proposal on the organization of new comparisons of standard bomb calorimeters using the samples of liquid pure organic substances, and agreed on the postponement of comparisons of national measurement standards of the temperature unit in the range from 961 °C to 3000 °C to 2024-2025, which have been planned for 2022-2023 under program COOMET P6/2021 "COOMET Roadmap for the Implementation of Decisions Related to the Redefinition of the Basic Units of the International System of Units (SI) for 2020-2025" (see A 1.3).

As part of discussion of the information, presented by CEEMS NMIs in terms of organization and conduct of comparisons, calibrations and trainings, it was decided to conduct pilot and supplementary comparisons for NMIs of Kyrgyzstan and Uzbekistan, and trainings for NMIs of Armenia and Uzbekistan.

Regarding the implementation of the CIPM MRA, discussion took place on streamlining the procedure of intra-and interregional CMC review within TC 1.10 and on updating the list of technical experts on CMC review.

As part of discussion of program COOMET P6/2021 "COOMET Roadmap for the Implementation of Decisions Related to the Redefinition of the Basic Units of the International System of Units (SI) for 2020-2025", it was decided to hold an online seminar "Implementation of a new definition of the temperature unit - Kelvin" in April 2023.

3. RESULTS OF THE IMPLEMENTATION OF THE COOMET STRATEGY AND COOMET DEVELOPMENT PROGRAM (concerning the activities of TC 1.10)

TC 1.10 members took part in the implementation of a number of events, provided for in the COOMET Development Program for 2020-2022 and in the Roadmap for the implementation of the COOMET Strategy for 2020-2025, namely:

- 9. (Ind-a.1.9) Carrying out of an analysis of the timeframe for conducting COOMET comparisons and taking corrective actions for its reduction: work was performed to officially complete the comparisons, conducted under the auspices of TC 1.10, in the KCDB;
- 19. (Ind-a.4.1) Preparation and implementation of a Roadmap for TC 1.2 – TC 1.11 for implementation of decisions related to the redefinition of the SI base units: work on the planned activities in the area of responsibility of TC 1.10 is underway;
- 78. Drawing up and implementation of a Plan for the preparation of COOMET recommendations, having requirements for calibration of various groups of measuring instruments (Guide on calibration): the issue was discussed at the TC 1.10 meeting in 2022 – it was decided that it was inappropriate to prepare model calibration procedures for groups of measuring instruments in the field of thermometry and thermal physics.

4. REVIEW OF COMPLETED PROJECTS AND INFORMATION ABOUT THE APPLICATION OF THE OBTAINED RESULTS

There were no projects completed within the area of responsibility of TC 1.10 in 2022.

5. IMPLEMENTATION OF THE CIPM MRA

PROGRESS WITH CMCS OF COOMET NMIS/DIS

Intraregional review of CMCs, submitted by COOMET NMIs/DIs, was not conducted.

COOMET PARTICIPATION IN INTERREGIONAL REVIEW OF CMCS:

Interregional reviews of 32 CMC entries, submitted by national metrology institutes of APMP and EURAMET, was conducted.

The lists of COOMET technical experts from TC 1.10 on CMC review and COOMET technical experts on peer review of the QMS of NMIs/DIs were updated.

6. INTERACTION WITH INTERNATIONAL AND REGIONAL ORGANIZATIONS

In January and February 2022 a session of the 30th meeting of the Consultative Committee for Thermometry (CCT) took place online, where representatives of VNIIM (Russia) took part.

The main issues, discussed at the session, included the following reports of the Chairs of working and task groups:

- for Key Comparisons (WG-KC);
- for Measurement Capabilities (WG-CMC);
- for Noncontact Thermometry (WG-NCTh);
- for Thermophysical Quantities (TG-ThQ);

- Group for Strategic Planning (WG-SP).
- reports of the Chairs of regional metrology organizations.

A report on COOMET activities was presented at the meeting.

7. INFORMATION ABOUT THE PROPOSED VENUE AND DATE OF THE NEXT TC MEETING

The next TC 1.10 meeting will be held online or in a combined format in autumn 2023. The decision on the exact dates and format of the meeting will be made by 1 June 2023.

TC 1.10 Chair
P.Krivonos