



MINUTES

of the 18th meeting of the COOMET Technical Committee

TC 1.10 “Thermometry and Thermophysics”

online

17 - 18 November 2021

1. Opening of the meeting, welcoming, introduction of the participants of the meeting, approving of the agenda of day

The meeting was opened by Chairperson of COOMET Technical Committee “Thermometry and Thermophysics” (TC 1.10) Anatoly Pokhodun, who addressed the meeting participants with a welcoming speech and wished them successful work.

A. Pokhodun welcomed the TC members and guests, who were present at the meeting. The meeting was attended by the representatives of 13 countries:

BELARUS

Mr. Krivonos P., member of TC 1.10, BelGIM

BOSNIA AND HERZEGOVINA

Mr. Cohodarevic S., member of TC 1.10, IMBIH

GEORGIA

Mr. Chelidze Yu., member of TC 1.10, GEOSTM

KAZAKHSTAN

Mrs. Duysebayeva K., member of TC 1.10, SKS RSE "KazInMetr", Almaty branch

KYRGYZSTAN

Mrs. Denisova M., member of TC 1.10, CSM at ME KR

LITHUANIA

Dr. Gaidamoviciute L., member of TC 1.10, FTMC

MOLDOVA

Mr. Bordianu K., member of TC 1.10, INM

RUSSIA

Mr. Pokhodun A., Chairperson of TC 1.10, D.I. Mendeleev VNIIM

Mr. Fuksov V., D.I. Mendeleev VNIIM

Mrs. Korchagina Ye., D.I. Mendeleev VNIIM

Mr. Zvyagin N., D.I. Mendeleev VNIIM

Mr. Razhba Ya., VNIIFTRI

Mr. Vinge M., VNIIFTRI

SLOVAKIA

Mr. Duris S., member of TC 1.10, Slovak Institute of Metrology

Ms. Durisova S., Slovak Institute of Metrology

TAJIKISTAN

Ms. Hudoieva M., member of TC 1.10, Tajikstandart

TURKEY

Ms. Aytekin S., official representative of TC 1.10 member, TUBITAK UME

UZBEKISTAN

Mr. Yusupov B., member of TC 1.10, UzNIM

UKRAINE

Mrs. Fil S., member of TC 1.10, NSC "Institute of Metrology"

COOMET SECRETARIAT

Ms. Liakhova N., BelGIM, Belarus

The quorum requirements at the meeting were met (more than half of the TC members were present).

The participants of the meeting approved the following agenda:

1.	On the activities of COOMET TC 1.10 in 2020-2021.
2.	Information about the decisions of the COOMET Committee and the President's Council.
3.	Informational announcement on the decisions of the 20th meeting of the COOMET Joint Committee for Measurement Standards and discussion of issues related to the taken decisions.
	1) on the implementation of the COOMET P6/2021 Program.
	2) on the possibility and necessity of developing calibration reference methods.
	3) discussion of digitalization issues in the field of metrology.
4.	Discussion of the progress of work on COOMET projects in the field of measurement of thermophysical quantities:
	1) discussion of the progress of works on the project: 826/MD-a / 21 "Supplementary comparisons of standards for the unit of relative humidity"
	2) discussion of the progress of work on the project: 787/UZ-a/19 "Pilot comparisons in the field of calibration of platinum resistance thermometers".
	3) discussion of the progress of works on the project: 771/MD-a/18 "Pilot comparisons in the field of calibration of platinum resistance thermometers at fixed points in the range from the triple point of mercury (-38.8344 ° C) to the melting point of gallium (29.7646 ° C)".
	4) discussion of the progress of works on the project: 744/RU-a/18 "Comparisons in the field of measuring the heat of combustion of coals with different values of sulfur."
	5) discussion of the progress of works on the project: 780/RU-a/19 "Pilot

	comparisons of national reference gas calorimeters on samples of gas mixtures”.
	6) discussion of the progress of works on the project: 704/RU-a/16 “Comparisons of national standards in the triple point of mercury”.
	7) discussion of the progress of works on the project: “Additional comparisons of dew point temperature standards” (during registration).
	8) discussion of new COOMET projects.
5.	On the participation of TC member countries in EMPIR projects
6.	On the implementation of the CIPM MRA Arrangement:
	1) consideration of issues of intra- and interregional review of CMCs on the KCDB 2.0 platform of the countries of the TC members and participation of experts in the type of measurements in the review of CMCs of other RMOs; updating the lists of technical experts for the review of the CMCs and the assessment of the QMS in the field of measurements of thermophysical quantities.
	2) analysis of the state of works on comparisons lasting more than 5 years.
7.	On the implementation of the activities of the Cooperation Plan between COOMET and EURAMET for 2021 and proposals for the Plan for 2022
8.	Discussion of the updated Regulations on TC 1.10, taking into account COOMET Document D5:2021 “Standard Regulations on a COOMET Structural Body”.
9.	Information about changes in the membership of the TC. On the authorities of the Chairperson of the TC.
10.	Closure of the meeting.

DECISIONS OF THE MEETING

1. On the activity of the Technical Committee of COOMET TC 1.10 in 2020-2021.

Speaker: A.I. Pokhodun (VNIIM)

Chairperson of the technical committee of TC 1.10 Pokhodun A. highlighted the main items of the COOMET Development Program implemented by TC 1.10:

- participation of NMIs of the COOMET member-countries in the implementation of the CIPM MRA;
- development of standard calibration procedures within COOMET;
- development and implementation of the Roadmap for the implementation of a new definition of the kelvin into the practice of NMIs;
- organization of training workshops, conferences;
- implementation of the Memorandum of Understanding between COOMET and EURAMET.

The practical implementation of the CIPM MRA is carried out by organizing and conducting regional key and supplementary comparisons, as well as by international recognition of the measurement capabilities of the NMIs of the COOMET member countries.

As part of the practical implementation of the CIPM MRA, the NMIs of the COOMET member countries perform research aimed at creating new national standards of units of

thermophysical quantities and improving existing standards. Along with the above mentioned, research is being carried out aimed at implementing a new definition of the kelvin into measurement practice in COOMET countries.

The Chairperson of TC 1.10 informed that in 2020, VNIIM began work on improving the primary standard of the unit of heat quantity in the field of dissolution and reaction calorimetry. The relevance of this work is due to the lack of traceability of measurements of extremely low thermal effects in the SI system. It is expected that after the completion of the work, a standard will be created that is capable to reproduce a unit of heat in the field of measuring small thermal effects in liquid media.

Decision

To take note of the information on the activities of the COOMET Technical Committee TC 1.10 in 2020-2021.

2. Information about the decisions of the COOMET Committee and the President's Council.

Speaker: Liakhova N. (BelGIM)

Head of the COOMET Secretariat Liakhova N. provided information on the decisions of the COOMET Committee and the Presidential Council adopted in 2021.

Thus, in particular, COOMET Document D2/2021 "COOMET Rules of Procedure" was approved instead of D2 / 2013, in which:

- the possibility of holding COOMET events in online format has been established;
- a more detailed procedure for voting on the agenda is prescribed;
- the possibility and algorithm of decision-making on behalf of the COOMET Committee based on the results of electronic voting has been established;
- the procedure for work with COOMET projects has been specified;
- the approaches to the formation and presentation of annual reports of COOMET structural bodies have been specified.

The Head of the COOMET Secretariat informed more detailed about the procedure for work with projects. The project proposer sends the form to the Secretariat through a member of the Committee of his country, after which the Secretariat registers the project and sends the form to all TC members who express their interest in the proposed project to the COOMET Secretariat within 3 months. If there is no interest in the project, it can be in the COOMET list of proposed projects for 1 year. In case the project and/or members of the Working Group are clarified or changed during the implementation of the project, the coordinator should prepare and send to the Chairperson of the TC and to the Secretariat an updated form of the agreed project. Upon completion of the project, a final report form should be prepared, presenting the results obtained and their possible application. At the suggestion of the TC chairpersons, the COOMET Secretariat excludes from the Work Program project that are considered unpromising or irrelevant.

Important decisions of the COOMET Committee should also include:

1) approval of the approach to performing a survey to assess the effectiveness of the CSB (in the autumn of 2021, online surveys were organized among COOMET Committee members and CSB members).

2) approval of COOMET criteria for classifying COOMET member countries to CEEMS, namely:

- the country does not have the status of "Member of the Metre Convention" or "Associate Member of the CGPM";
- lack of published CMC entries;
- non-participation in key comparisons registered in the KCDB database.

Other decisions of the COOMET Committee and the Council of the President are reflected in Annex 1.

Decision

To take note of information on the decisions of the COOMET Committee and the Presidential Council.

3. Informational message on the decisions of the 20th meeting of the Joint Committee on COOMET standards and discussion of issues related to the decisions taken.

1) on the progress of implementation of COOMET Program P6/2021

Speaker: Pokhodun A. (VNIIM)

Chairperson of TC 1.10 Pokhodun A. provided information on further actions of TC 1.10 aimed at implementation of a new definition of the kelvin into practice, namely, holding seminars on reproduction problems in accordance with its new definition. It is planned to compare the implementations of the new definition of the kelvin by the method of absolute primary radiometric thermometry and the method of relative primary radiometric thermometry, the participants of which will be VNIIM (Russia) and NSC "Institute of Metrology" (Ukraine).

2) on the possibility and necessity of developing standard calibration methods

Speaker: Pokhodun A. (VNIIM)

Chairperson of TC 1.10 Pokhodun A. informed the need to update the existing ones (recommendation COOMET R/T/33:2018) and develop new standard calibration procedures. Initiated NMI specialists in the joint development of methods.

3) discussion of digitalization issues in the field of metrology

Speaker: Zvyagin N.(VNIIM)

Digitalization in metrology is a digital measurement system, the creation and use of databases, digital certificates and the creation of an infrastructure for their use, a metrological cloud, and so on. The digital measurement system will allow a consistent approach to the provision of measurement information in all areas of metrology. Digital certificates based on the XML file format are machine-readable, have increased efficiency and security through process automation, and can be stored in databases.

Decision

1) Take note of the information on the progress of the implementation of the COOMET R6/2021 Program and send proposals from TC 1.10 to the JCMS.

2) Take note of the information on approaches to digitalization in the field of metrology.

3) Take note of the information on the need to update the standard calibration procedures.

4. Discussion of the progress of works on COOMET projects in the field of measurement of thermophysical quantities

1) Discussion of the progress of works on the project COOMET 826/MD-a/21

"Supplementary comparisons of standards of the unit of relative humidity".

Speaker: Bordianu K. (Moldova)

Project coordinator - INM, Moldova. The participants of the comparisons are the NMIs of: Moldova, Belarus and Finland. Measurements have been taken and the results are being processed. Draft A is being prepared for the beginning of 2022.

2) Discussion of the progress of works on the project COOMET 787/UZ-a/19 "Pilot comparisons in the field of calibration of platinum resistance thermometers".

Speaker: Yusupov B (UzNIM, Uzbekistan)

To confirm the equivalence of the national standards of Uzbekistan, a project was started on pilot comparisons of measurements in the field of calibration of platinum thermometers. Participants are: INM (Moldova) and UzNIM (Uzbekistan). Measurements were carried out in Moldova, measurements were started in Uzbekistan.

3) Discussion of the progress of works on the project COOMET 771/MD-a/18 "Pilot comparisons in the field of calibration of platinum resistance thermometers at fixed points in the range from the triple point of mercury to the melting point of gallium".

Speaker: Bordianu K. (Moldova)

Project coordinator - INM, Moldova. Comparison participants are: Moldova and Uzbekistan. Measurements were carried out in Moldova, it is planned to start measurements in Uzbekistan.

4) Discussion of the progress of works on the project COOMET 744/RU-a/18 "Comparisons in the field of measuring the heat of combustion of coals with different sulfur values".

Speaker: Korchagina Ye. (VNIIM, Russia)

Due to the fact that the humidity in coals was measured in different ways, the first processing of the measurement results led to inconsistent results. In the second processing of the results, a different method was used and consistent results were obtained. Examination of type B report within COOMET is planned.

5) Discussion of the progress of works on COOMET 780/RU-a/19 "Pilot comparisons of national reference gas calorimeters on samples of gas mixtures".

Speaker: Korchagina Ye. (VNIIM, Russia)

Project coordinator - VNIIM, Russia. The participants of the comparisons are the NMIs of Russia, France and Turkey. Due to the fact that most countries measure gas density in units of J/kg, VNIIM is currently developing a system for determining gas density in the above units with subsequent measurements. Turkey provided the measurement results, France plans to provide the measurement results in early 2022.

6) Discussion of the progress of works on the project COOMET 704/RU-a/16 "Regional key comparisons of national standards of the unit of temperature at the triple point of mercury".

Speaker: Razhba Ya., (FGUP «VNIIFTRI», Russia).

Project coordinator - FGUP «VNIIFTRI», Russia. The participants of the comparisons are the NMIs of Belarus, Moldova, Kazakhstan, Georgia, Germany, and Russia. Comparisons involve the transportation of reference platinum resistance thermometers belonging to a particular participant of the comparisons and the coordinator. The scheme of comparisons provides for subsequent calibration of the indicated thermometers at the triple point of mercury by the participants of the comparisons, at the triple point of mercury of the coordinating laboratory and repeated calibration by the participants.

Due to the fact that thermometers belonging to PTB (Germany) failed during measurements at FGUP VNIIFTRI, it was decided to send thermometers belonging to

FGUP VNIIFTRI to PTB (Germany) for measurements. At this stage, thermometers from FGUP "VNIIFTRI" have been sent to PTB (Germany), measurements are in progress. Measurement results from PTB (Germany) are expected in 2022.

7) Discussion of the progress of works on the COOMET project "Supplementary comparisons of dew point temperature standards".

Speaker: Vinge M., A. (FGUP «VNIIFTRI», Russia)

Project coordinator - FGUP "VNIIFTRI", Russia. The project has not been registered yet, the draft protocol of comparisons has been prepared. Intended participants are the NMIs of Belarus, Moldova, Kazakhstan. Comparisons will be carried out according to the "star" principle. There were sent invitations to participate in the project.

8) Discussion of new COOMET Projects

Due to the fact that at the moment there is no one CMC-entry in the field of thermophysical measurements, Korchagina E.N. (VNIIM, Russia) proposed a new project for 2023 - key comparisons of reference bomb calorimeters with high-purity benzoic acid.

The specialists of VNIIM (Russia) plan to act as coordinators of the comparisons.

Decision

- 1) Take note of the information on the status and work on COOMET projects.***
- 2) To ask the proposer of the COOMET project "Supplementary comparisons of dew point temperature standards" (M.Vinge, Russia) to expedite sending the project form to the Secretariat for registration.***
- 3) Approve the proposed new project of comparisons. To ask the coordinators of these comparisons to prepare and send to the COOMET Secretariat in accordance with the established procedure a form of the proposed COOMET project by the beginning of 2023 for registration of comparisons and their inclusion in the COOMET Program of comparisons.***

5. On the participation of TC member countries in EMPIR projects

Speaker: Bordianu K. (Moldova)

Bordianu K. informed about the participation of the NMI of Moldova in the project EMPIR 18PRT03 MetForTC "Traceability of measurement capabilities for monitoring the characteristics of thermocouples". The main goal of the project is to develop new methods that will improve the ability to measure and control temperature using thermocouples. The main objectives of the project are:

- development and testing of new methods and devices for monitoring the drift of thermocouples in the temperature range up to 1100 °C;
- development and testing of methods and equipment for evaluating the heterogeneity of thermocouples for secondary calibration laboratories.

The speaker provided extensive information, in particular, he gave block diagrams on the types of developed equipment.

Decision

Take note of the information about the EMPIR project on measurement capabilities for monitoring the characteristics of thermocouples.

6. On the implementation of the CIPM MRA Agreement

1) Consideration of issues of intra- and inter-regional review of CMC on the KCDB 2.0 platform of the countries of the TC members and participation of experts in the type of measurements in the review of CMCs of other RMOs; updating the lists of technical experts for the examination of the CMCs and the assessment of the QMS in the field of measurements of thermophysical measurements

Chairperson of TC 1.10 Pokhodun A. announced the need to create a group for the review of CMC entries, with a further selection of the chairperson of the group. Mr. Bordianu K. was nominated for the chairperson of the technical expert group.

Decision

To support the proposal of the chairperson of TC 1.10 Pokhodun A. on the creation of a group of technical experts of TC 1.10 to perform intra-regional and inter-regional review of the calibration and measurement capabilities of national metrological institutes.

To support the candidacy of Bordianu K. (Moldova) as chairperson of the expert group. To suggest Bordianu K. to update the membership of the expert group and organize their work on the review of CMCs. To report at the next meeting of TC 1.10 on the work done.

2) Analysis of the state of works on comparisons lasting more than 5 years

Speaker: Razhba Ya., (FGUP «VNIIFTRI»).

Comparisons on the project COOMET 704/RU-a/16 “Regional key comparisons of national standards of the temperature unit at the triple point of mercury” have lasted for more than 5 years. Information about the progress of works and the reasons for the delay in the timing of comparisons is presented in item 4.6.

Decision

Take note of the information on the state of works on COOMET topic 704/RU-a/16 and ask the coordinator of the comparisons to complete the comparisons as soon as possible.

7. On the implementation of the activities of the Cooperation Plan between COOMET and EURAMET for 2021 and proposals for the Plan for 2022

Speaker: Pokhodun A. (VNIIM)

In 2020, the Chairperson of COOMET TC 1.10 participated in the online meeting of EURAMET TCT, also the Chairperson of the Technical committee of EURAMET TCT took part in the online meeting of COOMET TC 1.10.

EURAMET TCT and COOMET TC 1.10 in 2020-2021 jointly developed instructions for calibrating surface temperature thermometers and calibrating radiation thermometers.

In 2022, a seminar will be held jointly organized by the EURAMET TCT and COOMET TC 1.10 Technical committees. Seminar topic: Implementation of the redefined Kelvin: making MeP-K a reality.

The seminar will cover the following topics:

- review of the implementation of the new definition of the kelvin (NPL, UK);
- high-temperature fixed points - introductory review (LNE-CNAM, France);
- experience of VNIIOFI in the development and application of high-temperature reference points (VNIIOFI, Russia);
- progress in the field of indirect primary radiometry for dissemination of measurements of thermodynamic temperature (LNE-CNAM, France);
- implementation at VNIIM of a new determination of the kelvin by direct primary radiometry in the range above the silver point (VNIIM, Russia);
- thermodynamic radiation thermometry in the IR region of the spectrum (NSC “IM”, Ukraine);
- relative acoustic gas thermometry VNIIFTRI in the range from 4.2 K to 80 K (VNIIFTRI, Russia);
- primary gas thermometry for thermodynamic temperature distribution (INRIM, Italy);

- calculation of ab-initio virial coefficients for metrology (Bruno Kessler Foundation);
- implementation and distribution of thermodynamic temperatures from 1 K to 5 K (PTB, Germany);
- implementation and distribution of thermodynamic temperatures below 25 K to 1 K (LNE, France);
- extension of the service life of the ITS-90 - non-uniqueness studies (NPL, UK);
- Implementation and study of carbon dioxide triple point temperature (VNIIM, Russia).

Decision

Take note of the information on the implementation of cooperation activities between COOMET and EURAMET for 2020-2021. and on the proposals of TC 1.0 to the Action Plan for 2022.

8. Discussion of the updated Regulations on TC 1.10, taking into account COOMET Document D5:2021 “Standard Regulations on COOMET Structural Body”.

Speaker: Liakhova N.

Head of the COOMET Secretariat Liakhova N. informed that COOMET Document D5:2021 “Standard regulation on COOMET structural body” was approved instead of COOMET Document D5/2020. The main changes are:

- the possibility of holding CSB meetings in an online format has been established;
- the possibility and algorithm for making decisions within the TCs based on the results of electronic voting are prescribed;
- requirements for a quorum at meetings of the CSB were established.

Also Head of the COOMET Secretariat Liakhova N. informed that the draft Regulation on TC 1.10 has already been developed, the document is being translated into English. Upon completion of the translation, the Chairperson of TC 1.10 will distribute to the members of the TC for voting.

Decision

Take note of the information about the updated Document COOMET D5:2021 and that the work on updating the Regulations on TC 1.10 (COOMET D5.10/2004) is at the final stage.

9. Information about changes in the membership of the TC. On the powers of the Chairperson of the TC.

Speaker: Liakhova N. (BELGIM), Pokhodun A. (VNIIM)

Head of the COOMET Secretariat Liakhova N. reported that there was a replacement of representatives from three countries participating in TC 1.10, which was confirmed by official letters to COOMET. Thus, Ms. Mussalama Khudoieva became a member of the TC from Tajikistan, Mr. Bekhruz Yusupov became a member of the TC from Uzbekistan, and Mr. Fran Javier Buson Gonzalez from Cuba.

Chairperson of TC 1.10 Pokhodun A. announced his desire to early resign his powers as Chairperson of TC 1.10 and nominated Petr Krivonos (BELGIM, Belarus) for this post. During the discussion, the participants of TC 1.10 came to the conclusion that it is necessary to perform electronic voting and submit the voting results to the COOMET President's Council.

Note: Mr. Pokhodun A. continues to act as Chairperson of TC 1.10 until the 33rd COOMET Committee meeting (2022).

Decision

Take note of the information about the replacement of members of TC 1.10.

To ask the COOMET Secretariat at the beginning of 2022 to organize electronic voting among the members of TC 1.10 on the issue of choosing a new Chairperson of TC 1.10.

9. Closing of the meeting

Chairperson of COOMET TC 1.10 "Thermometry and thermal physics" Prof. Pokhodun A. thanked the participants of the meeting for their active work.

Chairperson of TC 1.10

A. I. Pokhodun

Secretary of TC 1.10

S. V. Fil