



ANNUAL REPORT

TC 1.9 "Ionizing Radiation and Radioactivity" for 2020

The TC main mission is the organization of cooperation between the COOMET state metrological institutions in the ionizing radiation measurements area. Priority direction is key and supplementary comparisons organization and conduct for COOMET national metrological institutes measuring capabilities supporting.

1. TK 1.9 MEETING

The regular 17th meeting of TC 1.9 "Ionizing radiation and radioactivity" was held on-line on November 31, 2020.

Representatives of 8 COOMET national metrological institutes were present (Azerbaijan, Belarus, Kazakhstan, Moldova, Russia, Slovakia, Uzbekistan, Ukraine). IAEA Representative Paula Toro participated the meeting.

THE MAIN TOPICS

1.1 Information on the COOMET projects implementation in the "Ionizing radiation and radioactivity" thematic area is presented in Section 2 of this report.

1.2 Information on the International Metrology Organizations Activity

Information is presented on the main decisions of the COOMET Committee 30th meeting in particular, about the COOMET strategy and development program for 2020–2022 and Roadmap for this program implementation. Detailed Information is presented on the COOMET Joint Standards Committee meetings, the issues related to TC 1.9 activities were discussed in detail.

Information is provided on the CCRI, TC-RI EURAMET working groups activities, on the TC 1.9 representatives participation of in the NPL training course on comparisons in the ionizing radiation field organizing and conducting.

Special attention was paid heed to the seminar organized by CCRI on training to work in the new KCDB 2.0 base.

The Kazakhstan National Center for Expertise and Certification Representative, Nasyr Mamyrbek, provided detailed information on the training course "Improving the quality of calibration services in secondary standard dosimetry laboratories" conducted by him under the IAEA auspices for SSDL laboratories from Estonia, Kazakhstan, Latvia, Tajikistan, Turkmenistan and Uzbekistan. Support was provided to participants in their own national technical cooperation projects.

TC 1.9 Member the Moldovan National Institute of Metrology representative Efimia Lukyan took part in the Euromet technical committee on ionizing radiation (TC-IR Annual Meeting) meeting in January 2021, where presented information on the COOMET TC 1.9 activities.

1.3 Organizational matters

Cuban and Belarusian national secretariats introduced new TC 1.9 members from their countries.

PTB representatives will not work in TC 1.9 in future. It means we have to looking for new dosimetry coordinator in place of Ludwig Buermann

The experts list is updated

The matter of the new on-line TC editor on the COOMET portal is still unresolved.

2. THE PRESENT STATUS OF THE COOMET PROJECTS IN THE FIELD OF IONIZING RADIATION AND RADIOACTIVITY

2.1 Review of ongoing and completed topics and information on the results.

175/RU-a/99 Status of the measurement standards in the field of ionizing radiation and radioactivity in the countries-members of the COOMET

The aim of this work is to create a COOMET database on standards in the field of ionizing radiation and radioactivity. Participants - representatives of all COOMET member countries.

Within the framework of the implementation of the theme, representatives of COOMET member countries regularly provide information on the state of the reference base and the ongoing changes:

- list of national and other standards;
- metrological and technical characteristics of standards;
- information on conducted and planned comparisons;
- information about the work on the improvement of standards.

The topic is kept as a permanent one, the information is updated as the composition of the equipment changes and the capacities of COOMET member laboratories expand.

Participants of the meeting described the reference measurement tools available at their NMI and the measurement capabilities of ionizing radiation, changes in the composition of equipment and laboratory personnel.

635/DE/14 Comparison of the national standards of air kerma for x-rays qualities used in radiation protection, general diagnostic radiology, computed tomography and mammography COOMET.RI(I)-S4 (bilateral PTB and CPHR, pilot – PTB, Germany)

The aim of this comparisons is to support CPHR CMC entries for air kerma, air kerma-length products for selected X-ray qualities used in radiation protection, general diagnostic radiology, computed tomography and mammography.

Three spherical cameras for protective levels (type TM32002), two cameras for mammography (such as Radcal 10x5-6M), two CT cameras (types TM77336 and TW30009), and one camera dose per area (type TA34028) were used.

Comparisons are completed with positive results. Results are published [Metrologia 2020 57 Tech. Suppl. 06005](#)

641/BY-a/14 Comparison of the national standards of air kerma for x-rays qualities used in radiation protection and diagnostic radiology COOMET.RI(I)-S3 (pilot – BelGIM, Belarus).

Supplementary comparison of the national standards of air kerma for ISO 4037 narrow spectrum series (ISO 4037-1) and IEC 61267 RQR series (IEC 61267). The aim of the comparison is to publish new and/or support existing CMC entries for air kerma for the selected x-rays qualities used in radiation protection and diagnostic radiology.

The comparison procedure consists in calibrating three ionization chambers in terms of air kerma using X-ray radiation modes N-40, N-60, N-80, N-100, N-120, N-150, N-200, N-250 , RQR3, RQR5, RQR7, RQR9, RQR10. It is preferable to calibrate the cameras in all selected modes. It is allowed to calibrate chambers on five modes with a narrow spectrum and on three modes of the RQR series at a minimum. If a participant does not have RQR series modes in his laboratory, he can take part in comparisons only on modes with a narrow spectrum.

Comparison participants: VNIIM (Russia), BelGIM (Belarus), PTB (Germany), GEOSTM (Georgia), CPHR (Cuba), NIM (Moldova), AzMI (Azerbaijan), IAEA, (NIM) Ukraine, (AF NACEKS) Kazakhstan.

Comparisons are completed. Draft A was discussed on TC meeting. To date, the report has been finalized taking into account participants comments and suggestions, Draft B is sent to participants for approval.

833/RU/21 *Supplementary comparisons of radionuclide activity national standards (COOMET.RI(II)-S3)*

Supplementary comparison of the national standards of radionuclide activity. The aim of comparisons is the OSGI type point spectrometric gamma radiation sources activity measuring.

Comparisons are carried out by activity measuring of four spectrometric sources based on Co-60, Cs-137, Eu-152 and Am-241.

Comparisons have been registered, measurements procedure started, the planned completion date is 2022.

389/RU/07 *Comparison of re-entrant ionization chambers ("dosecalibrators") calibration factors for medical radionuclides* (pilot – VNIIM, Russia)

The topic was initiated by VNIIFTRI in 2007, in 2017 it was decided that the topic is important, it would be irrational to abandon it, further work was entrusted to VNIIM.

The aim of the comparison is to ensure the traceability of the technetium-99m measurements in the national metrology institutes and laboratories of the COOMET to the BIPM.RI (II)-K4.Tc-99m and BIPM.RI (II)-K4.F-18 key comparisons reference values (through the VNIIM results).

The first cycle of comparisons was carried out in 2017.

The work was stalled due to problems with the transportation of comparison instrument by participants from Cuba. The main reason for the delay is problems with logistics.

An option was proposed for creating a transportable analogue of a dosecalibrator with working gas low pressure and a highly stable control source. Proposed device should have a safety data sheet for transportation by air. Currently, work is underway to develop the design and manufacture of such a tool.

600/RU-a/13 *"Development of calibration procedure of PGe spectrometers for efficiency vs. gamma – radiation energy"*

The topic was proposed by VNIIFTRI in 2013. A new generation of specialists in the field of spectrometry grown up at VNIIFTRI is not ready to answer for their predecessors obligations. The topic is considered actual to this day. It was decided to transfer it to the rank of coordinated one, changing the project coordinator to VNIIM. To date, a draft methodology has been prepared, the final version will be presented for discussion at TC next meeting in 2022.

410/UA/07 *COOMET regional comparison of the national standards of absorbed dose to water for Co-60 gamma-radiation* (pilot – VNIIFTRI, Russia)

It was decided to exclude the topic 410/UA/07 "Regional comparisons of COOMET national standards of absorbed dose unit in water for the energy of Co-60 gamma radiation" from the COOMET Work Program.

2.2. The previous TC meetings decisions implementation

2.2.1 The VNIIFTRI representatives suggested to establish a new comparison in the field of radon volumetric activity. VNIIFTRI has the necessary equipment and experienced qualified personnel for carrying out comparisons. It was decided to instruct VNIIFTRI (S. Biryukov) to hold consultations with potential participants of comparisons, evaluate the prospects for such comparisons, and, in case of a positive result, develop and send a draft Technical Protocol to potential participants. At present there are no visible results, the next term for the Technical Protocol preparation has been set - 2021.

2.2.2 In 2019 it was proposed to arrange comparisons to measure the OSGI type point spectrometric gamma radiation sources activity. Comparisons have been registered (**COOMET.RI(II)-S3**), measurements procedure started, the planned completion date is 2022.

2.2.3 In 2019 BelGIM representatives suggested starting a new cycle of comparisons on radionuclide solutions specific activity measuring due to the ten-year period of legitimacy of previous comparisons is expired.

After discussion, it was decided to use for the future comparison the Barium-133 solution. The organization and conduct of comparisons should be entrusted to VNIIM (I. Alekseev).

The comparisons start has been postponed due to financial problems, the planned start date of comparisons is 2022.

2.2.4 It was decided in 2019 to update the Regulation on the TC 1.9 Technical Committee. The draft regulation was presented at the on-line meeting in 2020, to date it is finalized taking into account the comments and is ready to submission for approval.

3. PROGRESS WITH THE PREPARATION OF IR CMC OF COOMET NMIS

Current state of RI COOMET SMS

Country	CMC number	Dosimetry	Radioactivity	Neutrons
Belarus	51	21	30	
Bulgaria	23	7	16	
Cuba	68	13	55	
Georgia		2		
Germany	275	91	158	26
Moldova	2	2		
Romania	37		37	
Russia	329	161 (28+133)	124	44 (6+38)
Slovakia	71	30	32	9
Ukraine	15		15	
<i>Turkey</i>	3		3	
<i>China</i>	195	20	173	2

Last two years no new CMC were presented

4. The next meeting time and place

The next TC meeting is scheduled for autumn 2021. The decision on the meeting location and format will be made taking into account the situation with the Covid-19.

TC 1.9 Chair
Nikolay Moiseev