

## **Progress Report on the Radiation Dosimetry at OMH**

István Csete  
National Office of Measures (OMH)  
Radiation Physics Section  
Budapest, Hungary

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### **X-ray dosimetry**

- The diagnostic calibration service in the soft X-ray range was extended with mammography qualities using wolfram anode tube according to the IEC 61267.
- To evaluate the uncertainty component of field instruments calibration factor comes from the radial beam non-uniformity all the X-ray beam profiles used for routine calibrations are under investigations by semiconductor probe.
- There was a general revision of the free-air chamber primary standard of air kerma for 10 kV up to 50 kV. The correction factor for photon scattering was changed according to the MC calculation results published by David Burns in CCMRI(I)/99- Report. The physical parameters and other correction factors were re-measured. The ratios of re-evaluated sensitivity to previous one are between 1.0025-1.0039 depending of the beam quality.

### **Gamma-ray dosimetry**

- There has been an extended investigation for the validity of the MC calculations for wall correction of cavity ionization chambers used as primary standard of air kerma for  $^{60}\text{Co}$  and  $^{137}\text{Cs}$  radiation at the PTB. As a result of this joint research program the wall correction factor of the OMH standard was re-evaluated. A short summary of the results are in separate report, number CCRI(I)/01-03.
- The  $^{60}\text{Co}$  and  $^{137}\text{Cs}$  irradiation equipment are still under reconstruction in the gamma laboratory at OMH.

### **Legal metrology**

- The calibration services of the Dosimetry Section were accredited by the Hungarian Accreditation Board in 2000.
- Type testing of new dosimeters for medical, personal, and protection proposes has been continued. These instruments are subjects of compulsory verification.
- The reference irradiations of personal dosimeters in terms of  $H_p(10)$  and performance test for the personal dosimetric service has been started.

## International activities

- An indirect comparison of national primary standards of air kerma of OMH and PTB for medium energy X-rays was performed in 1999. The ratios of  $K_{\text{OMH}}/K_{\text{PTB}}$  were between 1.0006-1.0015 for the BIPM qualities and between 0.9923-0.9983 for the ISO narrow beam qualities. More details are available in the PTB-Bericht DOS-35.
- Direct comparison of primary standards of air kerma of OMH and PTB for  $^{60}\text{Co}$  and  $^{137}\text{Cs}$  radiation was performed in 2000. The average percentage deviations of the standards were 0.09 % and 0.15 % for the  $^{60}\text{Co}$  and  $^{137}\text{Cs}$  radiation beams, respectively. Details of comparison are in ongoing publication.
- The primary standards of air kerma for low energy X-rays was compared against the BEV standards in December 2000. The involved beam qualities were the BIPM soft X-ray qualities and 4 mammographic qualities. The comparisons were performed in direct and indirect ways using transfer chamber type RADCAL 6MX. The results will be published soon.
- Direct comparison of primary standards of air kerma of OMH and BIPM for low energy X-rays was performed in March 2001. The preliminary result for air kerma ratios (OMH/BIPM) are 0.9967; 0.9991; 0.9981; 0.9998; 0.9996 for 10 kV; 25 kV; 30 kV; 50b kV; and 50a kV respectively.
- The dosimetry section is participating in EUROMET project numbers 526 and 545.
- The CMC data file of the section has been compiled and proved by the EUROMET RAD group.
- The air kerma irradiations of TLDs for the IAEA SSDL service have being continued.

## Future works

- Determination of absorbed dose to water from absorbed dose to graphite is intended using our primary standard graphite calorimeter and scaling theory.
- Determination of absorbed dose to water by our graphite extrapolation chamber in the medium energy X-rays will be investigated.

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