COMPARISON OF RESULTS IN ABSORBED DOSE CALIBRATION BETWEEN USING AAPM TG-21 AND TG-51 PROTOCOLS – ELECTRON BEAMS

In this study we compare the values of absorbed dose determined at d_{max} according to the current AAPM dose calibration protocol TG-21 and the upcoming AAPM TG-51 protocol for electron beam of energies from 6 to 18 MeV. The incident electron beams are from an ELEKTA SL20 linear accelerator. The field size is 10×10 cm^2 and SSD = 100 cm. A Markus and an NACP plane-parallel chambers are used in the absorbed dose calibration. The values of N_{gas} and $k_{ecal} N_{D,w}^{^{60}Co}$ for plane-parallel chambers are cross-calibrated against a calibrated cylindrical ionization chamber (PR-06C) at d_{max} and at d_{ref} respectively. A field size of 20×20 cm^2 and SSD = 100 cm are used for cross-calibration for plane-parallel chambers. The exposure calibration factor N_x and the new absorbed-dose-to-water calibration factor $N_{D,w}^{^{60}Co}$ for the cylindrical ionization chamber (PR-06C) were provided by the primary standards laboratory (NRCC). We find that differences in determined absorbed dose at d_{max} between using two protocols vary with electron beam energies. Over 1% discrepancies are observed. The results are consistent with our current understanding on the discrepancies of water-to-air stopping power ratios between values calculated by using mono-energetic and realistic electron incident beams at d_{max}.