

**A COMPARISON OF THE AAPM TG51 PROTOCOL AND THE IAEA
ABSORBED-DOSE-TO-WATER BASED CODE OF PRACTICE FOR DOSIMETRY
CALIBRATION OF HIGH ENERGY PHOTON BEAMS**

Both the AAPM and the IAEA have recently developed a new generation of protocols that are based on standards of absorbed dose to water. The recommended dosimetry procedures in these protocols are based upon the use of an ionization chamber that has been calibrated in terms of absorbed dose to water in a standards laboratory's ^{60}Co beam. This is different from the recommendations given in the earlier generation of protocols, which were based upon either an exposure or air-kerma calibration factor of an ionization chamber. The purpose of this work is to compare the recommendations of the two protocols using two widely used Farmer type ionization chambers: PTW N30001 (PMMA wall) and NEL 2571 (graphite wall). This comparison was accomplished by determining the absorbed dose-to-water with both chambers irradiated in a water phantom using 6 and 25MV photon beams. Beam quality correction factors k_{Q,Q_0} , determined by following the recommendations of the two protocols, were found to differ by up to 0.2% at the highest energy. Despite significant differences in the method of beam quality specification, the overall agreement between the two protocols was found to be within 0.1% for the chambers and energies investigated in this study.