

AbstractID: 6623 Title: Calibration factors for parallel-plate ionization chambers at d_{\max} following the TG 51 protocol

In this work a method is described for the calibration of parallel-plate ionization chambers at d_{\max} , which is consistent with the TG 51 protocol. The protocol recommends calibrating these chambers in a high-energy electron beam similar to that proposed in TG 39 except that the measuring depth is at d_{ref} instead of d_{\max} where $d_{\text{ref}} \text{ (cm)} = 0.6R_{50} - 0.1$. The advantage of performing the measurements at d_{\max} is that the gradient correction factor, P_{gr} , is unity while at d_{ref} , the dose gradient is about 0.4 %/mm for 18 and 20 MeV electrons. Since measurements are made in water, a 1 to 2 mm error in positioning the chamber is possible and would introduce about a 1% measurement error. Whereas, measurements at d_{\max} would be negligibly affected by a 1 to 2 mm error in positioning. However, the measurements taken at d_{\max} cannot directly be used to obtain the calibration factors because the values for k_{R50} given in the protocol only apply at d_{ref} . A cylindrical ionization chamber having a $N_{D,w}(^{60}\text{Co})$ obtained from an ADCL is used in 16 and 20 MeV electron beams to obtain $[k_{\text{ecal}}N_{D,w}(^{60}\text{Co})]$ from measurements at d_{ref} according to the protocol for four commonly used parallel-plate chambers. Measurements are also made at d_{\max} and scaled to d_{ref} to obtain calibration factors to compare with those obtained from the measurements at d_{ref} . A discussion of these results will be presented.