

Title of Paper: Clinical Electron Beam Dosimetry - Comparison Between TG-21 and TG-51 Protocols

In this study we have compared the results of the absolute dosimetry for electron beams using the current TG-21 and the upcoming TG-51 protocols. The electron beams of energies 6-20 MeV were from a Siemens KD2 linear accelerator. The field size was $20 \times 20 \text{ cm}^2$ and $\text{SSD} = 100 \text{ cm}$. We used an NACP plane parallel chamber (serial number 34-08) which had $N_D^{60\text{Co}} = 3.20 \text{ cGy/R}$ provided by the NRCC standards laboratory. Dose/MU at the reference depth was converted to the value at d_{max} using PDD curves measured by high quality diodes (Scanditronix).

The dose calculations based on TG-51 methodology were done in 3 different ways:

1. Using the absorbed dose to water calibration factor, $N_D^{60\text{Co}}$, provided by the NRC for our NACP chamber and $P_{\text{wall}}^{60\text{Co}}$ previously measured for this chamber.
2. Using the absorbed dose to water calibration factor, $N_D^{60\text{Co}}$, provided by the NRC and $P_{\text{wall}}^{60\text{Co}}$ calculated by Rogers for this type of the chamber.
3. Using the cross – calibration of the NACP chamber versus cylindrical chamber for which the $N_D^{60\text{Co}}$ was provided by the NRC.

The differences between the data obtained by the 3 listed above methods vary for different beam energies are consistent with the differences between the stopping power ratios in TG-21 and the ones for the realistic clinical beams.