

AbstractID: 8320 Title: Ion Chamber Collection Efficiency Considerations for unflattened x-ray beams

**Purpose:** To assess the corrections necessary, due to loss of ion chamber collection efficiency, when measuring accelerator-produced unflattened x-ray beams. **Methods and Materials:** Ion chambers typically used to map therapeutic x-ray beams were used to map unflattened beams created by removing the flattening filter from a radiotherapy accelerator. Boag's two-voltage technique was used to calculate the collection efficiency at the high dose-per-pulse attained in such fields. **Results:** Collection efficiency could be fit with a simple linear function of dose-per-pulse. At the center of the unflattened fields the collection efficiency was as much as 2.6% lower than at the lower-intensity periphery. Different ion chamber types exhibited more or less loss of efficiency. **Conclusions:** When high intensity unflattened x-ray beam distributions are measured, appropriate corrections for collection efficiency must be made for accurate determination of those distributions. This can be accomplished using a simple linear correction function. These corrections will not be the same for all locations in the field.