

## Primary and Secondary Standards of Air Kerma Strength for Low Energy Brachytherapy Sources

Bert M. Coursey

Ionizing Radiation Division, Physics Laboratory, NIST, Gaithersburg, MD 20899-8460

NIST has developed a new primary standard for the low-energy brachytherapy sources of iodine-125 and palladium-103. The Wide Angle Free Air Ionization Chamber (WAFAC), developed by Robert Loevinger, realizes the quantity air kerma for photon emissions in the energy region from 10 keV to 50 keV. NIST is the only national laboratory to offer standards for these low-energy sources. Since January 1, 1999, NIST has calibrated iodine-125 sources for four manufacturers, and palladium-103 sources for two manufacturers, using the new WAFAC standard. In the case of the prostate therapy seeds, the manufacturers are asked to submit five seeds for measurement on the WAFAC. Additional measurements are then made on each batch with well ionization chambers from two manufacturers. Following these source characterization measurements at NIST, a subset of the seeds from a batch (usually three seeds) are sent to the AAPM Accredited Dosimetry Calibration Laboratories (ADCLs) to allow transfer of the calibration capability to the secondary laboratory network. The uncertainties in the measurement systems (NIST-manufacturer-clinic and NIST-ADCL-clinic) for air kerma strength will be described for the prostate seeds presently marketed in the U.S.