

AbstractID: 8435 Title: An evaluation of image quality and dose for a Hologic Selenia digital mammography system with a tungsten anode x-ray tube

**Purpose:**

Image quality and breast dose for an amorphous selenium detector digital mammography system with a tungsten (W) anode x-ray tube and rhodium (Rh) and silver (Ag) filters were compared to an equivalent model system with a molybdenum (Mo) anode x-ray tube and Mo and Rh filters.

**Method and Materials:**

Signal difference to noise ratio (SDNR) and mean glandular dose (MGD) were measured for 4, 6 and 8-cm thick breast equivalent material slabs and an aluminum contrast object. Values were compared over a range of kVp and mAs selections for Mo/Mo, Mo/Rh, W/Rh and W/Ag anode/filter combinations. The kVp selection that resulted in the highest SDNR for each thickness and anode/filter combination was determined. SDNR at the optimum kVp for each anode/filter was then compared. The automatic exposure control (AEC) selections for the W and Mo system were also compared with regards to SDNR and MGD.

**Results:**

W/Rh was found to produce the highest SDNR over a wide MGD range, followed by W/Ag, Mo/Rh and Mo/Mo. The W anode system provided a 30-35% improvement in SDNR for the same breast dose as compared to the Mo anode system. When the SDNR of the W anode and Mo anode systems are matched, the W anode system resulted in a 40-50% reduction in MGD. Using the W anode system default AEC for selection of exposure parameters, a 7-25% improvement in SDNR and a 10-30% reduction in MGD was achieved, as compared to the Mo anode system.

**Conclusion:**

The W anode system provides superior image quality for the same breast dose. The default AEC for this system provides a compromise between image quality improvement and decreased dose as compared to the Mo anode system.