

Purpose: The aim of this work was to implement different International protocols to estimate average glandular dose levels for the first Sectra MicroDose Mammography (MDM) unit used in routine mammography screening (Helsingborg, Sweden).

Method and Materials: The Sectra MDM is a scanning multislit digital mammography system which uses a direct photon counting technique with a solid-state detector, Si(B). A substantial dose reduction can be expected due to high photon absorption in the detector (90%) and scatter rejection (97%) as well as improved energy weighting compared to other mammography systems on the market. The multislit pre-collimator scans with a distance of only 115 mm above the breast support making it impossible to follow the usual procedure for half value layer (HVL) measurement. Instead, a sensitive and well-collimated solid state detector with simultaneous correction for the energy dependence (Barracuda X-ray multimeter, RTI Electronics AB, Sweden) is used for non-invasive measurements of the HVL.

Results: The average glandular dose was found to be e.g. 0.28 mGy for a 50 mm standard breast with 50 % glandularity simulated with 45 mm PMMA according to the so-called European protocol from 1996.

Conclusions: Methods of how to perform absorbed dose measurements according to European and American protocols on the Sectra MDM have been developed. The average glandular dose is much lower than for any other mammography unit on the market today. However, for increased accuracy, the dose protocols should be revised to account for the anode/filter combination used with the Sectra unit (W/AI), the scattered radiation from the multislit pre-collimator device and the occurrence of a dose profile in the scanning direction.