

Focal Spot Measurements Using CCD Sensor with a Dedicated Software to Quality Control Programs

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Focal spot size is an important limiting factor for the resolution of a radiographic imaging system. An x-ray sensitive CCD sensor was used as an alternative method for replacing direct exposure X-ray films on the evaluation of X-ray tube focal spot dimensions as proposed at the International Electrotechnical Commission (IEC) 336 Standard and at the National Electrical Manufacturers Association (NEMA) XR-5 Standard. Focal spot images were obtained using a slit camera in two positions following the standards recommendations about system alignment and quality image reference level. One parallel image to the anode/cathode axis (focal spot width) and other orthogonal to the anode/cathode axis (focal spot length) were registered for the determination of the respective Modulation Transfer Function (MTF). This work presents the development of a dedicated software and an optimized alignment system to simplify the implementation of this new methodology in routine Quality Control Programs. The software intends to provide an interactive tool for the alignment procedure, image capture and evaluation of the MTF. The developed software is able to calculate the image system resolution in lp/mm using this MTF information. Conventional and digital X-ray equipments, mammographic, dental and fluoroscopic systems were studied in terms of their alignment for data collection and image resolution behavior. Results show that the developed system is able to represent MTF of these equipments in a faster experimental procedure than the present film-based methodology.

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