

The primary goal of this presentation is to examine appropriate physics testing procedures for modern fluoroscopy equipment. Modern systems may contain new features like significant copper filtration, flat panel image receptors, and various automated systems which affect their performance characteristics. Regardless, fluoroscopy acceptance testing should be divided into the following categories: mechanical components, radiation measurements, electronic control features, image quality, software selections, regulatory compliance, display monitors, PACS systems and safety concerns. The mechanical system tests should include: the central beam alignment, isocenter accuracy, collimation accuracy, 3-D rotational imaging and system component motion. Radiation tests should at least measure patient entrance surface and image receptor input exposure rates determined with a range of attenuation materials (either acrylic slabs or the NYS metallic attenuators). The protection against scattered radiation should be evaluated for the more penetrating x-rays of modern units. Electronic control checks should include: kVp accuracy, Automatic Brightness Control (ABC) operations, examination of radiation pulse widths & frequency and true Field-of View (FoV) sizes. Image quality measurements should include high contrast resolution employing both bars patterns and screen meshes; the effects of filtration, magnification, detector element (del) and focal spot blur will be discussed. Low contrast measurements often utilize an aluminum penetrometer, ACR fluoroscopy phantom and different contrast-detail devices. The impacts of software features upon image quality like frame averaging, dynamic range compression, contrast adjustment and edge enhancement are important. Regulatory compliance may involve new criteria for HVL, and modern equipment can sometimes present difficulties with measurement of some parameters. Display monitor performance can be determined with light meter measurements and subjective evaluations using test patterns. PACS checks involve image transmission, archival storage and retrieval without degradation. Safety checks involve the assessment of various collision sensors, interlocks, electrical safety and other features. This presentation is directed towards providing insights, limitations and approaches to physics assessments of modern fluoroscopy systems.