

AbstractID: 6434 Title: Effect of processor temperature on film dosimetry:

Radiographic films have proven to be an important dosimetric tool for dose verification in advance treatment techniques such as IMRT, IGRT and SRT etc. Optical density (OD) is related to dose, and depends on various parameters including beam energy, depth, field size, film batch, dose, dose rate, air film interface, post exposure processing time and temperature of the processor. Most of these parameters have been studied for the XV and EDR films used in radiation oncology, however; there is no information on the functional form of OD with processor temperature, which is investigated in this study. Films were exposed with 6 MV photon beam and were processed in a Kodak X-OMAT 5000 RA processor. For sensitometric evaluation, films were processed at clinically set 95° F. A batch of films with same dose was processed at different temperatures in the range of 85°-105° F by changing the processor temperature in service mode with proper password and instructions. At each setup of temperature, enough time was given to change the display status from "WAIT" to "READY" sign. Additional 10 minutes were given after ready sign to stabilize the temperature further. One set of film from XV and EDR was processed at each temperature setting. It is observed that for a given dose, OD is linearly dependent on the processor temperature within narrow range of the temperature. It is also known that OD versus dose curve is a quadratic function. Combining these two functions provides OD in a quadratic function of the processor temperature. It is concluded that estimation of dose with film is strongly dependent on the processor temperature that should be maintained constant to reduce dosimetric uncertainty for XV and EDR films. Processor temperature should also be studied for each institution to estimate the correct OD and errors in dosimetry.