

A dual screen-dual film combination was developed based on a novel concept of employing light emitted from two sides of a phosphor screen to expose two films. Film #1 (Kodak Min-R E) was placed in direct contact with the phosphor side of Screen #1. Screen #1 was made of the Kodak Min-R phosphor coated on a 4 mil thick transparent backing. Film #2 (Kodak T-Mat G) was sandwiched between Screen #1 backing and the phosphor side of Screen #2 (Kodak Insight ME screen). The basic imaging parameters were measured, including H&D curves, MTF, NPS, with resulting DQE calculated. Sensitometric measurement showed that Film #2 was >2x faster than Film #1 in effective speed. Film #2 point contrast was >2 greater than Film #1 in the Film #1 optical density (OD) range below 0.7. Film #1 MTF performance was comparable to a Kodak Min-R screen-Min-R E film combination up to ~20 lp/mm, while MTF of Film #2 demonstrated a limiting resolution of ~11 lp/mm. NPS results showed Film #2 noise level was higher than the corresponding Film #1. Film #2 DQE was >1.5 greater than the corresponding Film #1 when Film #1 was underexposed (OD<1.0). In summary, the use of the dual screen-dual film combination in mammography provides a Film #1 image that is equivalent to that of a conventional screen-film combination. However, Film #2 produces an additional image with higher contrast and enhanced signal-to-noise ratio for breast regions that are underexposed on Film #1.

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