

AbstractID: 9395 Title: Effect of warm-up time on minimum and maximum luminance levels for calibrated and uncalibrated liquid crystal displays: an evaluation of current recommendations.

Purpose: To determine if current guidelines of a thirty minute display warm-up time (AAPM, 2005) before assessment of medical images are appropriate for flat-panel LCD displays.

Methods and materials: Three calibrated and three uncalibrated liquid crystal monitors were assessed in their ability to display the TG18LN12-01 and TG18LN12-18 over specified periods of time, in minutes after switching on: 0; 10 to 90 in 10 minute intervals; 120; 180. Ambient lighting levels were set at $\leq 0.1\text{cd/m}^2$ and room temperature was kept constant at 18.3 °C. Luminance measurements were made with a calibrated near range photometer.

Results: Calibrated LCD displays needed less time to stabilise at minimum luminance levels taking 50-90 minutes rather than 60-180 for the uncalibrated displays. Maximum luminance levels in calibrated displays took 30-50 minutes to stabilize compared with 60-80 in uncalibrated displays. Minimum and maximum luminances were deemed stabilised when readings were within +/- 2%.

Conclusions: maximum and minimum luminance levels stabilise more quickly in calibrated LCD displays. Only the maximum luminance of one calibrated display stabilised within 30 minutes with no other monitors stabilising within this currently recommended warm-up period. The results demonstrate that monitors must be switched on for substantial periods of time before any diagnostic results are obtained as variances within the maximum and minimum luminance levels will affect the amount of distinct grey levels visualised thus potentially reducing diagnostic efficacy. The standard thirty minute warm-up time is insufficient in terms of stabilising monitors and the establishment of appropriate recommendations is required if accurate and reproducible data are to be provided.