

Quality Improvements in High-Intensity Fade Units

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Xenon Arc units are used to simulate the effects of sunlight passing through window glass and striking a photographic print that might be set on a desk or table in front of the window. Although storage and display of prints adjacent to a window is not a recommended practice, the test does give some indication of the extremes of storage that could happen in the trade and also shows the effects of ultraviolet light on print stability for research and development purposes.

The xenon-arc units in use at Eastman Kodak Company are set to operate at intensity of 50 klx. The previous quality specification on light intensity of +/- 2% was not adequate for the needs of the research community. An effort was undertaken to improve the variability of both the light intensity and its translation to the dye fading of actual photographic samples. Three sources of variability were identified and subsequently improved so that the ultimate intensity variability on newly built units was +/- 0.25%. The three sources of variability were:

- Fluctuations in laboratory line voltage, causing changes in the arc light intensity.
- variation in quality and intensity of light because of the reflection characteristics of different samples around the spherical sample plane.
- Variations in temperature in the different vertical tier locations of the sample plane that affected the rate of light fading of the photographic samples.

The first two sources of variability were attacked by mounting white tiles in the sample plane and measuring the photometric response of light reflected from these tiles. The signals were filtered to 550 nm and a computer was programmed to adjust the intensity of the arc-lamp based on feedback off these tiles. The last source of variability was reduced by adding a new air conditioning system with a chilled water feedback control that opened or closed a solenoid valve based on the chilled water temperature.