

06 Lamp Flicker

In cinema lamps, flickering due to increasing variations in light output at relatively short cycles (just a few seconds) may occur in lamps as the operating time progresses. When a lamp begins to flicker, the variation in light is magnified by the projection optical system of the projector, causing fluctuations to appear when projected on the screen.

This flicker mainly occurs after prolonged lamp use due to changes in arcing caused by changes in the shape of the electrodes as the electrode material melts and evaporates, and the effects of convection of the Xenon gas within the bulb caused by weaker arcing as the cathode diameter expands and the current density decreases. Accordingly, to reduce flicker, the electrode material is selected and the shape of the electrode is designed to suppress electrode melting and evaporation, and the lamps use an electrode shape and bulb shape that suppresses Xenon gas convection within the bulb.

In particular, digital cinema lamps are high luminance designs, in comparison with film cinema lamps, where a higher burden is placed on the electrodes, making them more susceptible to the generation of flicker than film cinema lamps.

The following methods of lamp usage can lead to premature electrode wearing and flicker generation.

- ☐ Operation outside the specified current and voltage
- ☐ Continuous operation over extended periods
(lamp designs are optimized for single lighting use over a duration equivalent to the screening time of a single feature)
- ☐ Operation with varying current or voltage (continuous use with rated values varying in excess of 30%)
- ☐ Operation under poor cooling conditions
- ☐ Operation where lighting is offset from the optical axis
(if a lamp is installed offset from the focal position, premature electrode wear may occur due to heat from the reflecting mirror)
- ☐ Operation under conditions of large current ripple

The continued operation of lamps that generate flicker will accelerate electrode loss, cause premature blackening, and can lead to lamp rupture. Accordingly, lamps that exhibit flicker should be replaced as soon as possible.

