

## LED Lifetime Estimate (per TM-21)

IESNA TM-21-11, "Projecting Long Term Lumen Maintenance of LED Light Sources" is a newly developed Technical Memorandum which provides recommendations for projecting long term lumen maintenance of LEDs using data obtained when testing the LEDs per IESNA LM-80-08, "IES Approved Method for Measuring Lumen Maintenance of LED Light Sources." The TM-21 standard provides an industry-wide, standard and conservative method on which to base lumen maintenance of LEDs.

The TM-21 projections represent the anticipated lumen maintenance of the LEDs and does not account for reliability of all of the other components of the luminaire or of the luminaire as a system.

Cree currently has published 6048 hours of LM-80 on the XLamp XT-E White where  $I_f = 1000\text{mA}$  and  $T_{sp} = 55^\circ\text{C}, 85^\circ\text{C}, \& 105^\circ\text{C}$ . When using the TM-21 method to determine lumen maintenance of the XT-E based on a measured  $T_{sp}$  of  $56^\circ\text{C}$ , the reported L70 is 58,400 hours. This projection is limited by the 6X rule as defined in TM-21. This method also allows lumen maintenance for other L-values to be calculated.

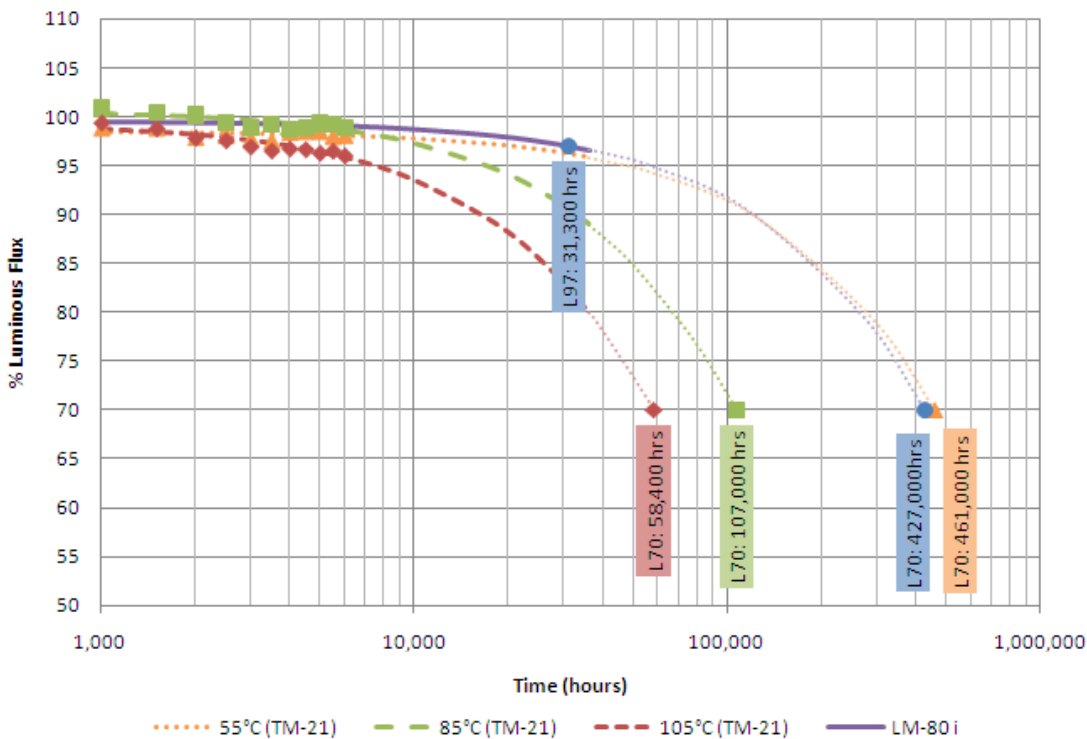


Chart 6: TM-21 Projection for XT-E at 1A and 57°C