

## TM-21 & L70 Life Calculations

LM80 data is created by the LED manufacturer for a specific LED and is proprietary to each specific LED offered from an LED manufacturer.

Once the LM80 data is calculated the LED manufacturer can conduct the IES approved method of calculating projected L70 life with TM-21 calculations based on the junction temperature of the LED. The typical junction temperature for TM-21 is calculated at 85C and 105 C junction temperature.

Most LED fixture manufacturers LED junction temperatures operate in the 85C to 105 C range versus Clarté Lighting's 65C to 85C range. Clarté Lighting's lower junction temperatures create longer life CREE L70 life ratings.

Clarté Lighting has designed and engineered all our LED fixtures to offer a minimum 100,000+ L70 life as outlined by our 10 Points of Light and 7-year warranty.

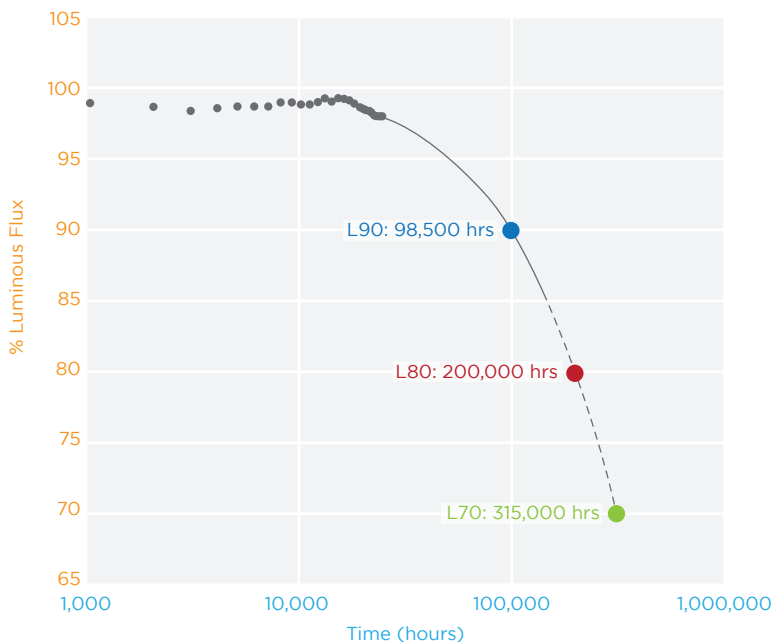
### 10 Points of Light

(click here)

Below is the TM-21 L70 calculated and projected L70 rating from CREE for their XHP502 utilized in all PAR8 scale LED fixtures and CREE XPL2 utilized in all other Clarté LED fixture offering.

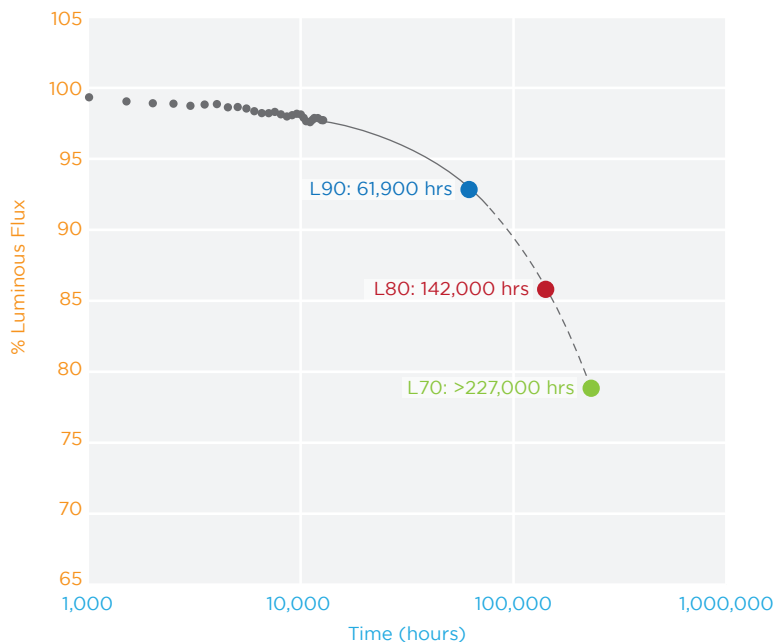
#### CREE XHP502 L70 life at 700 mA at 85°C

- Calculated L70 life operating 24 hours a day, 7 days a week = 145,000 hours = **16.55 years** (test duration 24,192 hours)
- Projected L70 life operating 24 hours a day, 7 days a week = 315,000 hours = **35.96 years**



#### CREE XPL2 L70 life at 2100 mA at 85°C

- Calculated L70 life operating 24 hours a day, 7 days a week = 75,600 hours = **8.63 years** (test duration 12,600 hours)
- Projected L70 life operating 24 hours a day, 7 days a week = 227,000 hours = **25.91 years**



Minimum LM80 test duration is 6,000 hrs. to be able to provide a calculated TM-21 L70 life. The test duration hours cannot exceed more than 6 times the hours of testing when calculating L70 life. Therefore, the longer the test duration the greater the calculated TM-21 L70 life that can be documented by the LED manufacturer.

The calculated L70 life can be extrapolated out to create a projected L70 life, even if enough hours of LED testing have not been completed, to reach the actual L70 life of the LED.

Since calculated L70 life can not exceed 6 x the hours of the actual test, the projected L70 life will be longer than the calculated L70 life, until the calculated test finally matches the projected L70 life over time. Hence the importance of presenting both a calculated and project L70 LED life.

### CREE LM80 TM21 Test Results

(click here)