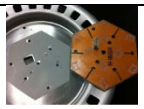
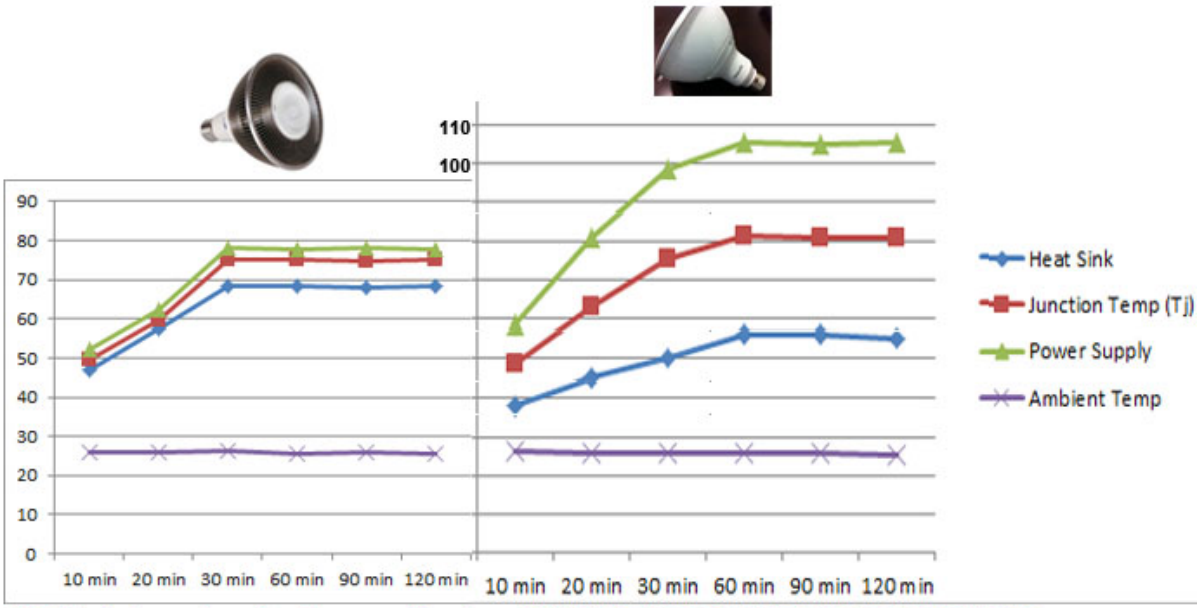
Subject : **Not All LED Lights are the same – The factors you don't see may determine the success of your projects**

It is common place today for individual LED chips to deliver up to 120 lumens per watt. With the continuous development of new materials and designs, it is not unrealistic to expect the efficacy of solid state sources to achieve 200 lumens per watt in the coming years. This advancement in LED Chip technology, however, is only as good as the technology that is designed into the complete LED luminaire. To help you better understand this difference in LED lights, we conducted a complete tear-down analysis between our Par 38 30 watt LED Bulb with a major global LED light provider. The highest Par 38 wattage we could find was 19.5 watts. The table below highlights the significant design differences. These fundamental and critical design differences are what determine the lifespan and durability of the LED luminaire.

	 **Ours, 30W** (The highest wattage and lumen output in the market)	 **Competitor's 19.5W** (The highest wattage offered)	
Comparison Factor	**Result (LED Rite)**	**Result (Competitor)**	**LEDRite vs Competitor**
Initial Efficacy	**63 lumen/Watt**	**62 lumen/Watt**	No significant difference
Initial Lumen output (3000K)	**1880 lumen**	**1200 lumen**	57% higher
Heat Sink and Dissipation Area	**208,000 mm^2** (Proprietary pure aluminum thin fin design)	**12,500 mm^2** (Baked-enamel over cast aluminum design)	17 times the surface area (This is one of the key factors that enable us to design 30+ watt products)
Thermal Conduction -PCB board material	 **Aluminum –PCB**	 **Fiber - FR-4 PCB**	FR4 is lower cost to buy and assemble, but Aluminum offers better heat conductivity to maintain LED junction temperature to run cooler
Thermal Conduction -Gap between PCB and heat sink	 **Thermal paste**	 **Thermal tape**	Thermal Tape is faster to apply but does not have as good thermal conductivity
IP Rating	**IP68** capable for outdoor and harsh environment applications	**No IP rating** for indoor applications only	Better Seal = less debris in the light over time results in better lumen maintenance
Rated Life	**50,000 hours**	**25,000 hours**	2 times
Warranty	**3 years, no limited**	**6 years on 3 hours**	Up to 4 times longer

	hours operation (commercial and residential applications)	**daily operation** (residential applications only)	covered usage

To further evaluate the thermal performance of each design, temperature measurements were taken on the LED solder joints (junction point), heat sink and power supply over a two hour period. The data shown below highlights the large difference in the thermal management ability of each design. The closer all three measurements are to each other the more robust the design. The large temperature gap between the junction temperature and the heat sink temperature will results in heat built up inside the light, which is a proven cause of early failures. In the competitors product, the power supply temperature reaches 105^{o} Celsius after just 2 hours of operation. That could be one reason their warranty is based upon only 3 hours of operation per day.



6.8C (-) -between junction temp and heat sink
2.8C (+)- between junction temp and power supply

26C (-)-between junction temp and heat sink
24.2C (+)- between junction temp and power supply

It is reasonable to state that the LED itself will last for a very long time, BUT it is actually the quality of the driver and thermal management design which will finally determine the life, and that is why not all LED lights are the same.