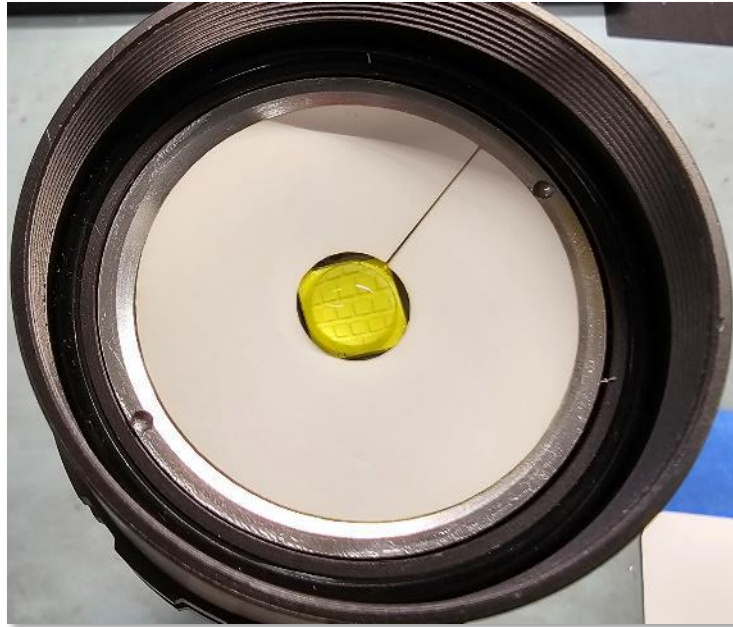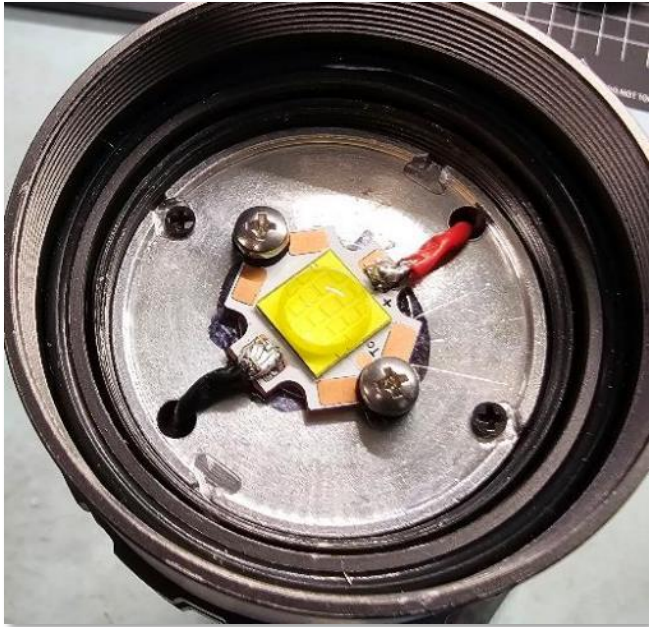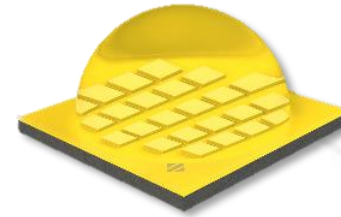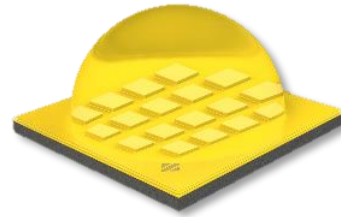# XLamp® XFL LED Flashlight Retrofit

Flashlight Housing Used

- Commercially available flashlight

- Battery: 7.4V custom pack of 2 26650 lithium-ion cells in series, nominally 5000 mAh

- Driver: Direct-drive via MOSFET with brightness controlled by PWM at 21.2 kHz with the following duty cycles:
  - Turbo 100%
  - High 63.2%
  - Medium 35.3%
  - Low 10.5%

- Optics: single 53 mm glass aspheric projection lens with variable focus. Optical efficiency is 89% on wide beam setting. Narrow beam reduces L_f to 59% of wide beam L_f

XLamp® XFL LEDs: 10K and 8K Retrofit

- Flashlight was retrofitted with:
  - XFL10K LED - 6000K, 72 CRI
  - XFL08K LED - 6500K, 70 CRI
- A diffuse white reflector was added to mimic the silver reflector used with the stock part

Performance of XFL in Flashlight (Total Lumens and Power)

- All tests conducted at instant-on, room temperature, and fully charged battery

XFL10K

Mode	Wide Lumens	Spot Lumens	Current (A)	Vf (V)	Power (W)
Turbo	11478	5855	17.70	6.42	113.6
High	6717	3535	9.70	5.74	52.1
Medium	3370	1745	4.20	5.19	21.8
Low	395	213	0.45	4.75	2.1

XFL08K

Mode	Wide Lumens	Spot Lumens	Current (A)	Vf (V)	Power (W)
Turbo	8423	4840	12.02	6.5	78.1
High	5533	2723	7.05	5.9	41.2
Medium	2962	1297	3.41	5.3	18.2
Low	372	197	0.51	4.8	2.5

Performance of XFL in Flashlight (Candela and Beam Angle)

- In "Medium" drive current mode (35.3%), using focused "Spot" lens
- All tests conducted at steady-state, room temperature, and fully charged battery
- **XFL10K showed 2.2x the max candela and throw of the stock COB on "Medium" mode**

Mode	Max Cd (Spot)	Cd/Lm (Spot)	FWHM (Spot)	FWTM (Spot)	Throw (Spot)	TURBO throw calculated (Spot)
XFL10K	8592	5.0	25.4	38.4	185 m	622 m
XFL08K	7453	4.4	26.9	39.7	173 m	644 m
29 mm COB	3869	1.8	48.0	56.2	124 m	419 m

*Data from "Medium" mode: 35.2% of TURBO current

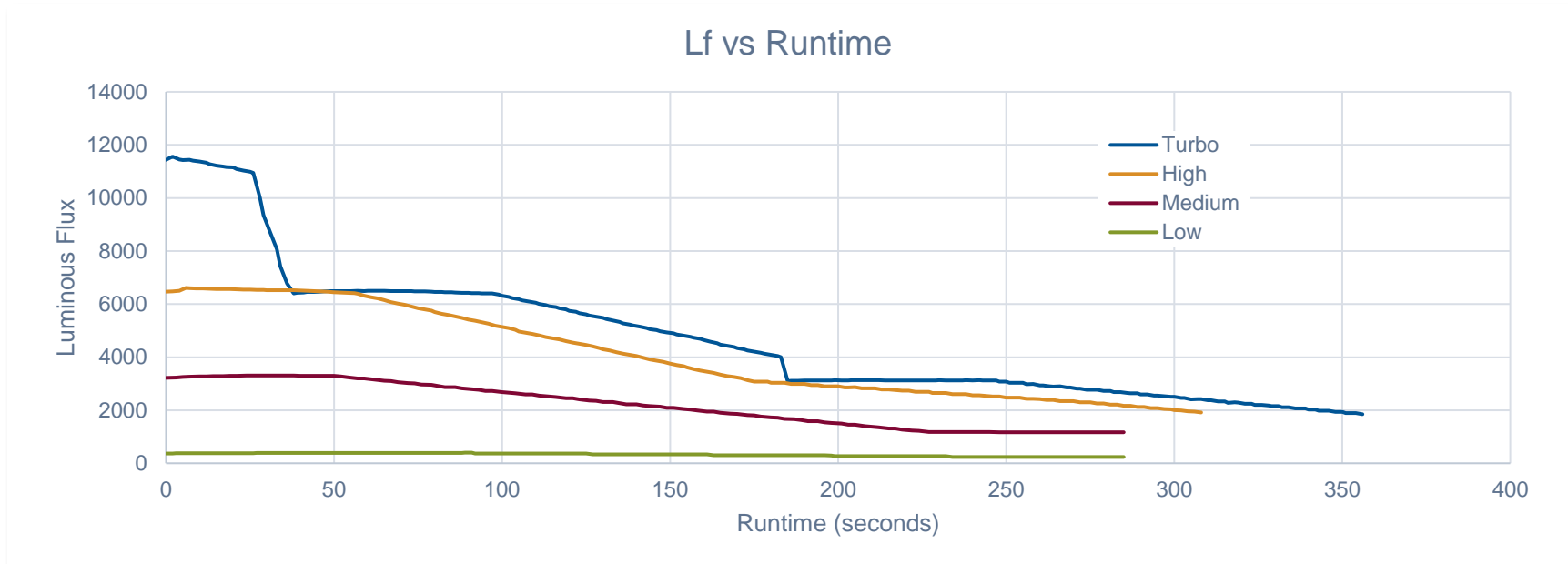# XLamp® XFL LED Flashlight Retrofit: Application Photos
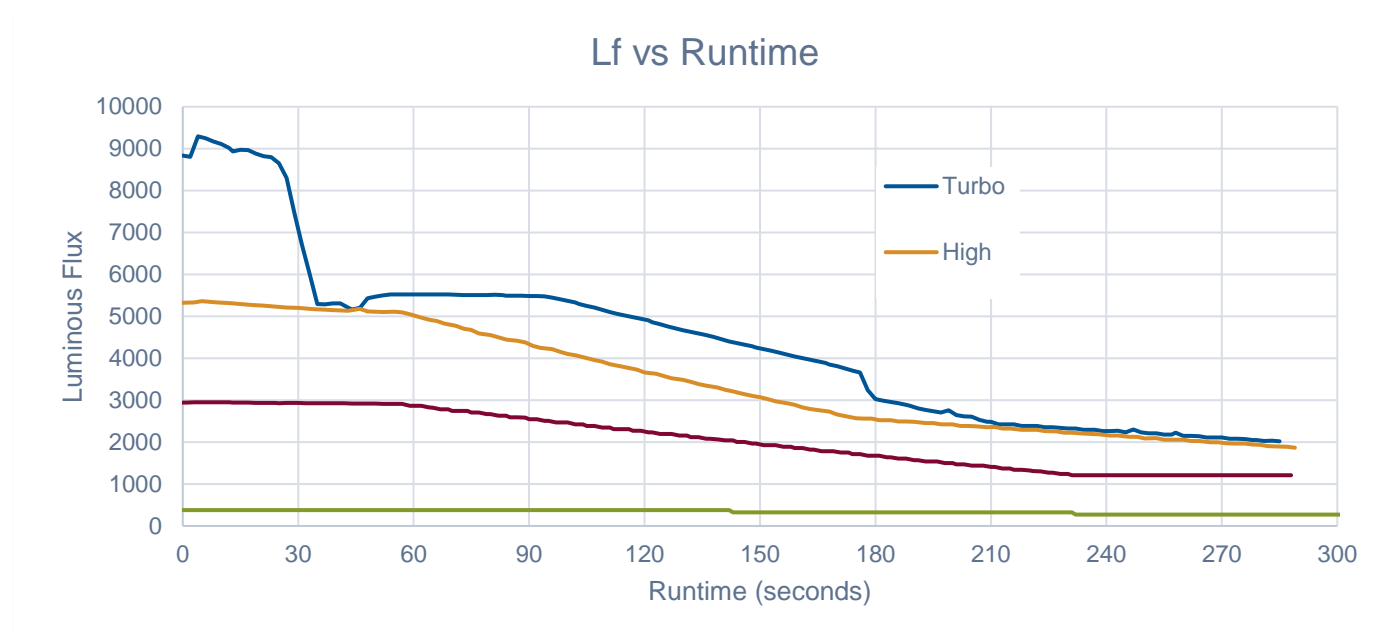
Narrow Beam

Wide Beam

Runtimes for XFL10K

- All tests conducted beginning at room temperature and with a fully charged battery

Lf vs Runtime

- Turbo mode begins a programmed ramp down after 26 seconds on, ramps for 10 seconds, and ends at the high level

- High mode begins a programmed ramp down after 55 seconds on, ramps quickly for 2 minutes until it reaches the medium level, then ramps more slowly for 3 minutes, and ends at a 1300 lm level (between normal medium and low)

- Medium mode begins a programmed ramp down after 39 seconds on, ramps for 3 minutes, and ends at a 1300 lm level

- Low mode does not ramp down

Runtimes for XFL08K

- All tests conducted beginning at room temperature and with a fully charged battery

Lf vs Runtime

- Turbo mode begins a programmed ramp down after 26 seconds on, ramps for 10 seconds, and ends at the high level
- High mode begins a programmed ramp down after 55 seconds on, ramps quickly for 2 minutes until it reaches the medium level, then ramps more slowly for 3 minutes, and ends at a level between normal medium and low
- Medium mode begins a programmed ramp down after 39 seconds on, ramps for 3 minutes, and ends at a level between normal medium and low
- Low mode does not ramp down

Thank You!

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