

# LED Aircraft Passenger Reading Lights

Aircraft manufacturers are considering a new option for passenger reading lights: the LED. Although common in niche cabin lighting applications, such as “No Smoking” and “Fasten Seat Belt” signs, LEDs may soon replace traditional halogen lamps for general and task lighting. But are they ready?

The LRC evaluated LED and halogen passenger reading lights for compliance with standards, performance, and user acceptance. The goal of this study was to identify the key characteristics for good reading light performance, regardless of lamp type.



LRC researchers test halogen and LED reading lights in a mock aircraft cabin in a laboratory.

## Results

### Standards Compliance and Performance

All reading lights tested met the standards, but the beam patterns, beam qualities, and light levels of each were significantly different. Spectral measurements indicated that people may notice color differences when viewing LED and halogen fixtures side by side. Power measurements showed that

the LED fixtures used half as much energy as the halogen fixtures.

### Passenger Opinion Survey

Subjects preferred the halogen reading light for comfort and skin tone appearance, but

disliked its yellowish color. They preferred the LED fixtures for helping them to see more clearly, but at the same time found them to be too bright and too blue or green.

## Conclusions

Manufacturers can remedy many of the problems noted by modifying color and optics. Given future improvements, LEDs will become a promising lighting option for commercial aircraft.

However, the results suggest that the current standards may not be sufficient to ensure a good quality passenger reading light. The guidelines are based on halogen technology and do not have the level of detail needed for LEDs. Updating them to include color, edge effects, glare, long-term performance, and energy consumption could improve the overall quality of reading lights.

## Experiments

### Standards Compliance and Performance

LRC researchers analyzed LED and halogen reading lights for compliance with national standards. They also compared the fixtures for optical, color, and power demand characteristics.

### Passenger Opinion Survey

Sixty subjects completed computer, reading, and color discrimination tasks under each fixture in a mock airplane cabin and rated the lights for color, brightness, and skin tone appearance.

## Sponsors

Boeing

Alliance for Solid-State Illumination Systems and Technologies (ASSIST)

For more information, visit [www.lrc.rpi.edu/programs/solidstate](http://www.lrc.rpi.edu/programs/solidstate)