



<b>AEROSPACE RECOMMENDED PRACTICE</b>	<b>ARP5873™</b>	<b>REV. B</b>
	Issued	2007-03
	Revised	2021-01
Superseding ARP5873A		
LED Passenger Reading Light Assembly		

## RATIONALE

This revision adds square illumination patterns, clarifications for color recommendations, and grammar corrections.

## INTRODUCTION

The purpose of this SAE Aerospace Recommended Practice (ARP) is to recommend minimum design criteria which will lead to adequate performance standards for LED passenger reading light assemblies in commercial aircraft. This document recommends design and performance criteria for light emitting diode (LED) reading lights in the passenger cabin of aircraft subject to FAR Part 25 certification. It is intended as guidance for the certifying authority. This document is specific to passenger reading lights using LED technology. Passenger reading lights based on other technologies, such as incandescent or halogen, should be as specified in ARP378. This document includes, but is not limited to, commercial aircraft.

### 1. SCOPE

This document presents minimum criteria for the design and installation of LED passenger reading light assemblies in commercial aircraft. The use of "shall" in this specification expresses provisions that are binding. Non-mandatory provisions use the term "should."

### 2. APPLICABLE DOCUMENTS

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the latest issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

#### 2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), [www.sae.org](http://www.sae.org).

ARP378	Passenger Reading Lights
AS8037	Minimum Performance Standard for Aircraft Position Lights
TSB 003	Rules for SAE Use of SI (Metric) Units

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For more information on this standard, visit  
<https://www.sae.org/standards/content/ARP5873B>

## 2.2 U.S. Government Publications

Copies of these documents are available online at <https://quicksearch.dla.mil>.

MIL-HDBK-217 Reliability Prediction of Electronic Equipment

## 2.3 Code of Federal Regulations (CFR) Publications

Available from the United States Government Printing Office, 732 North Capitol Street, NW, Washington, DC 20401, Tel: 202-512-1800, [www.gpo.gov](http://www.gpo.gov).

Code of Federal Regulations Title 14, Part 25

Code of Federal Regulations Title 21, Part 1040, Subpart J

CFR 1040.10 Radiological Health, Performance Standards for Light Emitting Products

## 2.4 FAR Publications

Available from Federal Aviation Regulations, <https://www.faa.gov>.

FAR 25.831 Ventilation

FAR 25.853 Compartment Interiors (Flammability)

FAR 25.863 Flammable Fluid Fire Protection

FAR 25.869 (a)(1) Fire Protection System

FAR 25.1301 Function and Installations

FAR 25.1309 Equipment, Systems, and Installations

FAR 25.1353(a) Electrical Equipment and Installations (Interference)

FAR 25.1431 Electronic Equipment

## 2.5 RTCA Publications

Available from RTCA, Inc., 1150 18th Street, NW, Suite 910, Washington, DC 20036, Tel: 202-833-9339, [www.rtca.org](http://www.rtca.org).

RTCA DO-160 Environmental Conditions and Test Procedures for Airborne Electronics/Electrical Equipment and Instruments

RTCA DO-178 Software Considerations in Airborne Systems and Equipment Certification

## 2.6 IEC Publications

Available from IEC Central Office, 3, rue de Varembe, P.O. Box 131, CH-1211 Geneva 20, Switzerland, Tel: +41 22 919 02 11, [www.iec.ch](http://www.iec.ch).

IEC 60825-1 Safety of Laser Products - Part 1: Equipment Classification and Requirements

## 2.7 CIE Publications

Available from CIE Central Bureau, Babenbergerstrasse 9/9A, 1010 Vienna, Austria, Tel: +43 1 714 31 87, [www.cie.co.at](http://www.cie.co.at).

Supplement No. 2 to CIE Publication No. 15 Recommendations on Uniform Color Spaces Color Difference Equations - Psychometric Color Terms

CIE 13.3 Method of Measuring and Specifying Colour Rendering Properties of Light Sources

CIE S009/E Photobiological Safety of Lamps and Lamps Systems

## 2.8 Other Publications

Available from Illuminating Engineering Society, 120 Wall Street, Floor 17, New York, NY 10005-4001, Tel: 212-248-5000, [www.ies.org](http://www.ies.org).

IESNA Lighting Handbook

IESNA LM-63 Standard File Format for the Electronic Transfer of Photometric Data and Related Information

MacAdam, D.L., "Journal of the Optical Society of America, Visual Sensitivities to Color Differences in Daylight," May 1942

Rensselaer Lighting Research Center

Passenger Reading Light Study

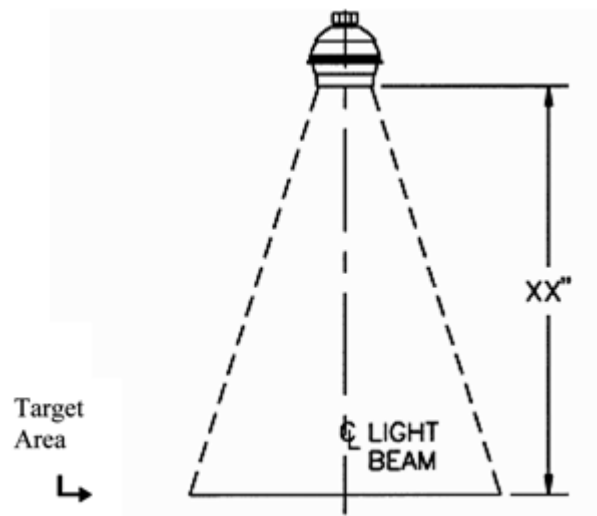
<http://www.lrc.rpi.edu/programs/solidstate/pdf/SAELEDreadinglightstudy4-25-05.pdf>

## 3. DETAILED RECOMMENDATIONS

### 3.1 Reading Light Design

#### 3.1.1 Illuminance Pattern

The reading light should provide a Gaussian (also known as the "normal" distribution) or a uniform pattern (also known as "top-hat" distribution) of illuminance on a target plane orthogonal to the beam axis per Figure 1. The width of the light pattern and the illuminance within the pattern should be in accordance with either Figures 2, 3, 4, or 5.



**Figure 1 - Target surface is normal to light beam**