



AEROSPACE RECOMMENDED PRACTICE

ARP6253™

REV. A

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Superseding ARP6253

(R) LEDs and Aircraft Applications

RATIONALE

This revision corrects references that are out of date or not applicable. Also LED failure modes were added.

ARP6253A has been reaffirmed to comply with the SAE Five-Year Review policy.

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Documents

Standard, visit Sharing Hub

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1. SCOPE

This document presents minimum criteria for the design and installation of LED assemblies in aircraft. The use of "shall" in this specification expresses provisions that are binding. Nonmandatory provisions use the term "should."

1.1 Purpose

The purpose of this SAE Aerospace Recommended Practice (ARP) is to recommend minimum design criteria which will lead to adequate performance standards for LED products in and on aircraft. This document recommends design and performance criteria for developing products subject to CFR Parts 23, 25, 27, and 29 certification that use light emitting diodes (LED) as their primary source of light for luminance and illuminance applications. It is intended as guidance for the certifying authority and lighting design engineers. This document includes, but is not limited to commercial aircraft.

2. REFERENCES

2.1 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 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.

2.1.1 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.

AIR512	Aircraft Cabin Illumination
AIR1106	Some Factors Affecting Visibility of Aircraft Navigation and Anticollision Lights
ARP503	Emergency Evacuation Illumination
ARP693	Landing and Taxiing Lights - Design Criteria for Installation
ARP711	Illuminated Signs
ARP712	Galley Lighting
ARP924	Specification and Inspection of Glass for Integrally Lighted Aerospace Instruments
ARP1088	Aircraft Indicating Systems
ARP1283	Cargo Compartment Lighting for Transport Category Aircraft and Rotorcraft
ARP1870	Aerospace Systems Electrical Bonding and Grounding for Electromagnetic Compatibility and Safety
ARP4087	Wing Inspection Lights – Design Criteria
ARP4103	Flight Deck Lighting for Commercial Transport Aircraft
ARP4168	Night Vision Goggle (NVG) Compatible Light Sources
ARP4169	Night Vision Goggle (NVG) Filters
ARP4967	Night Vision Imaging Systems (NVIS) Integrally Illuminated Information Panels

ARP5873	LED Passenger Reading Light Assembly
ARP6161	Flight Compartment Glare
ARP6402	LED Landing, Taxiing, Runway Turnoff, and Recognition Lights
AS5452	Night Vision Goggles (NVG) Compatible Lighting for Civil Aircraft
AS7768	Light, Desk, Aircraft
AS7768/1	Light, Desk, Aircraft
AS8017	Minimum Performance Standard for Anticollision Light Systems
AS8037	Minimum Performance Standard for Aircraft Position Lights
TSB003	Rules for SAE Use of SI (Metric) Units

2.1.2 ANSI Accredited Publications

Copies of these documents are available from <http://webstore.ansi.org/>.

ANSI/NEMA ANSLG C78.377	American National Standard for Electric Lamps - Specifications for the Chromaticity of Solid State Lighting Products
ANSI/IESNA RP-27.3	Photobiological Safety for Lamps - Risk Group Classifications and Labeling

2.1.3 CIE Publications

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

Supplement No. 2 to CIE Publication No. 15:2004 - Colorimetry

CIE 13.3	Method of measuring and specifying colour rendering properties of light sources
CIE S 009/E:	Photobiological Safety of Lamps and Lamps Systems
CIE 177:	Colour Rendering of White LED Light Sources

2.1.4 FAA Publications

Available from Federal Aviation Administration, 800 Independence Avenue, SW, Washington, DC 20591, Tel: 866-835-5322, www.faa.gov.

TSO-C30c	AIRCRAFT POSITION LIGHTS
TSO-C96a	ANTICOLLISION LIGHT SYSTEMS
AC20-30B	AIRCRAFT POSITION LIGHT AND ANTICOLLISION LIGHT INSTALLATIONS
AC20-74	Aircraft Position and Anticollision Light Measurements

2.1.5 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.

IEC 60810-1	Lamps for Road Vehicles
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2.1.6 NIST Publications

Available from NIST, 100 Bureau Drive, Stop 1070, Gaithersburg, MD 20899-1070, Tel: 301-975-6478, www.nist.gov.

CQS Davis Abstract Evaluation of color difference formulae for color rendering metrics

CQS Davis Ohno Abstract NIST Facility for Color Rendering Simulation

CQS Davis Ohno Development of a Color Quality Scale

Ohno and Davis Rationale of Color Quality Scale

2.1.7 RTCA Publications

Available from RTCA, Inc., 1150 18th Street, NW, Suite 910, Washington, DC 20036, Tel: 202-833-9339, 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

RTCA DO-254 Design Assurance Guidance for Airborne Electronic Hardware

2.1.8 U. S. Government Publications

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

CFR references are available at the Government Printing Office website: <http://www.gpoaccess.gov/crf/index.html>.

CFR references are available at the FAA home page at: <http://www.acquisition.gov/far>

STANDARDS

MIL-HDBK-217 Reliability Prediction of Electronic Equipment

MIL-HDBK-310 Global Climatic Data for Developing Military Products

MIL-STD-1472 Human Engineering

OTHER PUBLICATIONS

Code of Federal Regulations Title 14, Part 25

Some applicable sections may include, but are not limited to the following:

Code of Federal Regulations Title 14, Part 23, 25, 27, 29

Some applicable sections may include, but are not limited to the following:

§ 2-.1383 Taxi and landing lights

§2-.1385 Position light system installation

§2-.1387 Position light system dihedral angles

§2-.1389 Position light distribution and intensities

§2-.1391 Minimum intensities in the horizontal plane of forward and rear position lights