



AEROSPACE RECOMMENDED PRACTICE

ARP1283™

REV. C

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Superseding ARP1283B

(R) Cargo Compartment Lighting for
Transport Category Aircraft and Rotorcraft

RATIONALE

This document establishes minimum performance requirements for aircraft cargo compartment lights. The list of references has been modified to reduce duplication and remove references to general background documents not directly referenced herein. References to EASA documents have been added. Additional information regarding measurement methods has been added.

1. SCOPE

This SAE Aerospace Recommended Practice (ARP) establishes design guidance and photometric values for adequate cargo compartment and cargo access lighting systems for ground handling. The adoption of a standard set of illuminance values, found appropriate for the performance of the task in specified areas, should expedite ground handling.

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.

ARP881	Lamps for Aircraft Lighting
ARP6253	LEDs and Aircraft Applications
AIR512	Aircraft Cabin Illumination
SAE J1330	Photometry Laboratory Accuracy Guidelines

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2.1.2 U.S. Government Publications

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

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

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

14 CFR Part 23.853	Compartment Interiors (Normal Category Aircraft)
14 CFR Part 23.855	Cargo and Baggage Compartment Fire Protection (Normal Category Aircraft)
14 CFR Part 25.853	Compartment Interiors (Transport Category Aircraft)
14 CFR Part 25.855	Cargo or Baggage Compartments (Transport Category Aircraft)
14 CFR Part 27.853	Compartment Interiors (Normal Category Rotorcraft)
14 CFR Part 27.855	Cargo and Baggage Compartments (Normal Category Rotorcraft)
14 CFR Part 29.853	Compartment Interiors (Transport Category Rotorcraft)
14 CFR Part 29.855	Cargo and Baggage Compartments (Transport Category Rotorcraft) Appendix
14 CFR Appendix F, Part 2	Cargo and Baggage Compartments Not Occupied by Crew or Passengers
MIL-L-6503	Lighting Equipment, Aircraft, General Specification for Installation of

2.1.3 European Aviation Regulations Publications

Available from European Aviation Safety Agency, Postfach 10 12 53, D-50452 Cologne, Germany, Tel: +49-221-8999-000, www.easa.eu.int.

CS-23.855	Cargo or Baggage Compartment Fire Protection
CS-25.855	Cargo or Baggage Compartments

2.1.4 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 Equipment
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2.2 Related Publications

The following publications are provided for information purposes only and are not a required part of this SAE Technical Report.

2.2.1 CIE Publications

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

CIE 13.3-1995	Method of Measuring and Specifying Colour Rendering Properties of Light Sources
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2.3 Definitions

EOL: End of Life. End of life occurs in different ways depending on the light source technology. For incandescent bulbs, EOL occurs when the filament breaks. For HID bulbs, it typically occurs when the electrodes have eroded to the extent that the ballast is unable to strike an arc. For LED based lights, EOL is typically defined to be the time at which the light no longer meets photometric requirements, or at a specific percentage of initial light output.

LUMEN MAINTENANCE: This term is typically only used with LED based lights. The luminous intensity of an LED is inversely related to operational usage time and thermal exposure. Lumen maintenance is defined as the operating time (in hours) in the anticipated environment and installation conditions that results in a specified percentage of the initial luminous flux. A typical requirement might be written as follows: L70% = XXX hours. Other percentages, such as L80% or L50%, are possible.

LUMINAIRE: A light-producing assembly which is made up of a mechanical housing, light source(s), optical components, and electrical/electronic components. The ballast or power supply may or may not be integrated with the light assembly depending on the design approach and requirements for HID, halogen, and incandescent technologies. For solid state lights such as LEDs, the driver or power supply may or may not be integrated with the light assembly. There may be a single LED source or multiple LEDs arranged in an array. Optical elements such as reflectors and/or lenses may also be integrated into a sub-assembly. Heat sinks are usually included in LED luminaires for thermal management.

SUBDECK: An additional deck area for cargo stowage. It is usually located adjacent to the main cargo area and might be above or below the main cargo deck.

3. GENERAL CONSIDERATIONS

A general white light illuminance of 86 lx (8 foot-candle) is adequate for inspection of tie down nets, bulk carrier latches, etc., when the loading personnel are sufficiently adapted to low levels of ambient illumination. A sufficient number of lamps and fixtures should be used to reduce light blockage to a minimum and enable handling personnel in any of the various cargo loading possibilities to see each tie down and latch mechanism. Lamp technologies requiring a ballast or other type of switching power supply might create Electromagnetic Interference - EMI. For designs using incandescent lamps, it is recommended that the incandescent lamps be of the long life type, preferably selected from ARP881. Fluorescent, High Intensity Discharge, and LED systems are inherently more efficient and offer greater useful life than incandescent lights. Realizing the benefits requires diligence in the design approach and implementation as well as an awareness of the limitations of the alternative technologies. For example, long tubular fluorescent lamps are particularly vulnerable to breakage resulting in loss of light, broken glass and potential mercury contamination. The fixture design must consider impact protection from cargo handling.

3.1 Warm Up and Stabilization

For purposes of demonstrating compliance with this specification, all photometric and color measurements shall be made after a minimum warm up period (30 minutes for LED sources, 90 seconds for incandescent/tungsten halogen light sources), or after the light has reached thermal stabilization, whichever is longer. Stabilization shall be defined as the point at which light output does not change by more than 3% over a 15-minute period. Refer to ARP6253 for additional guidance in developing LED based systems.

3.2 End of Life Considerations

All luminaires will degrade in performance over time and under typical operating conditions. Each luminaire should have sufficient design considerations to ensure it will perform adequately even when such expected degradation is accounted for. For example, fixtures with incandescent bulbs should be designed so that the bulbs are easily replaceable. LED based luminaires shall be designed to meet their illuminance requirements at EOL as specified by the purchasing authority. Typical lumen maintenance requirements are for 70% of the initial luminous flux at EOL. Other requirements are possible depending on the purchasing authority.

3.3 Environmental Requirements

The cargo lights shall meet the environmental requirements of Table 1.