



AEROSPACE INFORMATION REPORT

AIR512™

REV. G

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Superseding AIR512F

Aircraft Cabin Illumination

RATIONALE

This document is being revised to add crew rest area illumination guidance and other format updates.

1. SCOPE

This document covers the general recommendations for cabin lighting in order to provide satisfactory illumination for, but not limited to, commercial transport aircraft:

- a. Boarding and deplaning
- b. Movement about the cabin
- c. Reading
- d. Use of lavatories
- e. Use of work areas
- f. Using stowage compartments, coat rooms, and closets
- g. Using interior stairways and elevators (lifts)
- h. Use of crew rest areas

1.1 Design Goals - Visual

The designer should strive to provide a comfortable visual environment by proper consideration of:

- a. Quantity of light: The amount of illumination required at each area or location to perform the pertinent visual task.
- b. Quality of lighting: The brightness distribution, including contrasts in the field of view. This includes the surrounding area, such as seat backs, carpeting, bulkheads, overhead, etc., as well as brightness of light sources and fixtures. The values will be influenced by the color, texture, and finish of the materials. Visual comfort is very much dependent upon the quality of the lighting.

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1. Brightness distribution is affected by glare (excessive brightness in the field of view), both direct and reflected, the source of which can be the light sources in the cabin, or light sources exterior to the cabin, such as the sun. The reflected glare may come from shiny, specular surfaces inside the cabin, or airplane parts, such as the wing on the exterior.
2. By choice of colors and brightness, claustrophobic effects may be reduced.

1.2 Design Goals - Electrical and Mechanical

The designer should strive to accomplish the above with:

a. Adequate hardware design with consideration given to:

1. Minimal weight
2. Reliability of equipment and lamps
3. Ease of maintenance

b. Safety

1. Electrical
2. Thermal
3. Moisture proof, as required

1.2.1 Illumination Design Errors

a. Improper quantity of light - too much as well as too little

b. Inadequate quality of lighting

1. Improper distribution
2. Exposed light sources - direct glare
3. Improper consideration of secondary surfaces that absorb or reflect light - brightness distribution, colors, reflected glare, etc.

c. Difficulty of maintaining lighting systems

1.2.2 Ingredients for Good Lighting

a. Sufficient illumination for task

b. Adequate quality

1. Adequate brightness control with respect to:
 - (a) Direct glare
 - (b) Reflected glare
 - (c) Contrast between task and surround
 - (d) Color of furnishings and light

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 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.

ARP378	Passenger Reading Lights
ARP503	Emergency Evacuation Illumination
ARP711	Illuminated Signs
ARP712	Galley Lighting
ARP5873	LED Passenger Reading Light Assembly
ARP6253	LEDs and Aircraft Applications
AS4914	Aircraft Fluorescent Lighting Ballast/Fixture Safety Standard

2.2 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
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2.3 Other Publications

Carson, D.H., Archea, J.C., Carson, F., Margulis, S.T., and Carson, F.E. (1978). Safety on Stairs. NBS Building Science Series 108. Washington, DC: National Bureau of Standards.

Templar, J (1995) The Staircase: Studies of Hazards, Falls and Safer Design. MA: The MIT Press.

3. SPECIFIC RECOMMENDATIONS

3.1 Cabin Lighting

3.1.1 Cabin Lights

Cabin lights should be provided in the passenger compartments by an indirect, direct, or combination lighting system to provide sufficient illumination of adequate intensity and distribution. Lighting tones or color throughout the passenger areas should be selected for comfort and aesthetic quality. Walls, window frames, and overhead surfaces of the passenger cabin should have a light-diffusing finish to minimize glare which might be annoying to adjacent passengers.

3.1.2 Cabin Lighting Control

Cabin illumination should be controllable at the attendant's panel for suitable lighting levels.