



AEROSPACE RECOMMENDED PRACTICE

ARP712™**REV. C**

Issued 1965-05
Revised 2017-09
Reaffirmed 2024-05

Superseding ARP712B

(R) Galley Lighting

RATIONALE

This revision adds references to the reference section, addresses LED and Fluorescent sources and expands on electrical power quality, EMI and environmental conditions.

ARP712C has been reaffirmed to comply with the SAE Five-Year Review policy.

1. SCOPE

This SAE Aerospace Recommended Practice (ARP) provides minimum standards and environmental design requirement recommendations for lighting and control in galley areas. It also addresses electrical shock hazard in galley areas. The use of "shall" in this document expresses provisions that are binding. Non-mandatory provisions use the term "should."

1.1 Purpose

The purpose of this recommended practice is to provide minimum standards for the illumination of galleys (buffets) and for the location of lighting controls within the galley area of passenger transport 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

AS4914 Aircraft Fluorescent Lighting Ballast/Fixture Safety Standard

ARP5873 LED Passenger Reading Light Assembly

ARP6253 LEDs and Aircraft Applications

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For more information on this standard, visit
<https://www.sae.org/standards/content/ARP712C/>

2.1.2 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 Equipment

2.1.3 U. S. Government Publications

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

MIL-STD-1472 Human Engineering

2.2 Definition

Galley lighting is the lighting that is provided within the galley area. Galley lighting should provide sufficient illumination for the preparation and serving of food, the reading of instruction manuals, and the identification and operation of the various controls and equipment located in the galley.

3. RECOMMENDATIONS

3.1 Lighting Levels

3.1.1 Average of 5.0 ft-c (53.8 lx) of illuminance should be provided on the floor of the galley area.

3.1.2 Average of 15.0 to 20.0 ft-c (161.4 to 215.2 lx) of illuminance should be provided on working surfaces such as counter tops.

3.1.3 Average of 1.0 ft-c (10.76 lx) of illuminance should be provided on the floor of deep compartments, such as ovens, and storage bins, which must be inspected.

3.1.4 Average of 5.0 ft-c (53.8 lx) of illuminance should be provided on all controls, operating instructions, and placards.

3.1.5 The galley area lighting should be provided with dimming controls, either continuous or stepped dimming, to reduce the illumination while operating under dark conditions.

3.1.6 The color of the galley light sources should be white.

3.2 General

3.2.1 Lighting Location

Light sources should be carefully located to minimize the casting of shadows on work areas by personnel occupying normal work positions. Light from the galley area should be confined to that area by directional light sources or by curtains around the galley area. Light sources should be located and trim materials selected to minimize glare in the eyes of an attendant working in the galley. To prevent glare, light sources should be located so the observer does not view the luminaire emitting surface directly.

3.2.2 Controls

All controls within the galley area should be so located or protected as to prevent injury to an attendant in the event of a violent airplane movement.

3.2.2.1 All lighting controls within the galley area should be placed on a single control panel and located within convenient reach of the attendant. Individual controls shall be arranged to conform generally to the physical location of the light sources. Light controls for continuous dimming shall rotate clockwise to increase intensity and shall provide an "off" position at the extreme of counter-clockwise rotation. For step dimming or on/off control, the toggle controls shall be full bright/on in the up position.

3.2.2.2 Ballast and transformers should contain replaceable fuses or other circuit protectors to prevent overheating and smoke. If fuses are used, replacement fuses should be available. AS4914 provides comprehensive guidance on ballast protection.

3.2.2.3 LED Lighting systems shall be designed such that no electrical component failures can result in an unsafe condition (e.g., smoke, excessive heat, arcing, excessive light energy levels, etc.). Safety devices such as fuses or circuit breakers should be used. Some factors to consider on fuse selection with LED light assemblies:

- LED Drive Circuit design: The LED drive circuit design can impact the expected useful life of the fuse. For instance, when using a constant power design, if the input voltage is reduced the current increases. This causes higher stress on the fuse reducing its life.
- Derating: Typical fuse nominal rating is at 25 °C. When operating at higher than nominal ratings the fuse needs to be derated.
- Fuse type: The type of fuse selected, fast acting vs slow blow, should be chosen based on the application.

3.2.3 Fixture Temperature

While installed, lighting fixture surfaces exposed to personnel should follow the touch temperature guidelines of MIL-STD-1472, Section 5.7.6.9 Thermal contact hazards.

3.2.4 Fixture Bonding

All exposed metal surfaces should be electrically bonded to airframe structure to prevent electrical shock hazard to personnel.

3.2.4.1 If input voltage to the fixture exceeds 30 V, an electrical ground should be provided.

3.2.5 Maintenance

Consistent with general galley design, lighting fixtures should be designed and fabricated to provide smooth, easily cleanable surfaces with a minimum of cracks and crevices.

3.2.6 Material and Workmanship

All galley lighting fixtures and equipment should be designed and qualified for reliable operation, under the applicable aircraft environment, throughout the life of the aircraft. Materials and workmanship should be consistent with the best manufacturing practice for aircraft equipment and accessories. Design should be such that noise from vibrating parts is minimized.

3.2.7 Lamp Replacement – Incandescent and Fluorescent Lamps Only

All lamps should be readily replaceable without the use of special tools.

When opened for re-lamping, the replacement lamp part number should be clearly visible in all lighting fixtures.

The manufacturer's name and part number shall be clearly visible to maintenance personnel, on all lighting fixtures.

The type of lamps used in the galley should be consistent with the type of lamps used throughout the airplane.

3.2.8 EMI

All lighting fixtures should meet the applicable electromagnetic interference requirements of RTCA DO-160 (see Table 1).

3.2.9 Environmental Conditions

Galley Lighting performance should be determined and testing accomplished in accordance with applicable environmental conditions of RTCA DO-160 (see Table 1).

3.2.10 Electrical Conditions

Galley Lighting performance should be determined and testing accomplished in accordance with applicable electrical conditions of RTCA DO-160 (see Table 1).

Table 1 - RTCA DO-160 Environmental requirements

Requirement	*Test Level
Temperature and Altitude	Category A1
Temperature Variation	Category C
Humidity	Category A
Operational Shocks and Crash Safety	Category A
Vibration	Category S or S2 test curves B or B2
Waterproofness	Category W. Use 5% NaCl in water sample for this test.
Power Input	Category B (for 28 VDC applications) Category A(CF) (for VAC applications; single phase). Category A(WF) (for 115 VAC variable frequency, single phase), For voltages other than 115 VAC, the tests shall scale the RTCA 115 VAC voltage requirements by the same proportion as the nominal operating voltage to 115 VAC (for example, 28 VAC would scale the RTCA requirements for maximum voltages, voltage surges, etc., by a factor of 28/115).
Voltage Spike	Category A
Audio Frequency Conducted - Power Inputs	Category B (for 28 VDC applications) Category R(NF) (for 28 VAC applications. Test shall scale the 115 VAC to 28 VAC or use a 115 VAC to 28 VAC transformer).
Induced Signal Susceptibility	Category B
Radio Frequency Susceptibility (Radiated & Conducted)	Category S
Emission of Radio Frequency Energy	Category B
Electrostatic Discharge	Category A

*Note: The categories and paragraphs noted in this table were specified from RTCA DO-160.

3.2.11 Electric Shock Hazard

To reduce the possibility of electric shock to crew and maintenance personnel, lighting equipment, which has exposed electrically conductive (metal) surfaces, should have the following:

- All electric circuits isolated from the case.
- All electrical terminations covered to prevent inadvertent shorting or personnel contact.
- All metal components electrically connected to a bonding stud so that chassis to (earth) ground may be accomplished with a separate wire.

4. OTHER CONSIDERATIONS

The lighting should comply with the design goals and other considerations as recommended in AIR512.

Fluorescent lamps should be considered to interface with electronic ballasts as identified in 3.2.2.

LED light sources should be considered as the optimal alternative. ARP6253 and ARP5873 provide recommendations with the design and instation of LED light assemblies.

The LED light assembly should be capable of providing the required cabin light illuminance over its useful life as specified by the purchasing authority. Lumen Maintenance and useful lifetime should be time until the LED light assembly is no longer capable of meeting the requirements of this specification.