



AEROSPACE STANDARD	AS8037™	REV. D
	Issued	1986-01
	Revised	2022-02
Superseding AS8037C		
Minimum Performance Standard for Aircraft Position Lights		

RATIONALE

This document establishes minimum performance levels for aircraft position lights including chromaticity, and light intensity in support of TSO and system certification. Information contained herein has been expanded from AS8037C in the areas of minimum criteria for showing compliance, continued airworthiness, glare, and specific criteria related to the use of LED technology. Sections related to chromaticity have been merged and simplified. Additional details have been provided on how to show compliance to regulatory requirements as well as practical applications and the rationale behind the regulations. Qualification categories have also been updated.

1. SCOPE

This SAE Aerospace Standard (AS) establishes minimum performance standards for new equipment position lights.

This SAE Aerospace Standard (AS) defines minimum and maximum light intensity in terms of candelas in vertical and horizontal directions about the longitudinal, vertical, and lateral axes of the aircraft. It also defines color tolerances in terms of limiting chromaticities for the light emitted from the position lights. It is not intended that this standard require the use of any particular light source such as quartz-halogen, incandescent, or any other specific design of lamp.

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.

AIR1106	Some Factors Affecting Visibility of Aircraft Navigation and Anticollision Lights
AIR5689	Light Transmitting Glass Covers for Exterior Aircraft Lighting
ARP991	Position and Anticollision Lights - Fixed-Wing Aircraft
ARP5029	Measurement Procedures for Short Pulse Width Strobe Anticollision Lights

SAE Executive Standards Committee Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be revised, reaffirmed, stabilized, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2022 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SAE.

TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
<http://www.sae.org>

SAE WEB ADDRESS:

Full document details: SAE AS8037D

For more information on this standard, visit
<https://www.sae.org/standards/content/AS8037D/>

Documents

Document Sharing Hub

ARP5414	Aircraft Lightning Zoning
ARP5637	Design and Maintenance Considerations for Aircraft Exterior Lighting Plastic Lenses
ARP6161	Flight Compartment Glare
ARP6253	LEDs and Aircraft Applications
AS25050	Colors, Aeronautical Lights and Lighting Equipment, General Requirements for
SAE J1330	Photometry Laboratory Accuracy Guidelines

2.2 RTCA Publications

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

DO-160	Radio Technical Commission for Aeronautics (RTCA), Environmental Conditions and Test Procedures for Airborne Equipment
--------	--

2.3 U.S. Government Publications

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

MIL-DTL-7989C	Covers, Light-Transmitting, for Aeronautical Lights, General Specification for
---------------	--

2.4 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.

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

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

§23-.2530	External and Cockpit Lighting
§25, 27, 29-.1385	Position Light System Installation
§25, 27, 29-.1387	Position Light System Dihedral Angles
§25, 27, 29-.1389	Position Light Distribution and Intensities
§25, 27, 29-.1391	Minimum Intensities in the Horizontal Plane of Forward and Rear Position Lights
§25, 27, 29-.1393	Minimum Intensities in Any Vertical Plane of Forward and Rear Position Lights
§25, 27, 29-.1395	Maximum Intensities in Overlapping Beams of Forward and Rear Position Lights
§25, 27, 29-.1397	Color Specifications

2.5 FAA Publications

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

NOTE: EASA CS paragraph numbers match the FAA at the time of this publication.

AC 20-30 Advisory Circular, Aircraft Position Light and Anticollision Light Installations

AC 20-74 Aircraft Position and Anticollision Light Measurements

TSO-C30 Aircraft Position Lights

2.6 ASTM International Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM F3234/F3234M-17 Standard Specification for Exterior Lighting in Small Aircraft

2.7 EUROCAE Publications

Available from EUROCAE Secretariat, 9-23 Rue Paul Lafargue, 93200 Saint-Denis, France, Tel: +33 1 40 92 79 30, <https://www.eurocae.net/>.

ED-14 Environmental Conditions And Test Procedures For Airborne Equipment

3. GENERAL STANDARDS

3.1 Dihedral Angle Coverage, Forward Position Lights, Types I and II, and Rear Position Lights, Type III

When mounted on the aircraft in accordance with manufacturer's instructions, the forward and rear lights shall show unbroken light within the dihedral angles specified in Table 1 and defined in 3.1.1. Forward position lights must consist of a red and a green light spaced laterally as far apart as practicable. The rear position light(s) must be a white light mounted as far aft as practicable on the tail or on each wing tip. Example system installations include but are not limited to those shown in Figure 1. Position lights are intended to be viewed from a distance and appear as point sources in order to make the individual colors identifiable from one another such that an observer can identify the aircraft's direction of flight.

Table 1 - Dihedral angle coverage

Position Light Type	Dihedral Angle
Type I (forward, red)	L (left)
Type II (forward, green)	R (right)
Type III (rear, white)	A (aft)

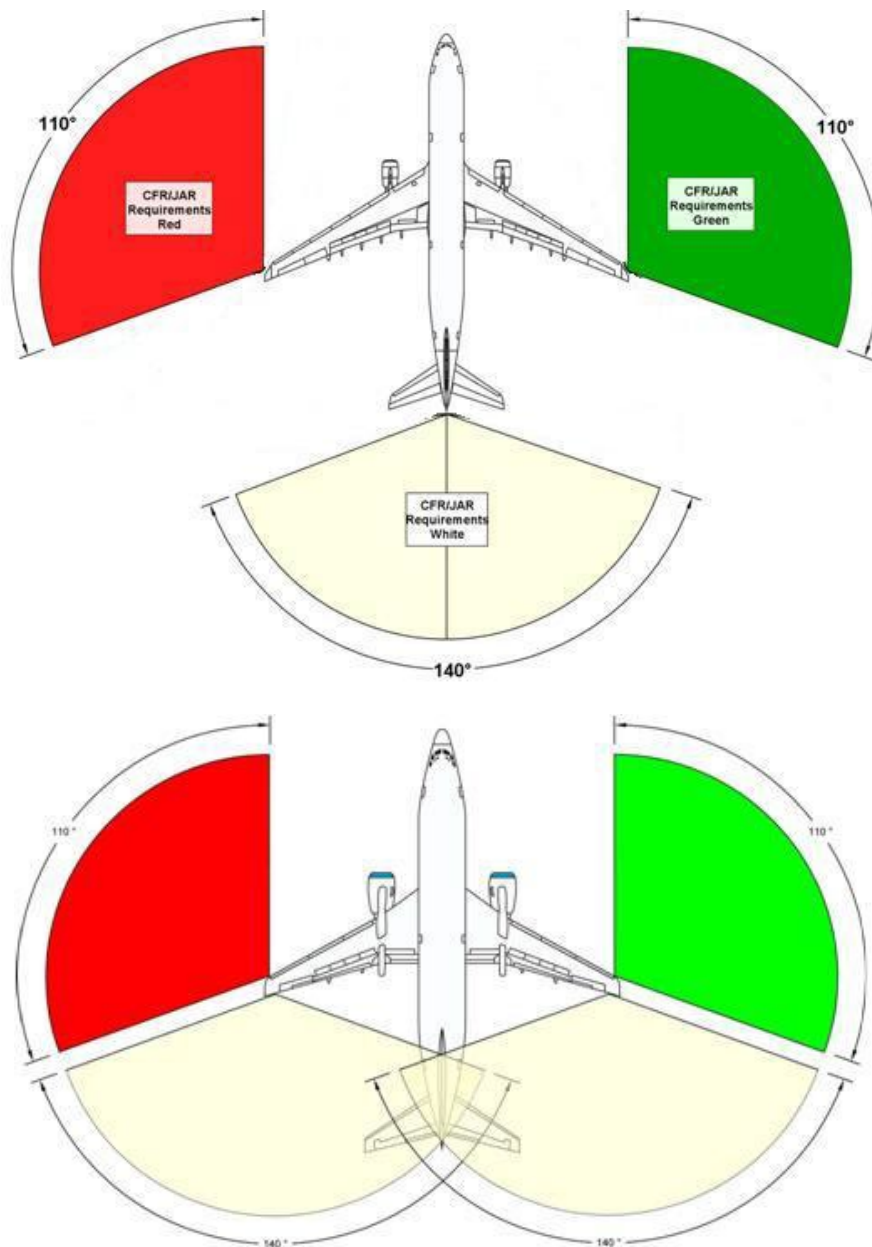


Figure 1 - Dihedral angle coverage, forward and rear position lights, showing both single and dual aft installations

3.1.1 Definitions of Dihedral Angles

- Dihedral Angle L (Left): The dihedral angle formed by two intersecting vertical planes, one parallel to the longitudinal axis of the airplane, and the other at 110 degrees to the left of the first when looking forward along the longitudinal axis (Figure 2).
- Dihedral Angle R (Right): The dihedral angle formed by two intersecting vertical planes, one parallel to the longitudinal axis of the airplane, and the other at 110 degrees to the right of the first when looking forward along the longitudinal axis (Figure 2).
- Dihedral Angle A (Aft): The dihedral angle formed by two intersecting vertical planes making angles of 70 degrees to the right and 70 degrees to the left, respectively, looking aft along the longitudinal axis, to a vertical plane passing through the longitudinal axis (Figure 3).

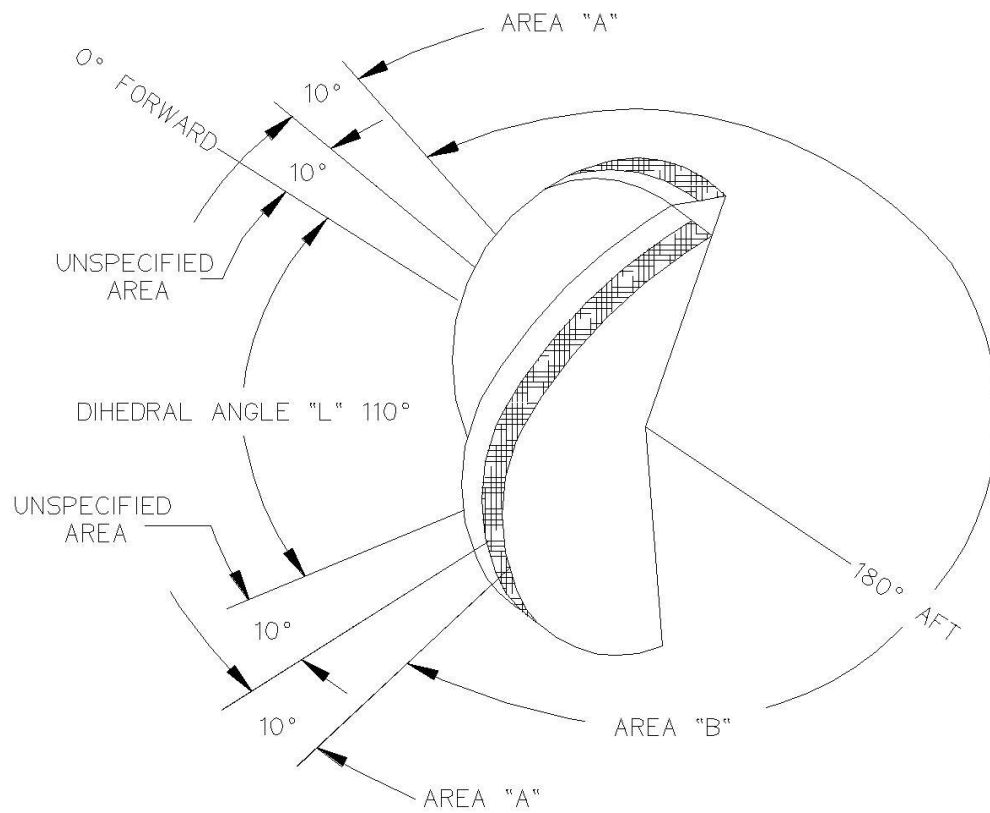


Figure 2 - Representation of angles for left forward position light

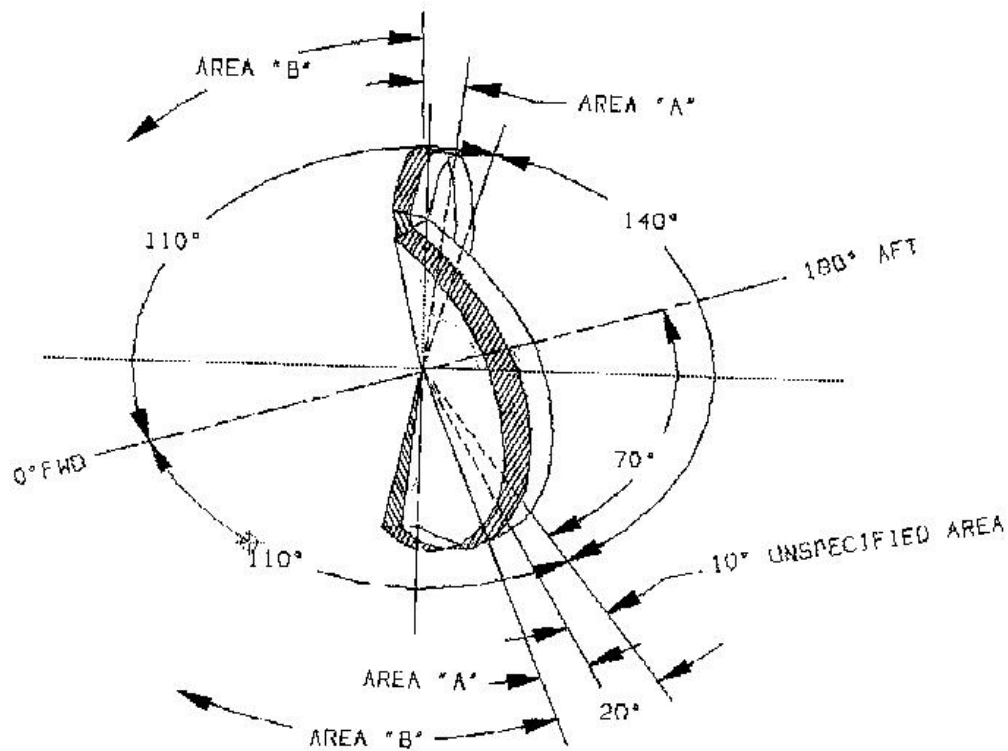


Figure 3 - Representation of angles for aft position light

3.2 Position Light Intensity Distribution

3.2.1 General

The intensities specified in this section shall be provided with all light covers and color filters in place, when mounted on aircraft in accordance with the manufacturer's instructions. Luminous intensity can be measured at nominal input voltage. If the luminous intensity varies with the input voltage, it should be shown that the light assembly meets the minimum and maximum intensity requirements throughout the rated (assembly) input voltage range.

3.2.2 Minimum Intensities in the Horizontal Plane

The intensities in the horizontal plane shall not be less than the values given in Table 2. The horizontal plane is defined as the plane containing the longitudinal axis of the airplane in the normal flying position and is perpendicular to the plane of symmetry of the aircraft.

Table 2 - Minimum intensities in the horizontal plane, forward and rear position lights

Position Light Considered	Angle (x) from Right or Left of Longitudinal Axis Measured from Dead Ahead (0 degrees)	Minimum Intensity (candelas)
Type I (forward, red) Type II (forward, green)	$0 \text{ degrees} \leq x \leq 10 \text{ degrees}$	40
	$10 \text{ degrees} \leq x \leq 20 \text{ degrees}$	30
	$20 \text{ degrees} \leq x \leq 110 \text{ degrees}$	5
Type III (rear, white)	$110 \text{ degrees} \leq x \leq 180 \text{ degrees}$	20

3.2.2.1 Minimum Intensities Above and Below the Horizontal Plane

The intensities in any vertical plane shall not be less than the appropriate value given in Table 3, where I is the minimum intensity specified in Table 2 for the corresponding angles in the horizontal plane. Vertical planes are defined as planes perpendicular to the horizontal plane.

Table 3- Minimum intensities in any vertical plane, forward and rear position lights

Angle (y) Above or Below Horizontal, in Any Vertical Plane	Minimum Intensity (I)
0 degrees	$1.00 \times I$
$0 \text{ degrees} \leq y \leq 5 \text{ degrees}$	$0.90 \times I$
$5 \text{ degrees} \leq y \leq 10 \text{ degrees}$	$0.80 \times I$
$10 \text{ degrees} \leq y \leq 15 \text{ degrees}$	$0.70 \times I$
$15 \text{ degrees} \leq y \leq 20 \text{ degrees}$	$0.50 \times I$
$20 \text{ degrees} \leq y \leq 30 \text{ degrees}$	$0.30 \times I$
$30 \text{ degrees} \leq y \leq 40 \text{ degrees}$	$0.10 \times I$
$40 \text{ degrees} \leq y \leq 90 \text{ degrees}$	$0.05 \times I$

3.2.3 Maximum Intensities in Overlap Regions, Forward Position Lights, Types I and II, and Rear Position Lights, Type III

The intensities in the overlap regions between any forward or rear position lights shall not exceed the values given in Figure 4 and Table 4, except as noted in 3.2.3.1. Area A includes all directions in the adjacent dihedral angle which pass through the light source and which intercept the common boundary plane at more than 10 degrees but less than 20 degrees. Area B includes all directions in the adjacent dihedral angle which pass through the light source and which intercept the common boundary plane at more than 20 degrees (Figures 2 and 3).