SAE Aerospace
An SAE International Group

AEROSPACE RECOMMENDED PRACTICE

ARP4087 REV. B

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Superseding ARP4087A

Wing Inspection Lights - Design Criteria

RATIONALE

This document complements current FAA regulations on wing icing detection lights by specifying light level and area to illuminate.

1. SCOPE

This SAE Aerospace Recommend Practice (ARP) is intended to cover the external lights on fixed wing aircraft for illuminating the wing leading edge and nacelles and the upper surfaces of the wing. The addition of ice detection system should be implemented when the areas to inspect are not visible from the aircraft cockpit.

1.1 Purpose

The purpose of this document is to set forth basic considerations and criteria which should be observed when designing wing inspection lights for all aircraft.

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 FAR Publications

Available electronically from the Federal Register at http://www.gpoaccess.gov/fr/advanced.html and by paper from the Government Printing Office at http://bookstore.gpo.gov.

FAR PART 121.629 Operation in icing conditions

FAR PART 25.1403 Wing icing detection lights

FAR PART 25.1397 Color specifications

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
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3. GENERAL PROVISIONS

3.1 Wing inspection lights are used to illuminate the wing leading edges, nacelles, upper wing surfaces, and any other external surfaces so that they may be visually inspected for ice accumulation or any other critical conditions at night. Inspection may be performed when the aircraft is on the ground, or in-flight, with and without fuel. Therefore, the wing deflection range needs to be considered for the lamp design.

3.2 When aircraft geometry permits, over wing inspection lights are recommended to illuminate the upper wing surfaces so that they may be visually inspected for snow/ice accumulation primarily during ground inspection.

3.3 On military aircraft the wing inspection lights may be used to provide visual reference for the boom operator in aerial refueling. In this case, it may be desirable to increase the illuminated areas on the inboard upper surface of the wings.

3.4 The lights shall be designed to provide proper illumination for the crew members, but care shall be taken in the design and installation location so that they will not cause objectionable glare or halation that might handicap crew members in the performance of their duties as required in FAR 121.629.

3.5 Aircraft geometry shall dictate the size, number, and location of lights required to perform the intended function(s).

4. SPECIFIC DESIGN REQUIREMENTS

4.1 Lighting Coverage

4.1.1 The aircraft surfaces that require illumination vary among aircraft designs. The parameters are dictated by aircraft geometry, aircraft mission (commercial or military), and crew member visual accessibility.

4.1.1.1 Aircraft Geometry

For different aircraft configurations, the wing area coverage shall vary. Consideration shall be given to aircraft with supplementary wings, for example, canards, and the necessity for providing illumination on them.

4.1.1.2 Aircraft Mission

For aerial refueling, the wing inspection lights may provide significant additional reference information for the boom operator. In order to maximize this, additional factors shall be considered:

a. Shield light sources from the direct vision of the boom operator.

b. Provide continuous or stepped intensity control.

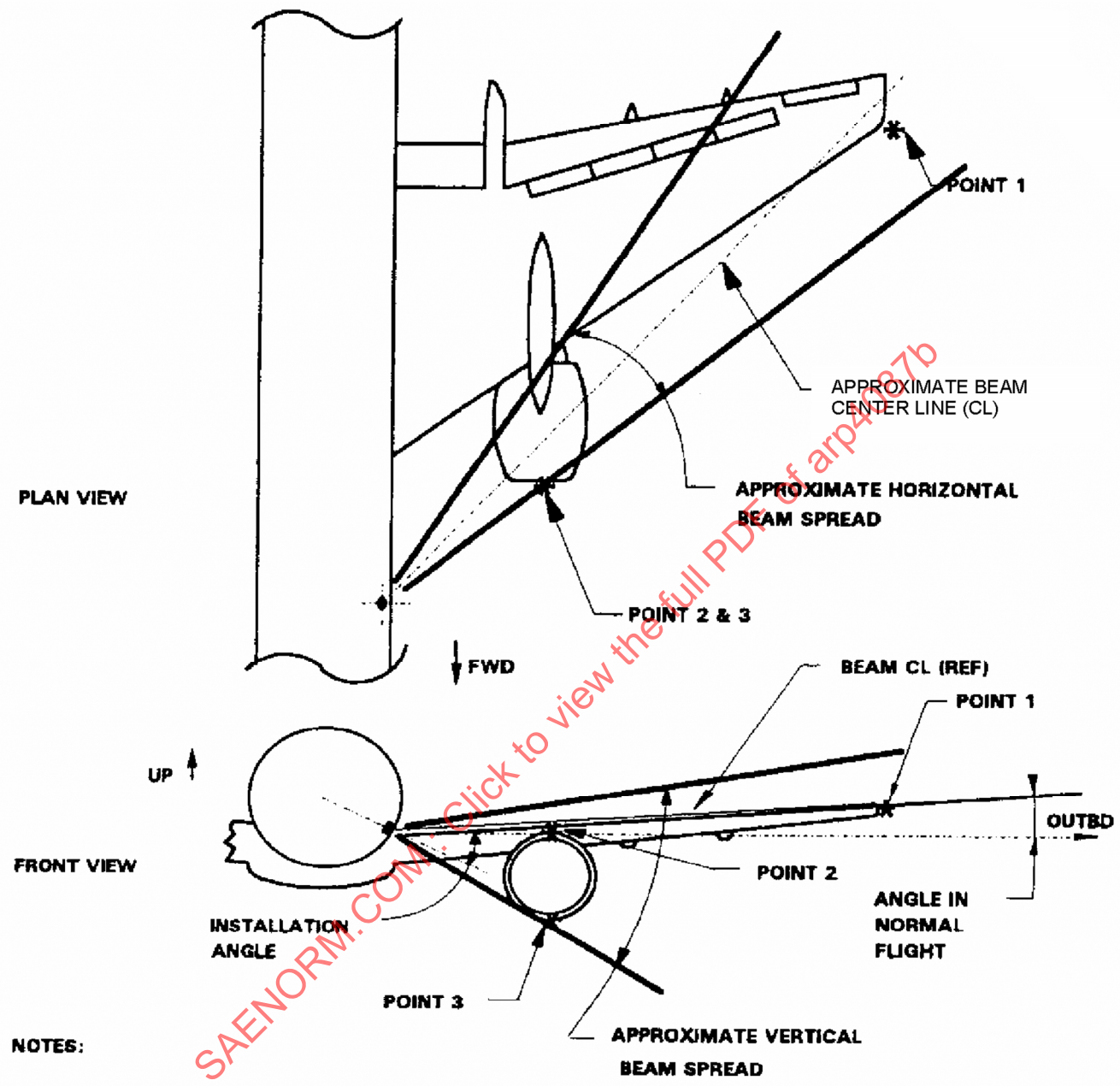
4.2 Illuminance

4.2.1 The recommended minimum illuminance for wing leading edge is 21.5 lux (2.0 ft-c) measured normal to the incident light. See Figure 1.

4.2.2 The recommended minimum illuminance for wing leading edge applies to all possible wing positions (in-flight or on the ground, loaded with fuel).

4.2.3 The recommended minimum illuminance for nacelles is 5.3 lux (0.5 ft-c) measured normal to the incident light. See Figure 1.

4.2.4 The recommended minimum illuminance for wing upper surface is 107.5 lux (10.0 ft-c) measured normal to the incident light. See Figure 2.

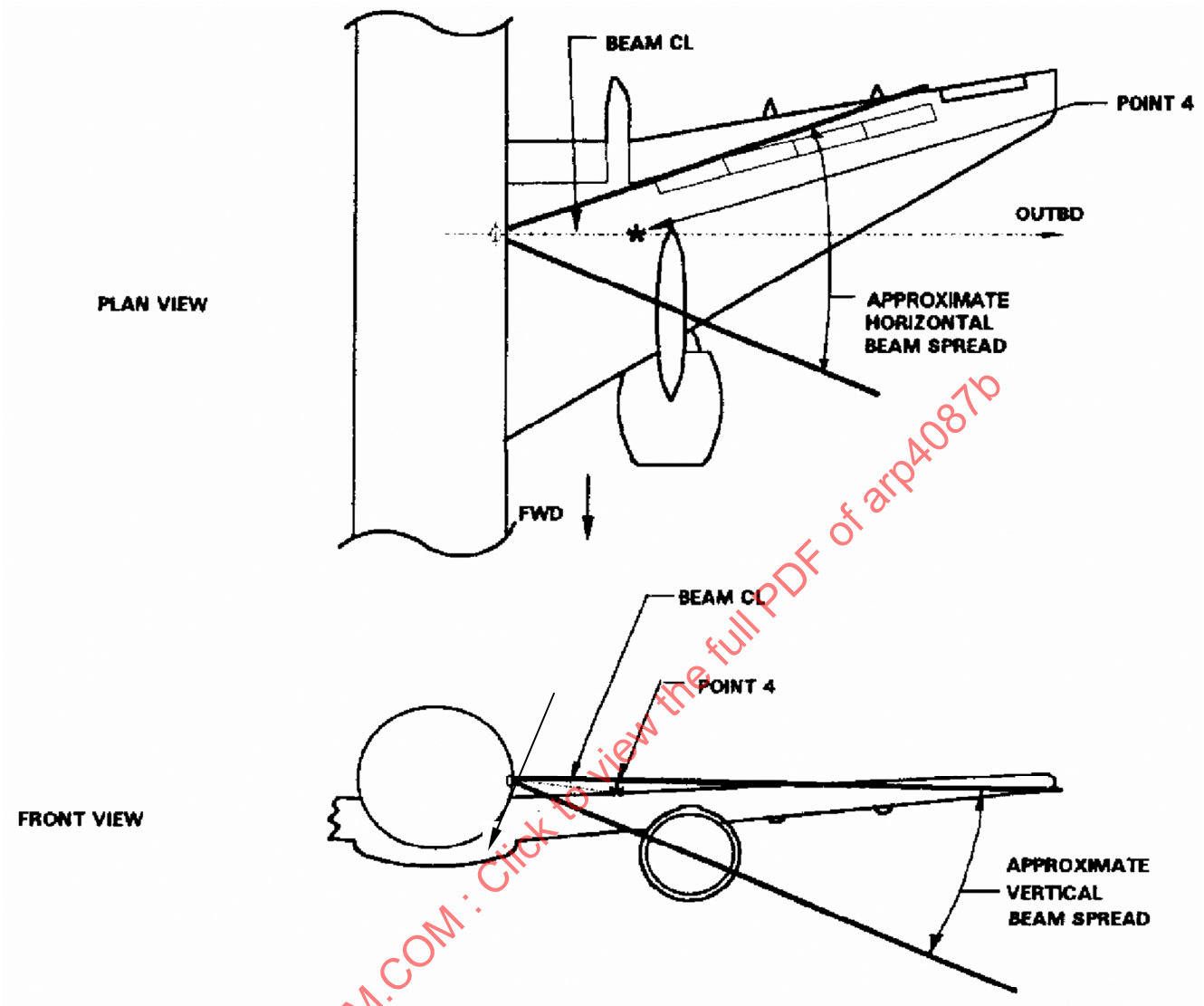


NOTES:

WITH FULL RATED VOLTAGE APPLIED TO THE LAMP ILLUMINANCE MEASURED NORMAL TO THE INCIDENT LIGHT SHALL BE AS FOLLOWS:

POINTS 1 = 21.5 LUX (2.0 FT-C) MINIMUM
POINTS 2 & 3 = 5.3 LUX (0.5 FT-C) MINIMUM

FIGURE 1 - WING ILLUMINATION PATTERN WING LEADING EDGE



NOTES:

WITH FULL RATED VOLTAGE APPLIED TO THE LAMP ILLUMINANCE MEASURED NORMAL TO THE INCIDENT LIGHT SHALL BE AS FOLLOWS:

POINT 4 = 107.5 LUX (10.0 FT-C) MINIMUM

FIGURE 2 - WING ILLUMINATION PATTERN WING UPPER SURFACE