SAE Aerospace
An SAE International Group

AEROSPACE RECOMMENDED PRACTICE

ARP378 REV. C

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Superseding ARP378B

Passenger Reading Lights

RATIONALE

This document has been revised to provide better guidance for the testing of passenger reading lights.

INTRODUCTION

The purpose of this SAE Aerospace Recommended Practice (ARP) is to recommend minimum design criteria which will lead to adequate performance standards for passenger reading lights in aircraft.

1. SCOPE

This document presents criteria for design and location of passenger reading lights in commercial aircraft.

2. APPLICABLE DOCUMENTS

The following publications form a part of this document to the extent specified herein. 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, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1 RTCA Publications

Available from Radio technical Commission for Aeronautics Inc., 1828 L Street, NW, Suite 805, Washington, DC 20036, Tel: 202-833-9339, www.rtca.org.

RTCA Document No. DO-160 Environmental Conditions and Test Procedures for Airborne Electronics/Electrical Equipment and Instruments", dated July 1984

3. DETAIL RECOMMENDATIONS

3.1 Performance

3.1.1 The reading light should provide a uniform circular or square pattern of illumination on a flat inclined reading surface located 203 mm (8 inches) above seat level. The center of the light pattern on the reading surface should be located on the fore and aft centerline of the seat and 533 mm (21 inches) from the base of the seat back (see Figure 1). The width of the light pattern should be 457 mm (18 inches). Within the light pattern, the minimum intensity should be 53.8 lux (5 ft-c), and the maximum intensity should be 592 lux (55 ft-c). All intensity measurements should be made with a cosine-corrected illumination meter that is parallel to a horizontal surface oriented normal to the reading light.

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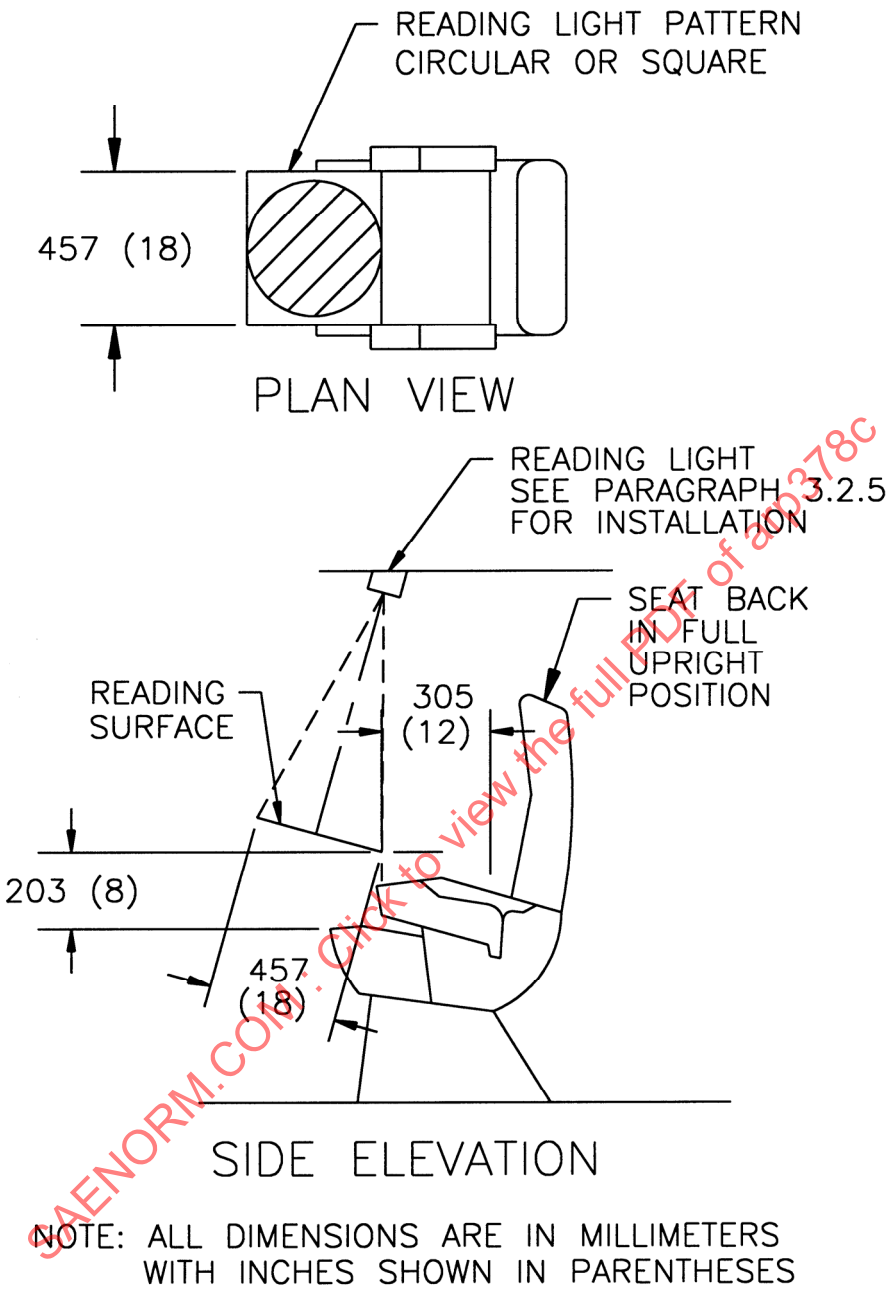

FIGURE 1 - RECOMMENDED READING LIGHT INSTALLATION

3.1.2 Recommended illumination levels and patterns are provided in Figure 2. An accurate rated lamp should be used for testing while operating the light at the design or system voltage which may be different from the rated lamp voltage. Accurate rated lamps are selected for their nominal filament position per specification and are calibrated to determine the voltage which produces the rated luminous flux (lumens or mean spherical candela (MSCd)).

3.1.3 The reading light should be designed in such a manner so that when the reading plane is oriented normal to the light source (see Figure 1) the intensity of the light falling outside the pattern, the peripheral area beginning at a distance of 76 mm (3.0 inches) and beyond the specified pattern, will not exceed 16.1 lux (1.5 ft-c).

3.1.4 Should the light be adjustable, adjustment should be restricted, so that no light in excess of 16.1 lux (1.5 ft-c) would fall on the armrests of the adjacent seats or on the back of the seat forward when that seat is fully inclined.

3.1.5 The reading light should be designed so that the light from the lamp will be projected to and confined within the specified limits of 3.1.1.

3.1.6 It is not considered necessary to provide light for reading when the seat is fully reclined.

3.2 Design and Installation

3.2.1 The light and installation should be such that lamps are easily replaceable in flight without the use of special tools and with a minimum disturbance to passengers.

3.2.2 To ensure uniform lighting and to enable rapid replacement of nonoperating lamps, the proper lamp numbers should be easily readable when the lamp is accessed for removal.

3.2.3 The light switch should be easily accessible. Legend, switch actuator shape, and switch location should be chosen to facilitate distinguishing the light switch from the attendant call switch and from light switches for adjacent seats. All switches should be flush or recessed.

3.2.4 The light and installation should be such that the temperature of exposed surfaces is not uncomfortable to the touch. Temperatures of exposed surfaces should not exceed 65.5 °C (150 °F) with an ambient temperature of 23.9 °C (75 °F). If surfaces are of a plastic material, slightly higher temperatures may be satisfactory. Downward heat radiation should be minimized. Heat rejection from the lamp should be controlled such that under continuous operation at maximum voltage and at 21 °C (70 °F) ambient temperature, components of the fixture will not be warped, discolored, or otherwise damaged, including solder and basing cement used in the lamp.

3.2.5 Reading lights should be designed and located to reduce glare to a minimum (see Figure 1).

It is recommended that the reading light be located no further forward than directly above the center of the passenger reading plane and preferably several inches aft of the centerline of the reading plane.

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.

3.2.6 The reading light should be designed to meet the recommended light patterns and illumination levels in the intended installation, as specified in Figure 2, even though the distance from the reading light to the reading surface throughout the passenger cabin may vary, i.e., a reading light designed for a short distance (36 inches) would not be recommended for an installation requiring a 72 inch distance.

3.2.7 Incandescent lamps should be operated at not more than 90% rated voltage to extend lamp life. Long life lamps (rated at 2000 hours average lab or more) should be operated at not more than 95% rated voltage.

3.2.8 Ballasts and transformers should contain replaceable fuses of other circuit protectors to prevent overheating and smoke.

3.2.9 If input voltage to the fixture exceeds 40 V, an electrical ground should be provided.

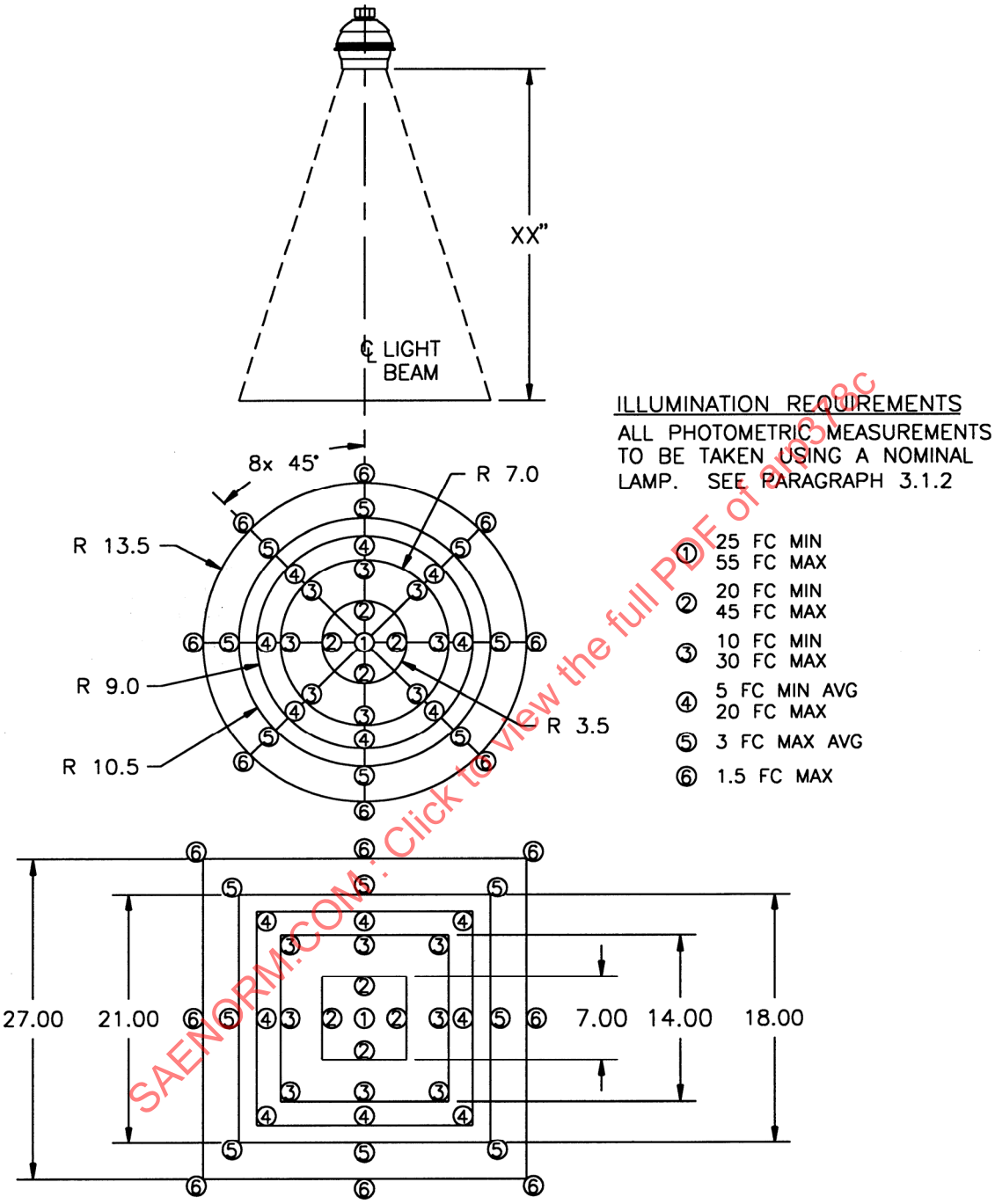

FIGURE 2 - RECOMMENDED ILLUMINATION LEVELS