UNITED STATES OF AMERICA
CIVIL AERONAUTICS BOARD
WASHINGTON, D. C.

Civil Air Regulations Amendment 3-1
Effective: April 1, 1957
Adopted: February 25, 1957

AIRPLANE AIRWORTHINESS: NORMAL, UTILITY, AND ACROBATIC CATEGORIES

POSITION AND ANTI-COLLISION LIGHT REQUIREMENTS

The currently effective provisions of Part 3 of the Civil Air Regulations prescribe certain installational requirements for an exterior lighting system consisting of three conventional position lights. Experience with the use of anti-collision lights on large airplanes has shown that a significant increase in the conspicuity of aircraft can be attained with such lights during night operations. Although such lights are not required on small airplanes by the currently effective provisions of the operating parts of the Civil Air Regulations, many owners and operators of such airplanes have elected to install anti-collision lights. In the approval of such installations, the Administrator had made applicable the requirements in § 4b.637 of Part 4b of the Civil Air Regulations in view of the fact that there were no specifications in this part.

Recent studies, with respect to the use of anti-collision lights on all types of aircraft, have indicated the need for broadening the specification in § 4b.637 to permit the use of newly developed lights. As a result of these studies, new specifications for anti-collision lights were developed and are being added to Part 3 by this amendment. These specifications are the same as those being incorporated by a concurrent amendment into Part 4b of the Civil Air Regulations. No differentiation is made between the standards in Part 3 and Part 4b in view of the Board's belief that equal conspicuity should be required for all future airplanes.

The continuing increase in air traffic density and the advent of airplanes capable of appreciably higher speeds than heretofore attained emphasize the need for increased conspicuity for newly designed small airplanes. Therefore, concurrently with this amendment, Part 43 of the Civil Air Regulations is being amended to require the use of anti-collision lights on all small airplanes for which application for type certification is made on or after the effective date of this amendment. Such lights will be required to comply with the anti-collision light specifications included in this amendment.

It is not anticipated that this amendment will affect the basis of approval used in the past by the Administrator with respect to the installation of anti-collision lights on small airplanes for which the application for type certification was made prior to the effective date of this amendment. Anti-collision lights which cannot comply with the aforementioned policy of the Administrator may be installed on such older airplanes on a voluntary basis if compliance can be shown with the new specifications in this amendment.

Another change being made by this amendment is the deletion of the specifications for the position light system flasher. This deletion is made in view of the belief that when position lights are used with anti-collision lights, steady lights provide important direction and attitude information whereas flashing lights contribute very little to increased conspicuity or to information on direction and attitude.

It is considered that these new requirements set forth necessary and sufficient conditions for anti-collision light systems to provide a reasonable level of safety. However, since these requirements entail more conditions than have been required in the past, experience with them on individual airplanes might indicate the need for future revisions, particularly with respect to light intensities and coverage. Further, as current research and development programs progress, the question of color of the light might need re-evaluation. The Board will consider any necessary changes as might be indicated by future developments.

Interested persons have been afforded an opportunity to participate in the making of this amendment (21 F.R. 3388), and due consideration has been given to all relevant matter presented.

In consideration of the foregoing, the Civil Aeronautics Board hereby amends Part 3 of the Civil Air Regulations (14 CFR Part 3, as amended) effective April 1, 1957.

1. By amending § 3.700 (a) to read as follows:

COMM-DC-29760

3.700 Position light system installation.

(a) General. The provisions of §§ 3.700 through 3.703 shall be applicable to the position light system as a whole. The position light system shall include the items specified in paragraphs (b) through (e) of this section.

2. By amending § 3.700 by deleting paragraph (e) and redesignating paragraph (f) as paragraph (e).

3. By adding a new heading and a new § 3.705 to read as follows:

ANTI-COLLISION LIGHT SYSTEM

3.705 Anti-collision light system. An airplane to be eligible for night operation shall have installed an anti-collision light system. Such system shall consist of one or more approved anti-collision lights so located that the emitted light will not be detrimental to the crew's vision and will not detract from the conspicuity of the position lights. The system shall comply with the provisions of paragraphs (a) through (d) of this section.

(a) Field of coverage. The system shall consist of such lights as will afford coverage of all vital areas around the airplane with due consideration to the physical configuration and the flight characteristics of the airplane. In any case, the field of coverage shall extend in all directions within 30° above and 30° below the horizontal plane of the airplane, except that a solid angle or angles of obstructed visibility totaling not more than .03 steradians shall be permissible within a solid angle equal to .15 steradians centered about the longitudinal axis in the rearward direction.

(b) Flashing characteristics. The arrangement of the system, i.e., number of light sources beam width, speed of rotation, etc., shall be such as to give an effective flash frequency of not less than 40 and not more than 100 cycles per minute. The effective flash frequency shall be the frequency at which the airplane's complete anti-collision light system is observed from a distance, and shall apply to all sectors of light including the overlaps which might exist when the system consists of more than one light source. In overlaps, flash frequencies higher than 100 cycles per minute shall be permissible, except that they shall not be higher than 180 cycles per minute.

(c) Color. The color of the anti-collision lights shall be aviation red in accordance with the specifications of § 3.703 (a).

(d) Light intensity. The minimum light intensities in all vertical planes, measured with the red filter and expressed in terms of "effective" intensities, shall be in accordance with Figure 3-18. The following relation shall be assumed:

$$I_e = \frac{\int_{t_1}^{t_2} I(t)\, dt}{0.2 + (t_2 - t_1)};$$

where:

I_e = effective intensity (candles);

$I(t)$ = instantaneous intensity as a function of time;

$t_2 - t_1$ = flash time interval (seconds).

NOTE: Normally, the maximum value of effective intensity is obtained when t_2 and t_1 are so chosen that the effective intensity is equal to the instantaneous intensity at t_2 and t_1.

Angle above or below horizontal plane	Effective intensity (candles)
0° to 5°	100
5° to 10°	60
10° to 20°	20
20° to 30°	10

Figure 3-18 - Minimum effective intensities for anti-collision lights

(Sec. 205 (a), 52 Stat. 984; 49 U.S.C. 425 (a). Interpret or apply secs. 601, 603, 52 Stat. 1007, 1009, as amended; 49 U.S.C. 551, 553).

By the Civil Aeronautics Board:

/s/ M. C. Mulligan

M. C. Mulligan
Secretary

(SEAL)

Part 3 last printed May 15, 1956.