



# Federal Aviation Administration

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## Memorandum

Date:

To: See Distribution

From: Manager, Small Airplane Directorate, Kimberly K. Smith, ACE-100

Prepared by: Leslie B. Taylor, ACE-111

Subject: PS-ACE100-2006-001; Proposed Policy Statement; 14 CFR, Part 23, §§ 23.1383 through 23.1395, and 23.1401, Installation of Non-Required Lights in Part 23 Aircraft and Airships

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### Summary

This policy memorandum clarifies Federal Aviation Administration (FAA) certification policy on 14 CFR, part 23. Neither Title 14 CFR, part 23 nor the Airship Design Criteria (ADC) have airworthiness standards for non-required lights. Applicants have requested certification of non-required recognition lights for part 23 airplanes. These applicants assert that taxi, landing and recognition lights have been approved without reference to their effect on the field of coverage for required position and anticollision lights. Applicants also assert that these lights have been approved without regard to their effect on required lights or the EMI issues they present for other installed equipment.

Other applicants have requested approval of non-required lights that are intended to illuminate parts of an aircraft (logo lights). Previously, these lights have also been approved without regard to their effect on required lights or the EMI issues they present for installed equipment.

Title 14 CFR, part 23, has one section, § 23.1383, for taxi and landing lights. Section 6.24 of the Airship Design Criteria contains requirements for landing lights. Taxi lights are designed for the taxi phase of flight; therefore, reducing the area covered by required position or anticollision lights in that phase is acceptable. Landing lights are designed for use in the approach and landing phases of flight; therefore, reducing the area covered by required position or anticollision lights in those phases is acceptable.

Part 23 does not require recognition lights which are brighter than position and anticollision lights. Issues of intensity, electromagnetic interference (EMI), and hazard analysis for these lights must be addressed. Recognition lights face forward. With two aircraft approaching each other on nearly nose-to-nose courses, the aircraft with recognition lights will be seen earlier than the aircraft with only the required lights. Recognition lights are acceptable if they supplement

but do not reduce the required field of coverage of position lights or anticollision lights, do not cause a hazard, and do not cause EMI.

Part 23 also has no requirements for lights used to illuminate parts of an aircraft (Logo Lights). They also have issues of intensity, EMI, and hazard analysis that must be addressed. If such non-required lights are installed, they must meet the same requirements as recognition lights regarding their effect on the required field of coverage of required lights, EMI concerns, and hazard analysis. If they are limited to use on the ground, then their effect on required lights is not an issue.

### **Applicability**

This policy statement clarifies 14 CFR, part 23, §§ 23.1383 through 23.1395, and § 23.1401 for installing required and non-required lights on part 23 aircraft. It applies to normal, utility, acrobatic, and commuter category airplanes. It also applies to non-rigid airships (ADC sections 6.24 through 6.30 and 6.32) certificated in the normal category (14 CFR, part 21, § 21.17(b)) with nine passenger seats or less.

### **References**

23.863	Flammable fluid fire protection
23.1301	Function and installation
23.1309	Equipment, systems, and installation
23.1383	Taxi and landing lights
23.1385	Position light system installation
23.1387	Position light system dihedral angles
23.1389	Position light distribution and intensities
23.1391	Minimum intensities in the horizontal plane of position lights
23.1393	Minimum intensities in any vertical plane of position lights
23.1395	Maximum intensities in overlapping beams of position lights
23.1397	Color specifications
23.1399	Riding light
23.1401	Anticollision light system
AC 20-30B	Aircraft Position Light and Anticollision Light Installations
AC 20-74	Aircraft Position and Anticollision Light Measurements

### **Policy**

The lights proposed for use as non-required recognition and logo lights are much brighter than the intensity requirements of position and anticollision lights. These lights have a potential to interfere with the field of coverage required for position and anticollision lights. Anticollision lights are installed to allow a pilot in an aircraft on an intersecting course to see the traffic. Position lights are red on the left side and green on the right side to allow a pilot in an aircraft on an intersecting course to determine the direction of flight of the traffic.

These lights may also cause electromagnetic interference with previously installed equipment. If the installation of non-required lights does not affect the field of coverage, the required intensities of the position and anticollision lights will not be reduced. Non-required lights should

not cause any dangerous glare visible to the pilots, not cause serious halation to the pilots, and not cause a fire hazard.

Title 14 CFR, part 23, has no rules for recognition or logo lights; it has one section, § 23.1383, for taxi and landing lights. Section 6.24 of the Airship Design Criteria contains requirements for landing lights. Taxi lights are designed for the taxi phase of flight; therefore, reducing the area covered by required position or anticollision lights is acceptable. Landing lights are designed for use in the approach and landing phases of flight; therefore, reducing the area covered by required position or anticollision lights is acceptable. Use of recognition lights as taxi or landing lights would require compliance with § 23.1383. Logo lights limited to use on the ground may be approved without regard to their effect on required position and anticollision lights.

## **HAZARD ANALYSIS**

The required position and anticollision lights are installed for use by pilots of other aircraft who need to be able to see and determine the flight path of an aircraft from the required lights. The § 23.1309 Hazard Analysis must consider the hazard of a pilot on an intersecting course who:

1. Does not see the traffic due to non-required lights, or
2. Cannot determine the flight path of traffic throughout the covered area, as required by §§ 23.1387 and 23.1401, for position and anticollision lights.

Any non-required light that is not limited to use on the ground or in the landing phase must:

1. Perform its intended function according to § 23.1301, and
2. Not present a hazard above “No Safety Effect” for a non-required light installation according to the requirements of § 23.1309; or
3. If the hazard of a non-required light installation is determined to be above “No Safety Effect,” the applicant must request an Equivalent Level of Safety (ELOS) to the field of coverage rules for position and anticollision lights.

## **ELECTROMAGNETIC INTERFERENCE**

EMI is a concern from two points:

1. Unshielded wiring from the installed lighting system wires to the non-required lights could act as an antenna and affect other installed equipment, and
2. The non-required lights can be a source of EMI.

Number 1 above is a concern for both Light Emitting Diode (LED) lights and High Intensity Discharge (HID) lights. Number 2 above is a concern for HID lights.

For a Supplemental Type Certificate (STC) for one model of aircraft, the applicant must verify that all installed equipment is unaffected by operation of the non-required lights. The concern for antenna EMI requires a ground test. The EMI of the lights may be verified by either a ground test or by environmental bench testing, under RTCA/DO-160E, Sections 15, Magnetic Effect, and 21, Emission of Radio Frequency Energy.

For an Approved Model List (AML) STC, environmental bench testing under RTCA/DO-160E, Sections 15 and 21, is required unless the applicant performs EMI ground testing on all aircraft listed on the AML. Also, an AML STC must include EMI shielding of the non-required wiring installation unless the applicant performs EMI ground testing on all aircraft listed on the AML.

## **FIELD OF COVERAGE**

Part 23 does not require recognition lights. They face forward and will be brighter than required lights in the forward direction. Therefore, when two aircraft are on nearly nose-to-nose courses, the aircraft with the recognition lights will be seen earlier than it would be with only the required lights. Installed recognition lights may account for part of the required field of coverage, but these lights must not reduce the area covered by anticollision lights or position lights for aircraft approaching from other than nearly nose-to-nose directions.

In addition, Part 23 does not require logo lights, but they may also be used in all phases of flight. Normally, these lights face toward the tail, but whatever the orientation they cannot reduce the field of coverage of required lights.

Section 23.1387, Position light system dihedral angles, requires:

1. Left (L) from two intersecting vertical planes, the first parallel to the longitudinal axis of the airplane, and the other at 110 degrees to the left of the first, as viewed when looking forward along the longitudinal axis.
2. Right (R) from two intersecting vertical planes, the first parallel to the longitudinal axis of the airplane, and the other at 110 degrees to the right of the first, as viewed when looking forward along the longitudinal axis.
3. Aft (A) from two intersecting vertical planes making angles of 70 degrees left and right respectively to a vertical plane passing through the longitudinal axis of the aircraft as viewed when looking aft along the longitudinal axis.

Wing mounted recognition lights do not affect the Aft dihedral angle, but these lights could affect Left and Right angles. Logo lights could affect the Aft dihedral angle.

In § 23.1401(b), Anticollision light system, the field of coverage requires the light to be visible from 75 degrees above and below a horizontal plane with an exception for the rear facing direction. An anticollision light mounted on the fuselage or vertical fin and aft of the recognition light will not be affected in the rear facing direction. A ground test in a darkened hangar should show that either the recognition light or anticollision light is visible 75 degrees above and below the horizontal plane from the front of the plane. A wing mounted anticollision light should be verified both forward and rearward.

For a logo light, a ground test in a darkened hangar should show that either the logo light or anticollision light is visible 75 degrees above and below the horizontal plane from the front of the airplane.

## **HANDLING AND PERFORMANCE**

If the non-required light installation extends into the airstream, the applicant must perform flight testing to verify compliance to applicable paragraphs in 14 CFR, part 23, Subpart B.

### **Effect of Policy**

The general policy stated in this document does not constitute a new regulation or create what the courts refer to as a "binding norm." The FAA Aircraft Certification Offices (ACOs) should implement this policy when applicable to the specific project. Whenever an applicant's proposed method of compliance is outside this established policy, it must be coordinated with the policy issuing office, for example, through the issue paper process or equivalent. Similarly, if the implementing office becomes aware of reasons that an applicant's proposal that meets this policy should not be approved, the office must coordinate its response with the policy issuing office.

Applicants should expect that the certificating officials will consider this information when making findings of compliance relevant to new certificate actions. Also, as with all advisory material, this policy statement identifies one means, but not the only means, of compliance.

For questions about this policy, please contact Mr. Leslie Taylor by telephone at (816) 329-4134, by fax at (816) 329-4090, or by e-mail at [leslie.b.taylor@faa.gov](mailto:leslie.b.taylor@faa.gov).

### **Distribution:**

Manager, Anchorage Aircraft Certification Office, ACE-115N  
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