



Federal Aviation Administration

Memorandum

Date: October 12, 2007

To: Manager, Small Airplane Directorate, ACE-100

From: Manager, Wichita Aircraft Certification Office, ACE-115W

Prepared by: Daniel Hilton, ASE, Electrical Systems & Avionics Branch, ACE-119W

Subject: Equivalent Level of Safety (ELOS) to § 23.1401(d); Cessna Aircraft Company, Models 172R, 172S; Finding No. ACE-07-09

This memorandum requests your office to review and provide concurrence with the proposed finding of equivalent level of safety to the Anticollision Light System requirements of § 23.1401(d) of 14 CFR, part 23.

BACKGROUND:

The Cessna Model 172R and 172S is a 2550 pound single engine airplane powered by a 160 or 180 horsepower Lycoming IO-360-L2A engine. Original approval for the type certification of the Model 172 was made December 14, 1956. The anticollision light utilized for the early Model 172 series aircraft was in compliance with the requirements for a red rotating beacon in effect at the time per CAR 3, paragraph 3.705. Strobe lights were later installed on the aircraft which are in agreement with the guidance provided by Federal Aviation Administration (FAA) Advisory Circular AC 20-30(.). When the Model 172R and 172S were certified in June 1996 and May 1998 respectively, an updated certification basis was voluntarily adopted utilizing 14 CFR part 23, amendment 23-6 as a baseline, with 14 CFR part 23, § 23.1401 applicable as it originally appeared in part 23. The requirements surrounding the anticollision lights had changed significantly in between the original CAR 3 certification basis and the new part 23 certification basis, such that the red rotating beacon installation's ability to meet the newer rule was unproven. After a review, the strobe light installation certified many years before was considered to be more readily employable for compliance. A similar ELOS was granted to Cessna on the Models 182T/T182T and 206H/T206H via ELOS memos ACE-01-03 and ACE-02-02, dated February 23, 2001, and December 3, 2001, respectively. It has now been discovered that the color of the strobe lights (aviation white) did not meet the requirements for aviation red anticollision lights as found in the certification basis for the aircraft for § 23.1401(d), Amendment 23-11. A later amendment level allowing the use of white anticollision lights could not be incorporated into the certification basis due to an attendant four-fold increase in the required light emission intensities. Cessna Aircraft Company requests the FAA to give them credit for the system by accepting it as a safety device equivalent to § 23.1401(d), Amendment 23-11, Anticollision Light System.

APPLICABLE REGULATIONS:

Section 23.1401(d), Amendment 23-11 requires that single engine, normal, utility, acrobatic, or commuter category airplanes must demonstrate compliance with this regulation which requires the color red for anticollision lights, or the applicant must provide an equivalent level of safety with sufficient compensating factors or factors for color compliance.

REGULATIONS REQUIRING AN ELOS:

In considering the current design, the applicant has requested an ELOS for anticollision wingtip strobe lights to use the color aviation white and the FAA has determined that an appropriate level of safety can be provided by the issuance of an ELOS, in accordance with the provisions of 14 CFR, part 21, § 21.21(b)(1).

DESCRIPTION AND EXPLANATION OF COMPENSATING FEATURES:

As with the 182T/T182T and 206H/T206H, Cessna holds that the white anticollision light installation on the Model 172R/172S meets or exceeds the safety level provided by 14 CFR, part 23, § 23.1401, per Amendment 23-11. The installation is shown to be directly compliant aside from color alone.

The system components are approved for installation on other Cessna aircraft via supplemental type certificate's (STCs) and attendant Parts Manufacture Approval (PMA) approvals owned by Whelen Engineering, Inc., as well as being approved by ELOS on the 182T/T182T and 206H/T206H. The FAA has reviewed and approved the operation and use of the strobe element, the lens, and the power supply used on the 172R/172S as parts of anticollision light systems on many other aircraft, and has issued Amended Type Certificates (ATCs), STCs and PMA authorizations as necessary.

As with the anticollision light system of the 182T/T182T and 206H/T206H, the strobe light intensities of the Model 172R/172S installation meet, or exceed, all minimum intensity requirements of § 23.1401 per Amendment 23-11, the anticollision light regulatory requirement per the certification basis of the aircraft. The FAA has issued an ELOS on the 182T/T182T, an ELOS on the 206H/T206H, and STCs for installation of the components on many different aircraft; therefore, the 172R/172S system and its components have already received FAA approval in other anticollision light systems. Furthermore, FAA issuance of those same Amended TCs, STCs and PMAs for acceptance of the components on applicable aircraft also prove prior FAA acceptance of the use of aviation white lenses in lieu of the aviation red lenses required by § 23.1401 per Amendment 23-11.

Further considerations:

At the next revision after that contained in the certification basis of the 172R/172S (Amendment 23-11, effective 11 August 1971), § 23.1401 was revised to allow for the use of either aviation red or aviation white anticollision lights.

FAA Advisory Circular AC 20-30B, dated July 20, 1981, specifically allows for the use of white anticollision lights for aircraft with certification bases using Amendments 23-11, and 14 CFR § 91.205(c)(3), also provides a general exemption for the use of aviation white anticollision lights on aircraft whose type certificates were issued, or applied for before August 11, 1971, the date of effectivity for Amendment 23-11 discussed above.

Summary:

The FAA has already provided acceptance of the use of white anticollision lights on aircraft via FAA regulations, advisory material, issuance of amendments to TC 3A13 and TC A4CE for the Model 182T/T182T and Model 206H/T206H, respectively, STCs and PMA approvals. These same approvals also attest to the technical acceptability of the system components used on the 172R and 172S for aircraft with the same anticollision light certification basis requirements, and the system installation is shown to meet the requirements of the Models 182T/T182T, 206H/T206H and 172R/172S, and Cessna maintains that an equivalent level of safety has been well-established for the anticollision light system utilized on the Models 206H and T206H.

ACO RECOMMENDATION:

The ACO concurs that the current Cessna Models 172R and 172S anti-collision light configuration has been analyzed and provides an equivalent level safety for § 23.1401 through Amendment 23-10.

RECOMMENDATION:

The certification basis for the Cessna Models 172R and 172S will include an Equivalent Level of Safety finding for 14 CFR, part 23, § 23.1401 through Amendment 23-10.

Concurred by:

Original Signed By Margaret Kline *September 6, 2007*

Manager, Wichita Aircraft Certification Office, ACE-115W Date

Wes Ryan for *October 11, 2007*

Manager, Standards Office, ACE-110 Date

David R. Showers for *October 12, 2007*

Manager, Small Airplane Directorate,
Aircraft Certification Service, ACE-100 Date

