



# Federal Aviation Administration

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## Memorandum

Date: February 13, 2015

To: Manager, BASOO, ANM-100B

From: Manager, Transport Airplane Directorate, ANM-100

Prepared by: James N. Sutherland, ANM-100B

Subject: INFORMATION: Equivalent Level of Safety (ELOS) Finding for Aviation Green Light Chromaticity Requirements on a Model Boeing 737-700/700C/800/900ER airplanes, FAA Project No. PS12-1026

ELOS Memo #: PS12-1026-SE-1

Regulatory Ref: § 25.1397(b)

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This memorandum informs the certificate management aircraft certification office of an evaluation made by the Transport Airplane Directorate (TAD) on the establishment of an equivalent level of safety (ELOS) finding for the Model Boeing 737-700/700C/800/900ER airplanes.

### Background

Title 14, Code of Federal Regulations (14 CFR) 25.1397(b) requires, “each position light color must have the applicable International Commission on Illumination chromaticity coordinates as follows: (b) Aviation green--‘x’ is not greater than  $0.440 - 0.320y$ ; ‘x’ is not greater than  $y - 0.170$ ; and ‘y’ is not less than  $0.390 - 0.170x$ .” FAA TSO-C30c for aircraft position lights specifies the Society of Automotive Engineers, Inc. (SAE), Aerospace Standard (AS) 8037, “Minimum Performance Standard for Aircraft Position Lights,” dated January 1986 that defines aviation green as “Yellow Boundary  $x=0.360-0.080y$ ; White Boundary  $x=0.650y$ ; and Blue Boundary  $y=0.390-0.171x$ .” Additionally, the FAA TSO-C30c states the following:

“e. Color and Intensity specifications. The chromaticity coordinates contained in AS 8037, paragraph 3.3.1 for aviation red, green, and white provide an equivalent level of safety to those specified in Section .1397 of FAR Parts 23, 25, 27, and 29. For national and international standardization these coordinates have been made identical to the existing International Civil Aviation Organization requirements. This also applies to specifying

intensity in terms of “candles” in AS 8037 as opposed to “candles” in Sections .1391 and .1395 of FAR Parts 23, 25, 27, and 29. In practical application all existing aircraft position light installations meet both the TSO and FAR requirements.”

Boeing installs the Aviation Partners Boeing (APB) blended winglet position light system under the Boeing Type Certificate (TC) on the 737-700/700C/800/900ER. The APB blended position light system does not strictly meet the requirements of § 25.1397(b) pertaining to the chromaticity requirements for the color aviation green, however it does satisfy the requirements found in TSO-C30c.

### **Applicable regulation(s)**

§ 25.1397(b)

### **Regulation(s) requiring an ELOS finding**

§ 25.1397(b)

### **Description of compensating design features or alternative standards which allow the granting of the ELOS finding (including design changes, limitations or equipment need for equivalency)**

The compensating factors that provide an equivalent level of safety for the regulations not complied with are as follows:

- The color measured is within the aviation green limits specified by TSO-C30c which states that, “The chromaticity coordinates contained in AS8037, paragraph 3.3.1 for aviation red, green and white provide an equivalent level of safety to those specified in section .1397 of FAR parts 23, 25, 27 and 29”.
- Compliance to either § 25.1397(b) or the TSO C30c color boundary for the position light provides a color that is perceived by the human eye as Aviation Green.
- The small chromaticity exceedence can only be captured by specialized photometric equipment (spectroradiometer) in a highly controlled photometric laboratory environment.
- The non-compliant green lens has been in service on more than 400 transport airplanes for up to 7 years. There have been no negative field reports from pre-flight inspections, walk-arounds or maintenance procedures, including lens inspections and removals.

### **Explanation of how design features or alternative standards provide an ELOS to that intended by the regulation**

The compensating factor(s) raise the level of safety to that required by § 25.1397(b) by the purpose of the chromaticity requirements are intended to provide, within limits, a standardized perception of “green” to the human eye when viewed from an external position to the aircraft. Compliance to either § 25.1397(b) Amendment 25-27, or the TSO-C30c, boundary for the forward position light and lens(es) as installed on the aircraft, provides a color that is perceived by the human eye as aviation green.

**FAA approval and documentation of the ELOS finding**

The FAA has approved the aforementioned ELOS finding in project Issue Paper SE-1, titled Aviation Green Light Chromaticity Requirements. This memorandum provides standardized documentation of the ELOS finding that is non-proprietary and can be made available to the public. The TAD has assigned a unique ELOS memorandum number (see front page) to facilitate archiving and retrieval of this ELOS finding. This ELOS memorandum number should be listed in the FAA TCDS A16WE in accordance with the statement below:

Equivalent Level of Safety Findings have been made for the following regulation(s):

§ 25.1397(b) Color Specifications.

(documented in TAD ELOS Memorandum PS12-1026-SE-1)]

Original Signed by

*Robert Duffer*

February 20, 2015

Transport Airplane Directorate,  
Aircraft Certification Service

Date

ELOS Originated by ACO:	ACO Manager (or Project Engineer for ANM-116):	Routing Symbol:
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