

INTERTEK AIRPORT LIGHTING EQUIPMENT CERTIFICATION PROGRAM

IESALC Government Contacts Subcommittee Meeting

IES ALC Technology Meeting, Scottsdale, AZ

November 7, 2023

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INTRODUCTION



- **Purpose / Outline**

- Applicability and outline of ALECP
- Update of Current Program Status
- Update on Current Initiatives



AIRPORT LIGHTING EQUIPMENT CERTIFICATION

Certification Program covers all equipment specified in the FAA AC 150/5345 series:

- Rotating Beacons
- Obstruction Lights
- Wind Cones
- Isolation Transformers
- Taxiway/ Runway Inpavement and Elevated Lights
- Retroreflective Markers
- Cable Connectors
- Underground Cable
- Runway & Taxiway Signs
- Portable Runway Lights
- Light Bases
- Constant Current Regulators
- Precision Approach Path Indicators (PAPI)
- Runway End Identification Lights (REIL)



ALECP PURPOSE AND APPLICABILITY



- **Purpose is to assist in enhancing aviation safety by:**
 - Standardizing performance, quality, reliability of airfield lighting and obstruction lighting products
 - Goal is that all pilots receive reliable, standardized visual queues.
- **Applicability of ALECP Certification**
 - **Airfield Lighting Products:**
 - One of the FAA acceptable means to satisfy Title 14 CFR Part 139 Section 139.311 Certification of Airports
 - Mandatory for all projects funded by Federal AIP for PFC monies
 - Widely used around the world to insure a standard level of performance



ALECP PURPOSE AND APPLICABILITY



- **Applicability of ALECP Certification**
- **Obstruction Lighting Products:**
 - **FAA Regulations - 14 CFR Part 77**
 - 77.7 – Specifies the requirements for notifying the FAA of construction or alteration of an obstruction.
 - FAA Form 7460-1, Notice of Proposed Construction or Alteration
 - 77.9 - Specifies what types of construction requires notification to the FAA.
 - 77.31 – Describes the determination that FAA makes for each obstruction.
 - Determination of No Hazard to Air Navigation is issued with conditions including the lighting and marking.
 - 77.33 – Determination of No Hazard to Air Navigation is good for 18 months.

ALECP PURPOSE AND APPLICABILITY



- **Applicability of ALECP Certification**

- **Obstruction Lighting Products:**

- **FAA AC 70/7460-1M**

- Describes how obstructions must be marked and lighted

- Section 15.4 states that lighting equipment should conform to the latest version of FAA AC 150/5345-43.

FAA AC 150/5345-53 lists the manufacturers that have demonstrated compliance

Other manufacturers' equipment may be used if it meets the requirements of -43





- **GENERAL OUTLINE**

- Manufacturer submits certification request via AL-2 application form
- Qualification testing
- Documentation submittal and engineering review
- Initial manufacturing facility audit (semi-annual inspections continue)
- License Agreement
- Certificate issued and product listed in 53D Addendum
- Certification process covered under ANSI accreditation to ISO 17065

- **DOCUMENTATION REVIEW**

AL-2 Application Form

5. Required Supporting Documentation (send with this form)	
<input type="checkbox"/>	List of Types, Classes, Styles, Sizes, manufacturer's catalog numbers (product variants)
<input type="checkbox"/>	Electrical Schematics
<input type="checkbox"/>	Assembly Drawings
<input type="checkbox"/>	Bill of Materials showing manufacturer's name and part numbers
<input type="checkbox"/>	Statement of Warrantee
<input type="checkbox"/>	Instruction/Installation/Operating Manual
<input type="checkbox"/>	Product Description sheet (marketing material)
<input type="checkbox"/>	AL-2B Light Source Form with referenced documents for each light source (if applicable)
<input type="checkbox"/>	Test Reports for all testing not done by Intertek Cortland, NY



FAA AC 150/5345-53D

DOCUMENTATION REVIEW

Statement of Warrantee

FAA AC 150/5345-53D, Appendix 2, section 5.a.iv

1 year from installation / 2 years from shipment

“...defects in design, materials, workmanship”





FAA AC 150/5345-53D

DOCUMENTATION REVIEW

Statement of Warrantee

FAA AC 150/5345-44K (runway and taxiway signs)

section 5.2

2 years from installation

“...defects in materials or workmanship”

FAA EB67D (all LED products except obstruction lighting)

section 4.0

4 years from installation

inclusive of all electronics



CURRENT ALECP PROGRAM STATISTICS

- 59 program participants
 - No change from last meeting
 - 5 pending
- 65 licensed manufacturing facilities
 - No change from last meeting
 - 5 pending

CURRENT ALECP PROGRAM STATISTICS



- Certifications since the Spring Government Contacts Meeting in April 2023
 - 28 new or full re-qualification certificates
 - 9 revised certificates
 - 11 de-listings

NEW SPECIFICATIONS



Cancelation dates:

Each new AC states that it cancels the previous version.

Effective dates:

FAA AC 150/5345-53D section 12.a.v

The previous equipment certificates automatically expire on the given effective date.

Effective dates are usually six months from the issue date.

NEW SPECIFICATIONS



FAA Engineering Brief #105 – Vertiport Design

Issue date: September 21, 2022

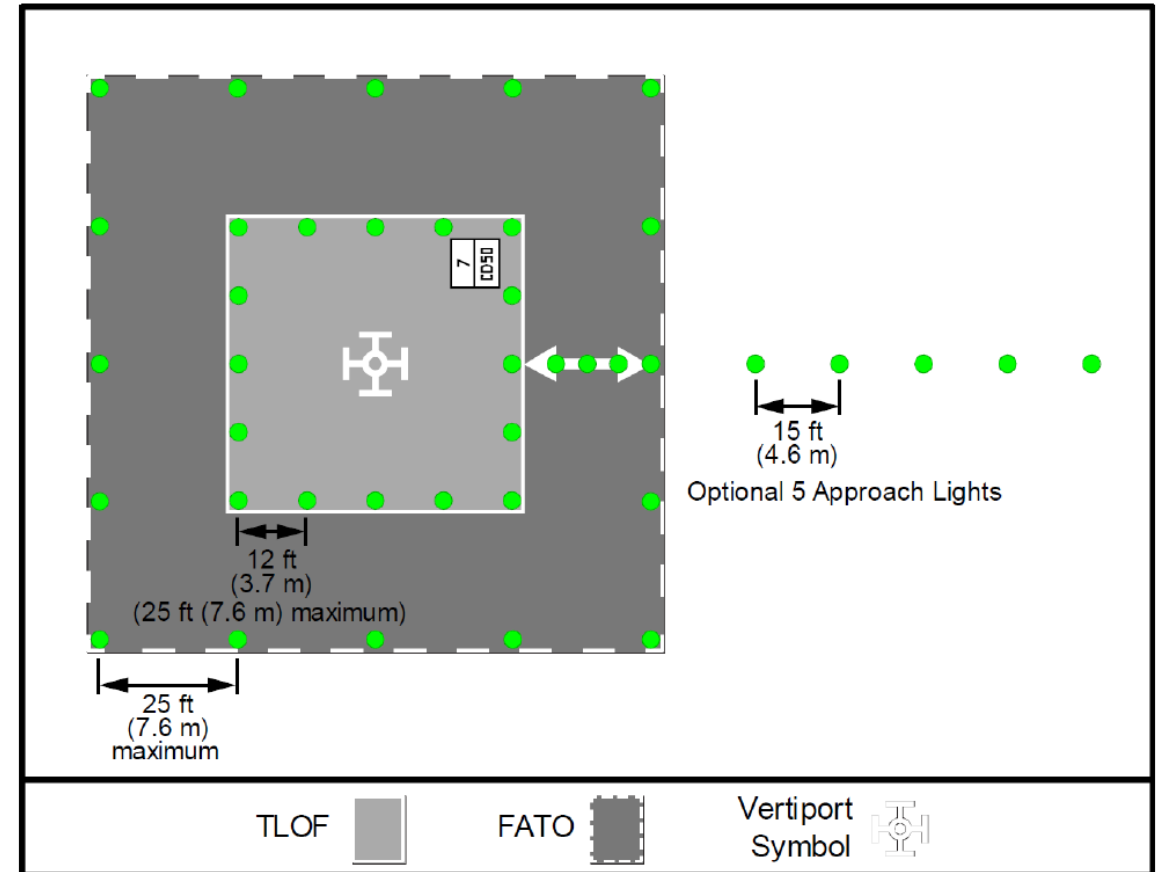
Interim guidance for the design of vertiports

Lighting References

FAA AC 150/5390-2

FAA AC 150/5345-46

Figure 3-7: TLOF/FATO Perimeter Lighting





NEW SPECIFICATIONS

FAA Engineering Brief #105 – Vertiport Design

Issue date: **September 21, 2022**

L-806 Wind cones (FAA AC 150/5345-27)

L-801H/802H Heliport beacon (FAA AC 150/5345-12)

L-882/883 – VGSI (Visual Glideslope Indicator) (FAA AC 150/5345-52)

L-861H - Elevated heliport perimeter light

L-852H - Inpavement heliport perimeter light



NEW SPECIFICATIONS

FAA AC 150/5390-2D Heliport Design

Issued January 5, 2023

Principal Changes

Complete re-organization

Incorporation of FAA EB87 (Heliport Perimeter Lights For Visual Meteorological Conditions (VMC)-January 2012) as Appendix G



NEW SPECIFICATIONS

FAA AC 150/5390-2D

Applicable Lighting (Section 4.13 and 6.1):

L-853 Retroreflective Markers (FAA AC 150/5345-39)

L-806 Wind cones (FAA AC 150/5345-27)

L-852T and L-861T Taxiway edge lights (FAA AC 150/5345-46)

L-852 Taxiway centerline lights (FAA AC 150/5345-46)

L-801H/802H Heliport beacon (FAA AC 150/5345-12)

L-882/883 – VGSI (Visual Glideslope Indicator) (FAA AC 150/5345-52)

HILS (Heliport Instrument Lighting System) – 200W PAR 56

HALS (Heliport Approach Lighting System, or lead-in lights) - 200W PAR 56

L-860H - Elevated heliport perimeter light (FAA AC 150/5345-46)

L-852H - Inpavement heliport perimeter light (FAA AC 150/5345-46)

NEW SPECIFICATIONS

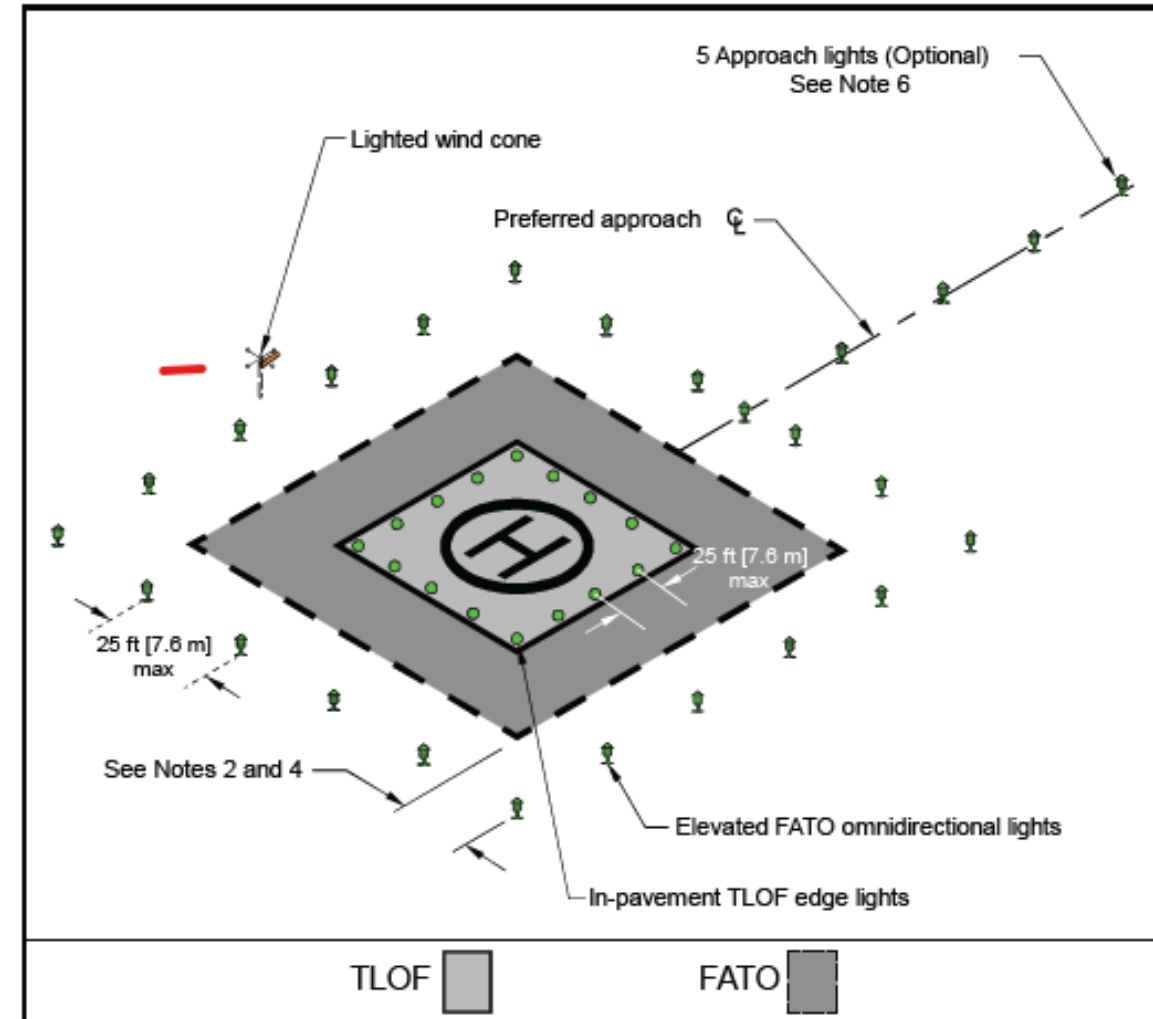


FAA AC 150/5390-2D (continued)

L-860H - Elevated heliport perimeter light

L-852H - Inpavement heliport perimeter light

Figure 4-11. TLOF In-pavement and FATO Elevated Perimeter Lighting

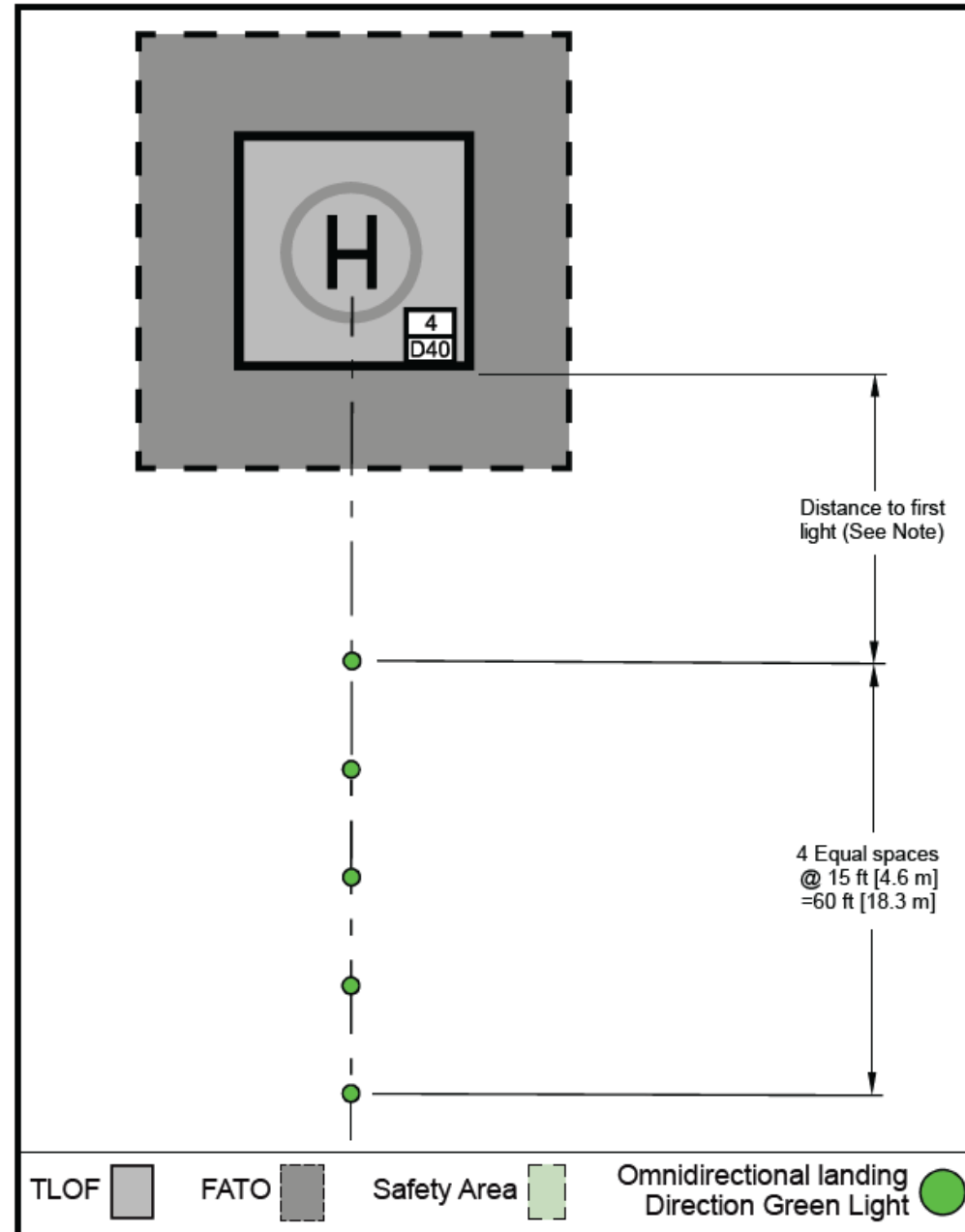


NEW SPECIFICATIONS

FAA AC 150/5390-2D (continued)

Landing Direction / Approach

Figure 4-13. Landing Direction Lights.

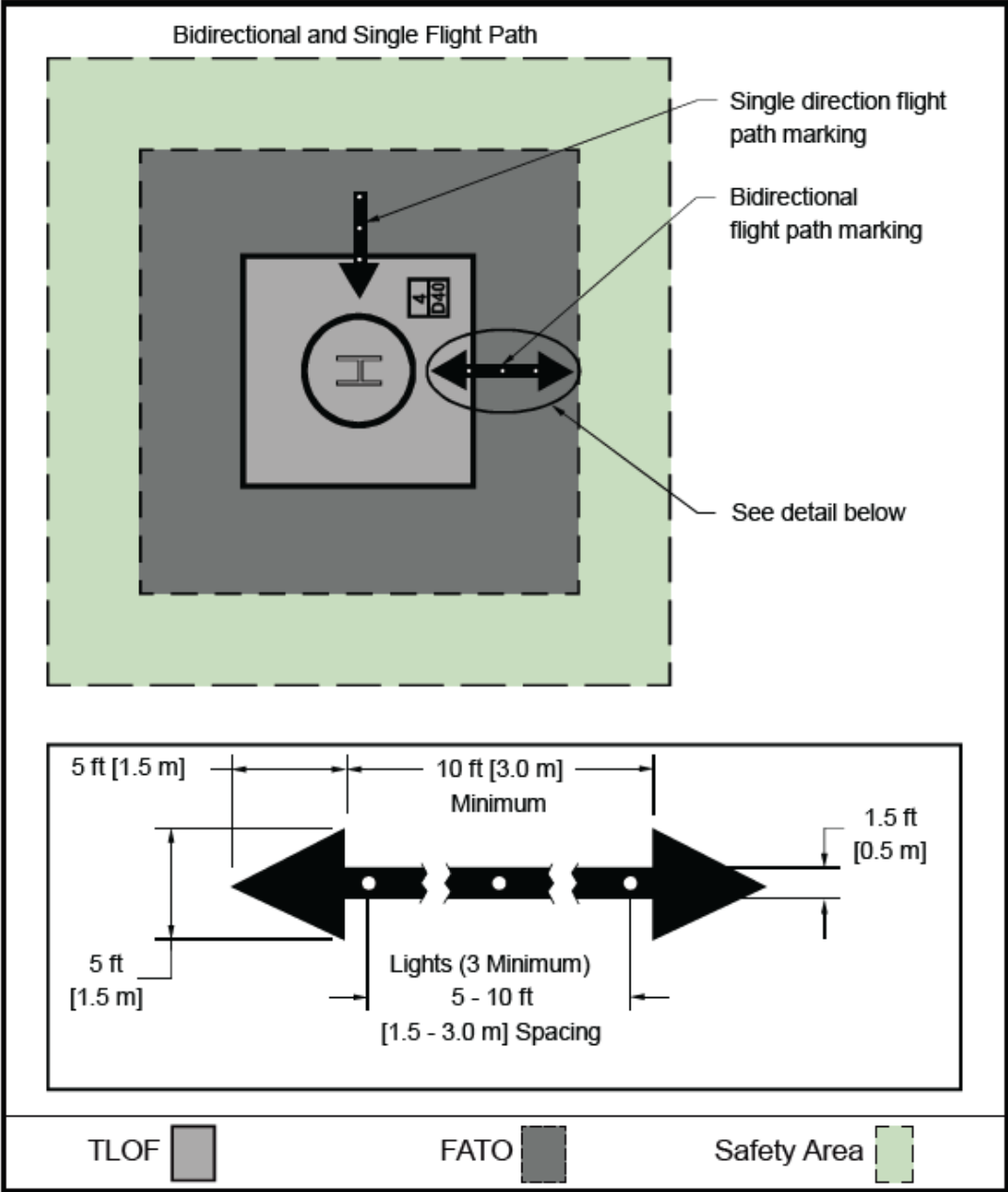


NEW SPECIFICATIONS

FAA AC 150/5390-2D (continued)

Flight Path Alignment

Figure 2-19. Flight Path Alignment Marking and Lights



DRAFT SPECIFICATIONS



FAA AC 150/5345-46F – Specification for Runway, Taxiway, Heliport, and Vertiport Light Fixtures

Comments were due January 6, 2023

Principal Changes

- General clarifications

- Addition of Heliport and Vertiport application fixtures (L-860/1H and L-852H)

- Modification of specified horizontal shear force

Impact on Certifications

- L-860/1H and L-852H will now be eligible for certification.

- Horizontal shear test for all in-pavement light casting designs.

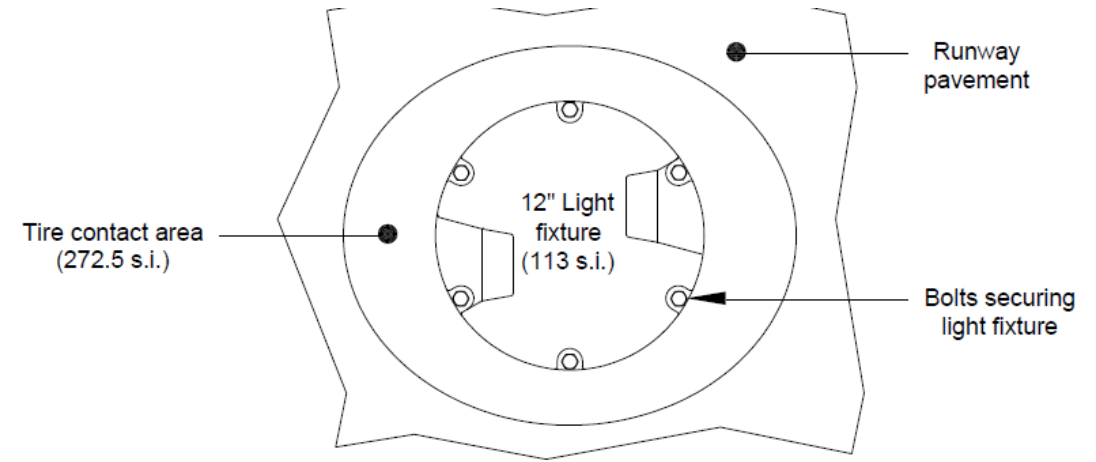
DRAFT SPECIFICATIONS



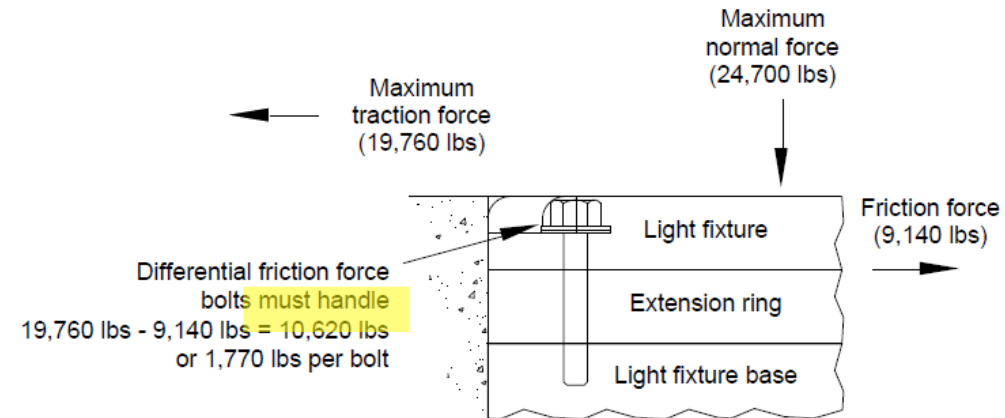
FAA AC 150/5345-46F

New shear load value of 11,000 lbs is consistent with the FAA EB 83A Appendix A calculation for a 12" fixture.

Calculation must be done if certifying an 8" only class 1 or class 2. (4700 lbs)



Tire contact area over fixture

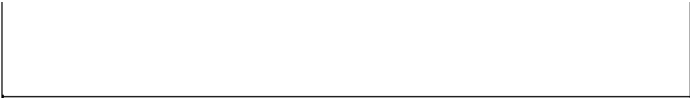


Detail - Bolt securing fixture

COMMON QUESTIONS



FAA AC 150/5345-46E Class 1 vs. Class 2 certification



CERTIFICATE OF CONFORMANCE
NUMBER XXXXXXXX-XXX-X

The product described below is hereby approved for listing in the next issue of the Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5345-53, Appendix 3 Addendum "Airport Lighting Equipment Certification Program. The approval is based on successful completion of tests in accordance with the specifications listed in, and the requirements for approval described in the Advisory Circular, and the reporting to the Program Administrator the results of such tests, accompanied by related documents by an Intertek recognized testing laboratory. This Certificate is only confirmable in conjunction with equipment being listed in AC 150/5345-53, Appendix 3, Addendum, as currently published by the FAA. The certification is not valid for a product modified with non-OEM replacement parts or non-production components.

L-850(L) – Lights, Runway, Inpavement (AC 150/5345-46E)				
Manufacturer	Type	Class	Style	Manufacturer's Catalog Number
XXXXXX	L-850A(L)	1	3	XXXXXXXXXX1 (XXX)
		2	3	XXXXXXXXXX2 (XXX)
	L-850B(L)	1	3	XXXXXXXXXX1 (XXX)
		2	3	XXXXXXXXXX2 (XXX)
	L-850C(L)	1,2	3	XXXXXXXXXX (XXX)
	L-850D(L)	1,2	3	XXXXXXXXXX (XXX)
NOTES: (XXX) Yellow LED; (XXX) Red LED; (XXX) White LED; (XXX) Green LED				
Equipment meets the requirements of FAA Engineering Brief No. 67D additional requirements for "Light Sources Other Than Incandescent and Xenon for Airport and Obstruction Lighting Fixtures" dated March 6, 2012.				

- 1. This Equipment requires continuing validation in accordance with the requirements of AC 150/5345-53, and the Intertek Airport Lighting Equipment Certification Program.
- 2. Product tested and Report issued by: Intertek



COMMON QUESTIONS



FAA AC 150/5345-46E Class 1 vs. Class 2 certification

Class 1 (Direct Mounted) Requirements – Section 3.4.1.1

The shallow bases are considered part of the light fixture for certification due to the fact that they are required to comply with this paragraph.

3.4.1.1.c – The light fixture must be designed to maximize adhesion via the securing compound and to resist rotation and uplift.

3.4.1.1.d – All optical components and electrical components (except those used to provide the power) must be removable for servicing without breaking the adhesive bond.

3.4.1.1.e – A shallow base or other installation accessories must withstand the loading and environmental stress requirements in this AC.

COMMON QUESTIONS



FAA AC 150/5345-46E Class 1 vs. Class 2 certification

Class 1 (Direct Mounted) Requirements – Section 3.4.1.1

Electrical

3.7.1.d - Light fixture leads must be sealed at the entry to the fixture and must have the ends ready for splicing.

3.9i – Light fixtures must include a proper lug/connector for accommodating the ground connection.

COMMON QUESTIONS



FAA AC 150/5345-46E Class 1 vs. Class 2 certification

Class 2 (Base Mounted) Requirements – Section 3.4.1.2

Light fixtures must interface with standard L-868 light bases per FAA AC 150/5345-42J. (Multiple section base is the worse case.)

Light fixtures must be designed to mount on an L-868 base whose top surface is $\frac{3}{4}$ " below grade.

3.4.1.2.b requires that any necessary adapter rings must be qualified with the light fixture.

COMMON QUESTIONS



FAA AC 150/5345-46E Class 1 vs. Class 2 certification

Class 2 (Base Mounted) Requirements – Section 3.4.1.2

Electrical

3.7.1.c - Light fixture leads must be terminated with a certified L-823.

3.9i – Light fixtures must include a proper lug/connector for accommodating the ground connection. See FAA AC 150/5340-30J section 12.6. (6 AWG stranded copper or braided ground strap)

COMMON QUESTIONS



FAA AC 150/5345-46E Class 1 vs. Class 2 certification

Class 2 (Base Mounted)

L-868 flange ID is 6.500" to 6.515"

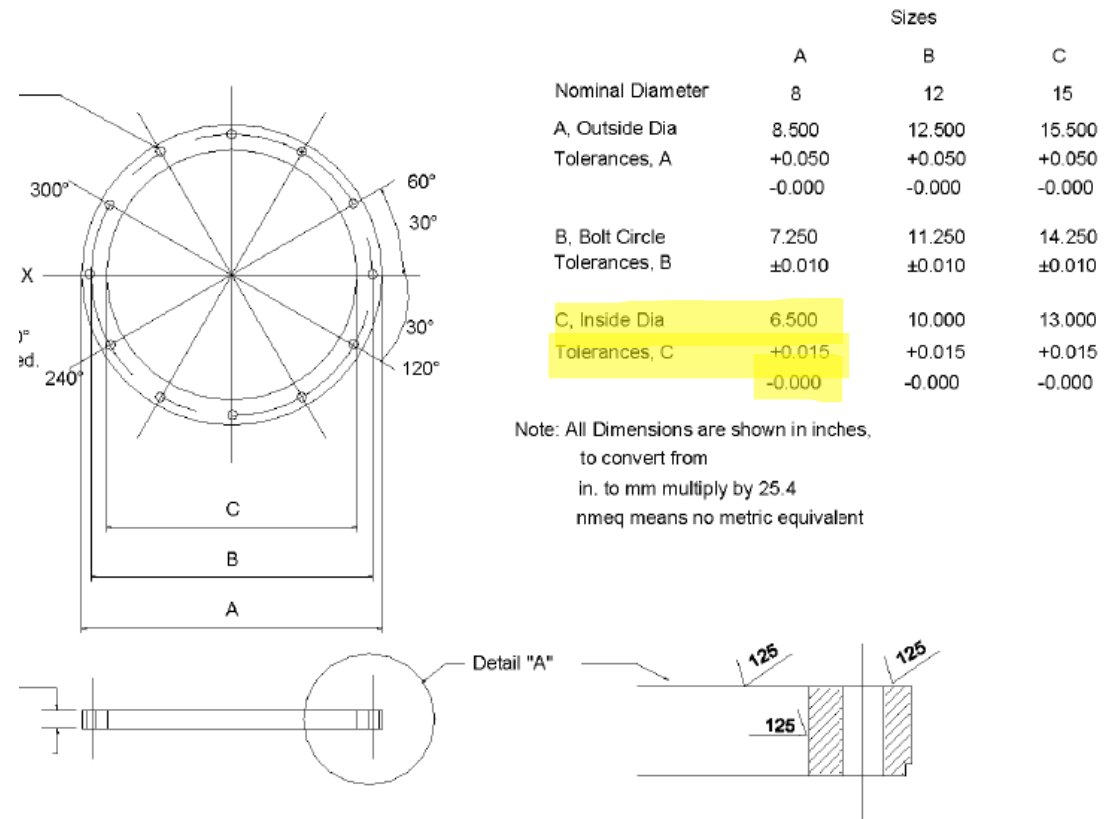


Figure 5-5. Flange, Type L-868, Class IA, Class IB

COMMON QUESTIONS

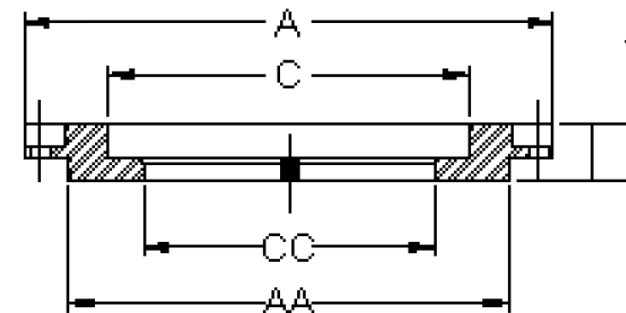
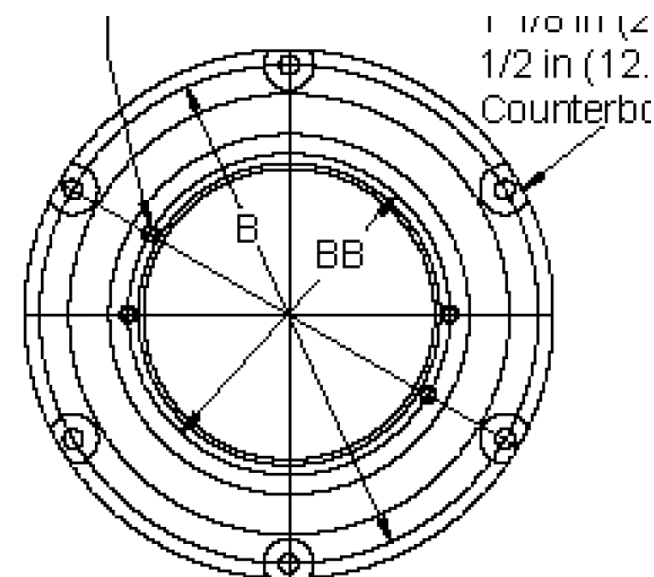


FAA AC 150/5345-46E Class 1 vs. Class 2 certification

Class 2 (Base Mounted)

	Sizes		
	A	B	C
A, Outside Dia Tolerances, A	8.000 +0.050 -0.000	12.000 +0.050 -0.000	15.000 +0.050 -0.000
AA, Outside Dia Tolerances, AA			
AAA, Outside Dia Tolerances, AAA	8.50 +0.050 -0.000	12.50 +0.050 -0.000	15.50 +0.050 -0.000
B, Bolt Circle Tolerances, B	7.250 ±0.010	11.250 ±0.010	14.250 ±0.010
BB, Bolt Circle Tolerances, BB	6.250 ±0.010	10.250 ±0.010	13.250 ±0.010
C, Inside Dia Tolerances, C	6.500 +0.015 -0.000	10.000 +0.015 -0.000	13.000 +0.015 -0.000
CC, Inside Dia Tolerances, CC			

Typical Adapter Ring	
8" TO 12"	12" TO 15"
11.938" +0.100 -0.000	14.938"/17.250" +0.100 -0.000
9.938" +0.000 -0.030	
11.250 ±0.010	14.250 ±0.010
7.250 ±0.010	11.250 ±0.010
8.125* +0.015 -0.000	12.250* +0.015 -0.000
6.500 +0.015 -0.000	10.000 +0.015 -0.000



8" - 12"

COMMON QUESTIONS



FAA AC 150/5345-46E Class 1 vs. Class 2 certification

Class 1 certified light fixture, or a light fixture certified with an adapter ring for class 2 applications may not meet the class 2 requirements by itself.

COMMON QUESTIONS



FAA AC 150/5345-26E Specification for L-823 Plug and Receptacle, Cable Connectors

FAA AC 150/5345-47C Specification for Series-to-Series Isolation Transformers For Airport Lighting Systems

FAA AC 150/5345-7F Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits

ANSI/ICEA S-95-658 / NEMA WC70 – 2009 (cable for 2000V or less)

ANSI/ICEA S-96-659 / NEMA WC71 – 1999 (non-shielded cable 2001-5000V)

ANSI/ICEA S-93-639 / NEMA WC74 – 2000 (shielded cable 5-46kV)

COMMON QUESTIONS



FAA AC 150/5345-7F Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits

Most requirements come from:

- ANSI/ICEA S-95-658 / NEMA WC70 – 2009 (cable for 2000V or less)

- ANSI/ICEA S-96-659 / NEMA WC71 – 1999 (non-shielded cable 2001-5000V)

- ANSI/ICEA S-93-639 / NEMA WC74 – 2000 (shielded cable 5-46kV)

Section 1.1 Scope states that this AC does not apply to cable used in L-823 class A connectors, or for cable used in L-830 isolation transformer leads.

COMMON QUESTIONS



FAA AC 150/5345-26E Specification for L-823 Plug and Receptacle, Cable Connectors

Section 3.4.4.1 Class A (factory molded) connectors must use primary cables that meet:

ANSI/ICEA S-96-659 / NEMA WC71 (non-shielded cable 2001-5000V)

...and secondary cables that meet:

ANSI/ICEA S-95-658 / NEMA WC70 (cable for 2000V or less)

COMMON QUESTIONS



FAA AC 150/5345-47C Specification for Series to Series Isolation Transformers For Airport Lighting Systems

Section 3.4.2.1 Primary leads

Must use L-823 style 2 and 9 per FAA AC 150/5345-26.

Cable must be 8 AWG, 19 strand conforming to:

ANSI/ICEA S-96-659 / NEMA WC71 (non-shielded cable 2001-5000V)

Section 3.4.2.2 Secondary leads

Must use L-823 style 7 or 8 per FAA AC 150/5345-26.

Cable must be 12 or 14 AWG conforming to:

ANSI/ICEA S-95-658 / NEMA WC70 (cable for 2000V or less)

COMMON QUESTIONS



FAA AC 150/5345-26E Specification for L-823 Plug and Receptacle, Cable Connectors

FAA AC 150/5345-47C Specification for Series to Series Isolation Transformers For Airport Lighting Systems

Cables used in L-823 class A, and L-830/831 must comply with the applicable NEMA standards, but are not required to fully comply or be certified to -7F.

COMMON QUESTIONS

FAA AC 150/5345-7F Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits

AC 150/5345-7F

08/19/2013



Table 1. Cable Requirements

CABLE TYPE	B		C	
VOLTAGE RATING, VOLTS	600	5000	600	5000
1. CONDUCTOR				
a. Material: Coated and uncoated copper	X	X	X	X
b. General Requirements:				
ICEA S-95-658, Section 2	X	--	X	--
ICEA S-96-659, Section 2, non-shielded	--	X	--	X
ICEA S-93-639, Section 2, shielded	--	X	--	X
c. Stranding: 7-wire Class B strand or	X	X	X	X
19-wire Class C strand	X	X	X	X
d. Size: AWG	12-4	8-4	12-4	8-4
e. Conductor stress control (conductor shield)				
ICEA S-96-659, Section 3, non-shielded	--	optional	--	optional
ICEA S-93-639, Section 3, shielded	--	X	--	X
2. INSULATION				
a. Material:				
Ethylene Propylene Rubber				
ICEA S-95-658, Class E-1 or E-2	X	--	--	--
ICEA S-96-659, Class E-1 or E-2 or E-4, non-shielded	--	X	--	--
ICEA S-93-639, Class I, II, or IV, shielded	--	X	--	--
Cross-linked Polyethylene				
ICEA S-95-658, Class X-1 or X-2 or X-3	--	--	X	--
ICEA S-96-659, Class X-1 or X-2 non-	--	--	--	X

