




Federal Aviation Administration

Memorandum

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To: Helicopter Association International and all Industry

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Subject: Engineering Brief No. 87: Heliport Perimeter Light for Visual
Meteorological Conditions

This Engineering Brief (EB) specifies the design requirements for raised and semi-flush heliport perimeter lights. The new light fixture photometric standard is based on testing and pilot surveys performed by the Federal Aviation Administration Airport Safety Technology Research and Development at the William J. Hughes Technical Center, Atlantic City, New Jersey.

Key Elements of this EB, including the applicability of referenced fixtures for Flight Path Alignment Lights and Landing Direction Lights, will be incorporated into the newly revised Heliport Design Advisory Circular 150/5390-2C.

ENGINEERING BRIEF #87

Heliport Perimeter Lights For Visual Meteorological Conditions (VMC)

I. PURPOSE

This engineering brief specifies the design requirements for a new raised heliport perimeter light, Type L-860HR and semi-flush heliport perimeter light, Type L-860HS listed in Heliport Design Advisory Circular AC 150/5390-2.

II. BACKGROUND

The acquisition distance at which heliport lighting is apparent to a helicopter pilot is a vital operational parameter. If an approach is conducted using only visual cues, the heliport location and identification tasks must be accomplished at an appropriate distance that will facilitate a safe landing. The heliport must be illuminated so that it is conspicuous. The heliport perimeter lighting is one of the primary visual cues that pilots use to locate the heliport. The heliport lighting should enable the pilot to both establish the location of the heliport and identify its outline.

The new light fixture photometric standard is based on testing and pilot interviews performed by the Federal Aviation Administration (FAA) Airport Safety Technology Research and Development (R&D) Sub-Team located at the William J. Hughes Technical Center, Atlantic City, New Jersey.

III. APPLICATION

The Federal Aviation Administration recommends the design guidelines and standards in this Engineering Brief for the use of heliport "only" light fixtures in field applications.

IV. DESCRIPTION

A new raised light fixture (Type L-860HR) and a new semi-flush light fixture (Type L-860HS) are specified in this Engineering Brief to identify the heliport perimeter in visual meteorological conditions. Both the light intensity and horizontal/vertical light distribution are characterized. The light emitting diode (LED) raised heliport fixture and LED semi-flush fixture will be identified as: L-860HR (L) and L-860HS (L) respectively. Any of these fixtures may be used as Flight Path Alignment Lights and Landing Direction Lights as described in AC 150/5390-2.

V. EFFECTIVE DATES

This engineering brief is effective immediately.

VI. APPLICABLE DOCUMENTS

FAA Advisory Circulars:

AC 150/5345-46, *Specification for Runway and Taxiway Light Fixtures*

AC 150/5345-42, *Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories*

AC 150/5390-2, *Heliport Design*

FAA Engineering Briefs:

Engineering Brief 67, *Light Sources Other Than Incandescent and Xenon For Airport and Obstruction Lighting Fixtures.*

Society of Automotive Engineers (SAE)

AS 25050, *Colors, Aeronautical Lights and Lighting Equipment, General Requirements For,*

1.0 Proposed Raised and Semi-Flush Helipad Perimeter Light

1.1 Horizontal Beam Coverage

Approaches to heliports are typically performed into the prevailing wind direction - helicopters can approach the heliport from any direction. Therefore, the intensity for heliport perimeter lighting must be maintained for all possible directions of approach, requiring an omnidirectional horizontal light pattern.

1.2 Vertical Beam Coverage

The approach paths flown by the helicopter pilot dictate the required vertical intensity coverage of the light fixture. Because of the limited availability of accurate data, the FAA Flight Standards Service made a determination of the vertical approach paths most used by helicopters making approaches to a heliport in visual meteorological conditions (VMC). See Table 1.

Table 1. Helicopter Approach Angles Assuming VMC

Approach	Typical Descent Angle
Shallow	Less than 12 degrees
Normal	12 degrees to 15 degrees
Steep	Greater than 15 degrees

The approach path data were converted to the corresponding angle of elevation from the heliport perimeter lighting as a function of range. The mean angle of elevation and the upper and lower limits of the vertical beam spread will increase as the range from the heliport decreases. By controlling the vertical intensity distribution of the heliport perimeter lighting as a function of elevation, it is ensured that the lighting is sufficiently bright to be seen at the required range without glare at closer ranges.

1.3 Helipad Perimeter Lighting Intensity

The intensity requirements were developed into a specification that can be used by industry to produce and install optimized perimeter lighting. The intensity specification is based on a currently available light fixture (L-860E) that was determined to be the most effective in meeting the need for the pilot to be able to clearly see the perimeter lighting.

1.4 Helipad Perimeter Lighting Chromaticity

Helipad perimeter light fixtures must meet chromaticity requirements for aviation green per SAE AS 25050, *Colors, Aeronautical Lights and Lighting Equipment, General Requirements For*, when using incandescent lights. For light fixtures that use light emitting diodes (LEDs) see the requirements in FAA Engineering Brief 67, *Light Sources Other Than Incandescent and Xenon for Airport and Obstruction Lighting Fixtures*.

2.0 Photometric Requirements

Refer to Table 2 for the heliport perimeter light fixture photometric requirements.

Table 2. Perimeter Lighting Intensity Recommendations

Color	0 to 15 degrees		16 to 90 degrees
	Minimum	Minimum Average Intensity	Minimum
Green	10	15	5

NOTE: See AC 150/5345-46D, *Specification for Runway and Taxiway Light Fixtures*, paragraph 3.3, Photometric Requirements, for detailed measurement methods and requirements.

Figure 1 illustrates the proposed light fixture intensity distribution.

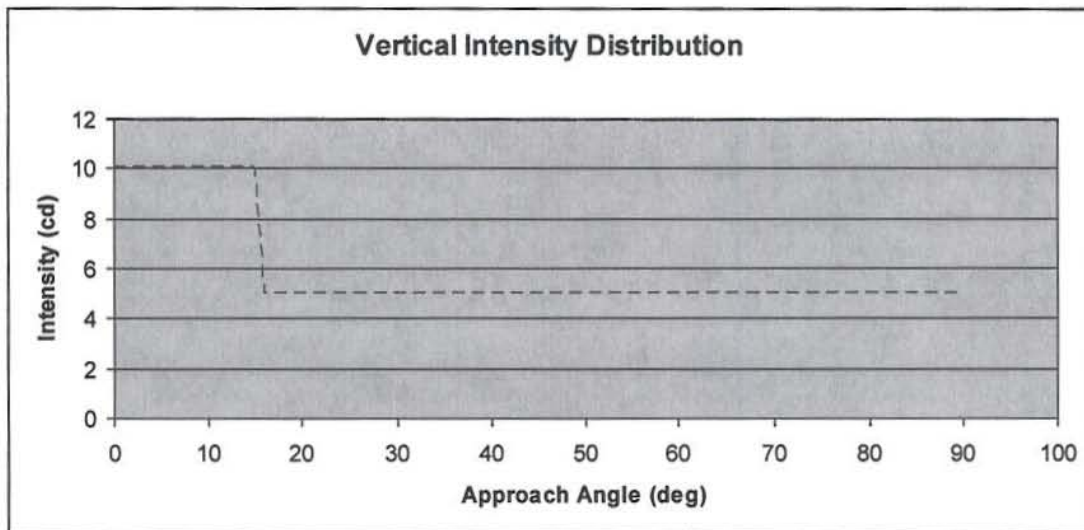


Figure 1. Perimeter Light Intensity Distribution

3.0 Additional Heliport Perimeter Light Requirements

The construction, materials, environmental requirements, and production testing for the qualification and acceptance of raised helicopter perimeter light fixtures must be per AC 150/5345-46, *Specification for Runway and Taxiway Light Fixtures*.

3.1 LED Light Fixtures

The additional requirements in FAA Engineering Brief #67 are applicable for light fixtures that use LEDs.

3.2 Light Fixture Type Number

The light fixtures will be listed in AC 150/5345-46, as a Type L-860HR, raised heliport perimeter light and Type L-860HS, semi-flush heliport perimeter light.

3.3 Light Base Requirements

Raised heliport perimeter light fixtures must be installed in a load bearing light base (L-868, Size B) or non-load bearing light base (L-867, Size B) per AC 150/5345-42, *Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories*. Shallow base type light bases must not be used.

4.0 L-860HR and L-860HS Light Fixture Testing

4.1 Laboratory Testing

The prototype L-860HR and L-860HS light fixture must be fully characterized in the laboratory using a goniometer and calibrated photo-detector for spatial light intensity distribution. For vertical angles of 0 to 10 degrees, the light intensity must be measured for each 1 degree vertically over 360 degrees horizontally (5 degree intervals). For vertical angles of 10 to 90 degrees, the light intensity must be visually verified as projected.

All testing requirements specified in AC 150/5345-46 must be observed except for photometric requirements.

4.2 Field Testing

After verification of the light fixture photometrics in the laboratory, the light fixture(s) must be installed on a helipad and visually verified in clear weather conditions for proper functionality.

4.3 Reports

At the conclusion of all testing, the manufacturer must generate a report that details the photometric testing results in the laboratory per paragraph 4.1. The report will also include the results of field-testing per paragraph 4.2.

4.4 Production

All subsequent L-860HR and L-860HS light fixture production will be based upon the documented results of testing per paragraph 4.1 and 4.2. The FAA will include the L-860HR and L-860-HS fixtures in the next scheduled update of AC 150/5345-46.

5.0 Installation Criteria

Heliport light fixtures must be installed in accordance with the criteria of AC 150/5340-30, *Design & Installation Details for Airport Visual Aids*.