U.S. Department
of Transportation
**Federal Aviation**
**Administration**

# Advisory Circular

| **Subject:** FAA Specification for Wind Cone Assemblies | **Date:** 12/15/2021<br>**Initiated By:** AAS-100 | **AC No:** 150/5345-27F<br>**Change:** |
|---|---|---|

1 **Purpose.**

This advisory circular (AC) contains a specification for wind cone assemblies to be used to provide wind information to pilots of aircraft.

2 **Cancellation.**

AC 150/5345-27E, *Specification for Wind Cone Assemblies*, dated September 26, 2013, is canceled.

3 **Applicability.**

The Federal Aviation Administration (FAA) recommends the standards and guidelines in this AC to develop specifications and guidance for the design of wind cone assemblies. This AC does not constitute a regulation, is not mandatory and is not legally binding in its own right. It will not be relied upon as a separate basis by the FAA for affirmative enforcement action or other administrative penalty. Conformity with this AC is voluntary, and nonconformity will not affect rights and obligations under existing statutes and regulations, except for the projects described in subparagraphs 3 and 4 below:

1. The standards and guidelines contained in this AC are practices the FAA recommends to establish an acceptable level of safety, performance and operation of wind cone assemblies.
2. This AC provides one, but not the only, acceptable means of meeting the requirements of Title 14 Code of Federal Regulations (CFR), Part 139, *Certification of Airports*.
3. Use of these standards and guidelines is mandatory for projects funded under Federal grant assistance programs, including the Airport Improvement Program (AIP). See Grant Assurance #34.
4. This AC is mandatory, as required by regulation, for projects funded by the Passenger Facility Charge (PFC) program. See PFC Assurance #9.

4 **Principal Changes.**

The AC incorporates the following principal changes:

1. Updated the Applicability paragraph.
2. Added the reference in paragraph 2.1.3 for Engineering Brief 67, *Light Sources Other Than Incandescent and Xenon for Airport and Obstruction Lighting Fixtures*.
3. Updated paragraph 3.1.3, Rain.
4. Updated paragraph 3.2.2, Dimensions.
5. Updated paragraph 3.8, Painting.
6. Reformatted Figure 5-1, Figure 5-2, and Figure 5-3.
7. The format of the document has been updated in this version, and minor editorial changes have been made throughout.

5 **Hyperlinks.**

Hyperlinks (allowing the reader to access documents located on the internet and to maneuver within this document) are provided throughout this document and are identified with underlined text. When navigating within this document, return to the previously viewed page by pressing the "ALT" and " ←" keys simultaneously.

6 **Use of Metrics.**

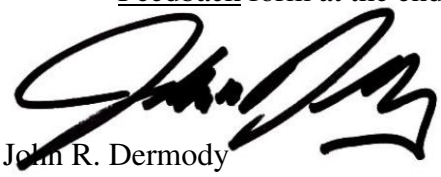
Throughout this AC, U.S. customary units are used followed with "soft" (rounded) conversion to metric units. The U.S. customary units govern.

7 **Where to Find this AC.**

You can view a list of all ACs at https://www.faa.gov/regulations_policies/advisory_circulars/. You can view the Federal Aviation Regulations at https://www.faa.gov/regulations_policies/faa_regulations/.

8 **Feedback on this AC.**

If you have suggestions for improving this AC, you may use the Advisory Circular Feedback form at the end of this AC.



John R. Dermody
Director of Airport Safety and Standards

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# CHAPTER 1. SCOPE AND CLASSIFICATION

## 1.1 Scope.

This specification covers fabric windsocks and their supporting structures used at airports and heliports to indicate surface wind conditions.

## 1.2 Wind Cone Assemblies Classification.

### 1.2.1 Types.

| | |
|---|---|
| L 806 | mounted on low mass supporting structures (typical assemblies are shown in Figure 5-1) |
| L 807 | mounted on rigid supporting structures (typical assemblies are shown in Figure 5-2) |

### 1.2.2 Styles.

| | |
|---|---|
| Style I-A | externally lighted |
| Style I-B | internally lighted (typical internally lighted wind cone is shown in Figure 5-3) |
| Style II | unlighted |

### 1.2.3 Sizes.

| | |
|---|---|
| Size 1 | 8 feet (2.5 m), for use with Type L 806 and L 807 assemblies. |
| Size 2 | 12 feet (3.75 m), for use with Type L 807 assemblies. |

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## CHAPTER 2. REFERENCED DOCUMENTS

2.1 **General.**

The following is a list of documents referenced in this AC.

2.1.1 FAA Advisory Circulars.

Copies of FAA Advisory Circulars may be obtained from:
https://www.faa.gov/airports/resources/advisory_circulars/

| | |
|---|---|
| AC 150/5300-13 | *Airport Design* |
| AC 150/5345-43 | *Specification for Obstruction Lighting Equipment* |
| AC 150/5345-45 | *Low-Impact Resistant (LIR) Structures* |
| AC 150/5345-53 | *Airport Lighting Equipment Certification Program* |

2.1.2 Federal Standard.

Copies of Federal specifications and standards may be obtained from www.dsp.dla.mil

| | |
|---|---|
| FED STD 191A | *Textile Test Methods*, or current version |

2.1.3 FAA Engineering Briefs.

Copies of FAA Engineering Briefs may be obtained from:
https://www.faa.gov/airports/engineering/engineering_briefs/

| | |
|---|---|
| Engineering Brief 67 | *Light Sources Other Than Incandescent and Xenon for Airport and Obstruction Lighting Fixtures* |

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# CHAPTER 3. EQUIPMENT REQUIREMENTS

## 3.1 Environmental Conditions.

The wind cone assemblies must be designed to operate under the following environmental conditions:

### 3.1.1 Temperature.

Any ambient temperature between -67°F (-55°C) and 131°F (+55°C.)

### 3.1.2 Wind.

Wind speed up to 75 knots (140 km/hr or 86 mph).

### 3.1.3 Rain.

Enclosure of wind cone assemblies - NEMA rating of 3R if indoors or sheltered (and elevated above the site runoff or flood line); enclosure of wind cone assemblies installed outdoors - NEMA rating of 4 including approved gasket, seals and breather drain to prevent water entry.

## 3.2 Fabric Windsocks.

### 3.2.1 Fabrication.

The fabric windsock must be:

1. made so it takes the shape of a truncated cone (cone with the tip "sliced off") when it is filled with air;
2. reinforced at all points that are subject to abrasion by flexing against the metal framework;
3. designed to allow removal and replacement without the use of special tools or stitching; and
4. constructed to allow water drainage out of the area of the basket assembly.

### 3.2.2 Dimensions.

The minimum effective length and the throat end opening diameter, respectively, of the fabric windsock are as follows:

- **Size 1** - Eight feet (2.5 m) in length and 18 inches (0.45 m) in throat diameter.
- **Size 2** - Twelve feet (3.75 m) in length and 36 inches (0.9 m) in throat diameter.

Design the taper or the fabric windsock from the throat to the trailing end to cause the windsock to fully extend when exposed to a wind of 15 knots (28 km/hr or 17 mph).

### 3.2.3 Fabric.

Fabric for the windsock may be made of cotton, a synthetic material, or a blend of the two, and may be coated. The fabric must be water repellent. The color of the windsock

fabric may be natural (white), yellow, or orange and will be specified by the purchaser. No lettering or logos are allowed on the windsock. The manufacturer will certify that the fabric meets the following requirements:

- Minimum breaking strength: warp - 150 pounds (667 N); filling - 150 pounds (667 N). Method 5102, "Strength and Elongation, Breaking of Woven Cloth; Cut Strip Method" of FED-STD-191A can be used to determine the minimum breaking strength.
- "Good" or "Excellent" rating for colorfastness as determined by Method 5671, "Colorfastness of Textile Materials to Weather; Accelerated Weathering Method" of FED-STD-191A.

3.3 **Framework.**

Provide a framework to hold the throat of the fabric windsock fully open under no wind conditions and to provide an interface with the support. It will be of low-mass design to yield minimum resistance to an inadvertent strike by aircraft. The framework may be made of metallic or nonmetallic material. Provide a means for protection against corrosion of ferrous materials. The framework will be constructed to deter the accumulation of water in the windsock. Ensure the framework supports the fabric windsock in a rigid position for three-eighths of its length. When the fabric windsock is attached to the framework, ensure the combination performs as a wind vane. Bearings, bushings, or like devices will be either permanently lubricated or provided with fittings to allow periodic lubrication.

3.4 **Supporting Structures.**

Typical supporting structures are shown in Figure 5-1, Figure 5-2, and Figure 5-3. Although the illustrations are typical, the dimensions shown are to be complied with.

3.4.1 Type L-806.

The type L-806 support must be of low-mass and designed for easy installation and maintenance. When firmly anchored, the frangible support must withstand a moment of 350 pound-feet (475 N m) without damage and fail before a moment of 700 pound-feet (950 N m) is reached by a force applied parallel to and 6 feet (1.8 m) above the surface to which the support is attached. Alternatively, a support meeting the requirements of AC 150/5345-45, *Low-Impact Resistant (LIR) Structures,* may be used.

3.4.2 Type L-807.

The type L-807 support may be hinged at its base or near its middle so the wind cone and light fixture can be serviced from the ground. When the support is mounted in place, it must withstand, without damage, a moment of not less than 3200 pound-feet (4340 N m) when the force is applied parallel to and 16 feet (4.8-m) above the surface to which the support is attached. This support may be used only where allowed by airport design standards published in AC 150/5300-13, *Airport Design*.

3.5 **Windsock Movement.**

Ensure the windsock moves freely about the vertical shaft it is attached to when subjected to wind of 3 knots (5.6 km/hr or 3.5 mph) or more and indicate the true wind direction within ±5 degrees.

3.6 **Photometric Requirements.**

Place and aim light fixtures to minimize objectionable glare to aircraft pilots. Install wiring from the base of the supporting structure to the light fixture in the structure or in electrical conduit. Ensure light output of all lighted wind cone assemblies complies with the specified requirements over the full range of manufacturer specified input voltage or current. Ensure electrical cable is of proper type and size for its application.

3.6.1 Style I-A.

Style I-A, externally lighted wind cone assemblies will be supplied with sufficient light fixtures to provide a minimum of 2 foot-candles (fc) (21.5 lux) illumination on any point of the horizontal plane described by the complete rotation of the upper surface of a fully extended cone.

3.6.2 Style I-B.

Style I-B, internally lighted wind cone assemblies, will have backup or redundant light sources so the wind cone will not be rendered ineffective at night if a primary light source fails. Arrange the power supply in such a way that when transferring electrical power to the lamps the wind cone assembly is allowed to rotate freely with the existing wind. Ensure each top and lateral surface of the fabric windsock of Style I-B wind cone assemblies have an average luminance of 10 to 30 ft-lamberts (fL) and a minimum luminance at any point of 2 fL.

3.7 **Obstruction Light.**

When specified, an L-810 red obstruction light conforming to AC 150/5345-43, *Specification for Obstruction Lighting Equipment*, must be supplied. Mount the red obstruction light at the highest point of the wind cone assembly to avoid being obscured by any other part when viewed from above.

3.8 **Painting.**

Apply one prime, one body, and one finish coat of paint to all exposed metal parts of the wind cone assembly, except reflecting surfaces of light fixtures. The prime coat will be appropriate for the metal being painted. The finish coat will consist of a colorfast orange color paint. Light sources and heat sinks may be anodized, powder coated or painted per manufacturer discretion.

3.9 **Equipment Parts and Instructional Manual.**

Supply a manual with each assembly containing, as a minimum, the following information:

- Complete wiring diagram for lighted wind cones.
- Complete parts list with the name and part number of the original manufacturer.
- Assembly and installation instructions, including mounting foundation and anchor bolt requirements.
- Maintenance instructions.

# CHAPTER 4. EQUIPMENT QUALIFICATION REQUIREMENTS

## 4.1 Qualification Procedures.

Procedures for qualifying equipment to be furnished under the federal grant assistance program for airports are contained in AC 150/5345-53, *Airport Lighting Equipment Certification Program*.

## 4.2 Qualification Tests.

### 4.2.1 General.

Each type, style, and size of wind cone assembly for which approval is requested must be tested.

### 4.2.2 Windsock Cone Attachment.

Test the attachment of the fabric windsock to the metal framework by applying the following tension to the free end of the wind cone:

- Size 1 - 45 pounds (200 N)
- Size 2 - 100 pounds (450 N)

Any distress noted in the fabric windsock or the means of attachment will be cause for rejection.

### 4.2.3 Support Rigidity.

Mount the support on a surface to simulate its normal field installation and apply the following forces to the support. Apply the force parallel to and at the specified distance from the surface:

**Table 4-1. Support Rigidity**

| Type | Force | | Distance |
|---|---|---|---|
| | Hold | Fail by | |
| L-806 | 58 lb. (264 N) | 117 lb. (530 N) [1] | 6 ft. (1.8 m) |
| L-807 | 200 lb. (890 N) | - | 16 ft. (4.9 m) |

**Note 1:** Low mass structures must cause minimal damage when struck by aircraft. The structure must not wrap around the aircraft but must crumple or collapse on impact.

### 4.2.4 Windsock Movement.

Test the windsock movement around the vertical axis. Ensure the windsock moves freely and align with a 3-knot (5.6 km/hr or 3.5 mph) wind as specified in paragraph 3.5. The wind test must be run at no less than 6 equally spaced points about the vertical axis.

4.2.5 Photometric Test.

4.2.5.1 **Style I-A, Externally Lighted Wind Cone.**

Test the illumination at the throat, trailing end, and center points of the upper surface of the extended fabric wind cone at 30-degree intervals throughout a complete horizontal rotation of the wind cone. Ensure the illumination at the test points are not less than a minimum of 2 foot candles as noted in paragraph 3.6.1.

4.2.5.2 **Style I-B, Internally Lighted Wind Cone.**

Test the internally lighted wind cone for luminance while fully extended. Luminance measurements must be taken from 1 foot away from the throat to 11 feet for Size 2, or 7 feet for Size 1, away from the throat at 1-foot intervals and 45-degree increments around the circumference of the wind cone. Ensure the spot-size for the luminance measurement is 1.5 inches in diameter. Ensure the average luminance on each top and lateral surface of the windsock is 10 to 30 fL and a minimum luminance at any point of 2 fL as noted in paragraph 3.6.2.

4.2.6 Windsock Extension.

Test the windsock to ensure that it extends fully when subjected to a wind of 15 (+2, -1) knots, 28.7 (+3.7, -1.8) km/hr, or 17.8 (+2.3, -1.2) mph.

4.2.7 Windsock Fabric.

Supply a certification from the fabric manufacturer that the fabric meets the requirements in paragraph 3.2.3. The manufacturer will retain on file written letters of conformance from the fabric manufacturer for all fabric used in the wind cone manufacture.

## CHAPTER 5. PRODUCTION TEST REQUIREMENTS

5.1 **Production Tests.**

A certified copy of test reports on the tests specified in paragraph 4.2.5, must be made available by the manufacturer upon written request by the FAA.

**Figure 5-1. Typical Type L-806 (Externally Lighted)**

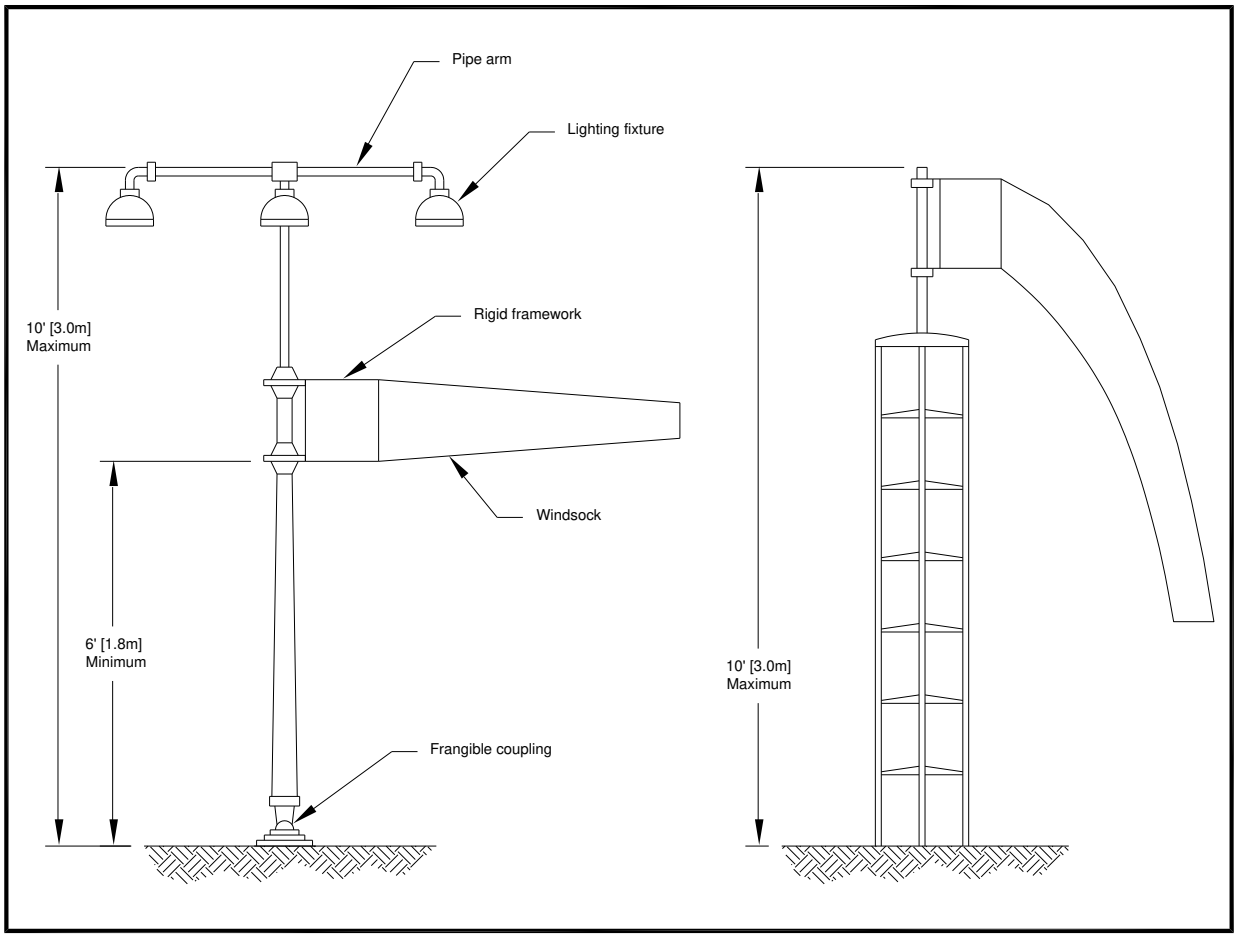


**Figure 5-2. Typical Type L-807 (Externally Lighted)**

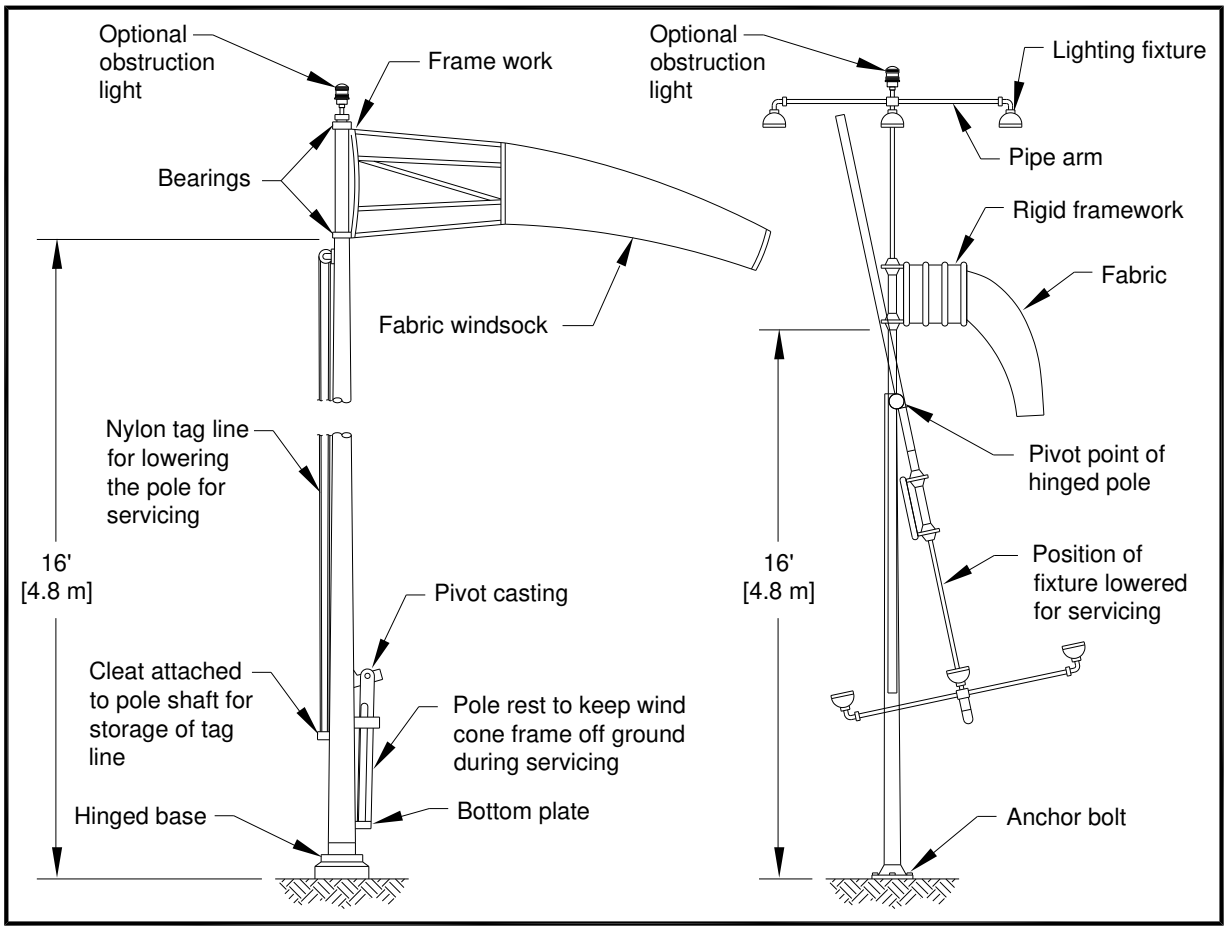
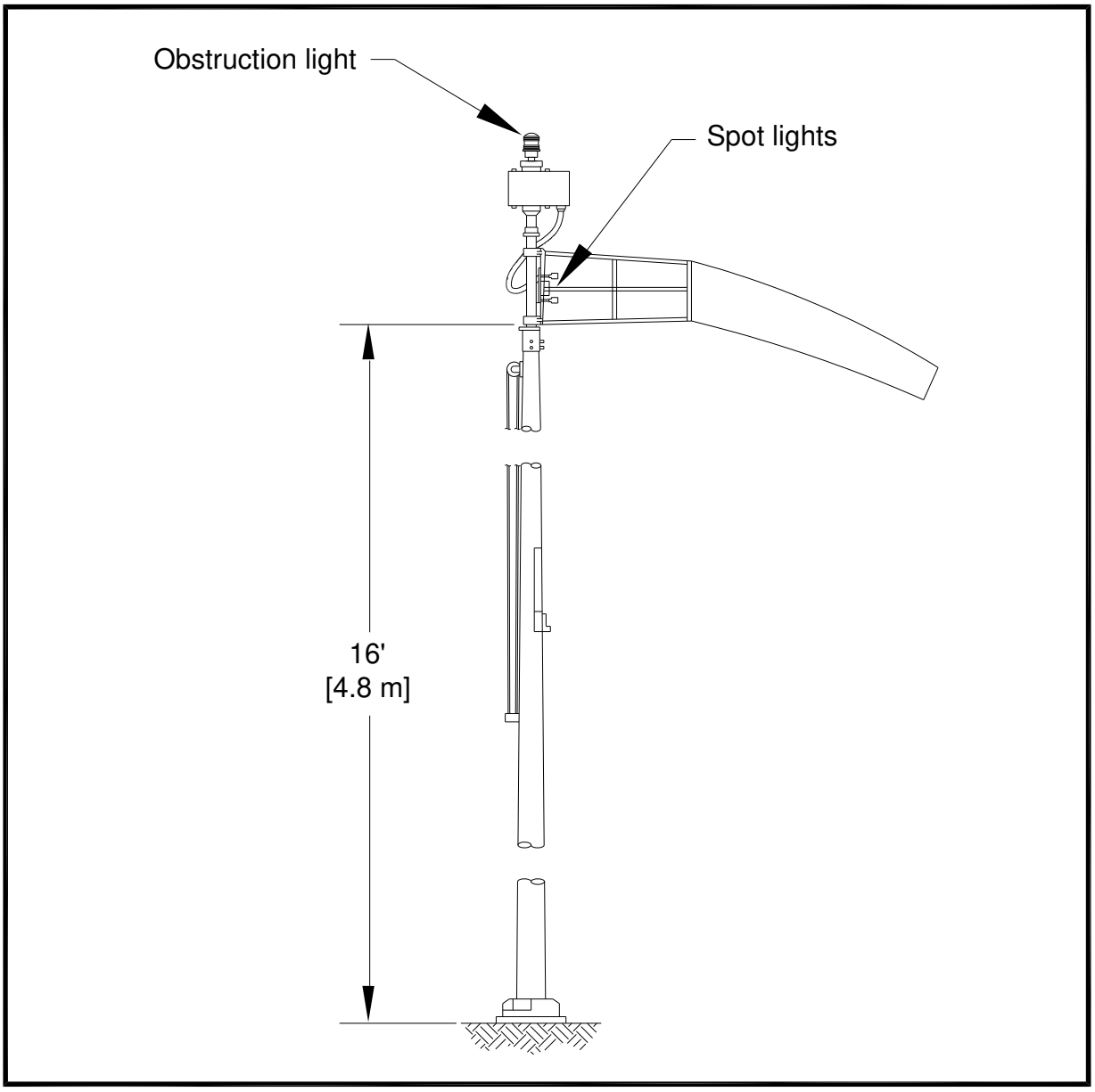


**Figure 5-3. Typical Type L-807 (Internally Lighted)**



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