



Advisory Circular

Subject: FAA Specification for Wind
Cone Assemblies

Date: Draft
Initiated By: AAS-100

AC No: 150/5345-27F
Change:

1 1 **Purpose.**

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

4 2 **Cancellation.**

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

7 3 **Applicability.**

8 The Federal Aviation Administration (FAA) recommends the standards and guidelines
9 in this AC to develop specifications and guidance for the design of wind cone
10 assemblies. This AC does not constitute a regulation and is not mandatory. However,
11 the following applies:

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

22 This AC provides an acceptable means of complying with Title 14 Code of Federal
23 Regulations (CFR) Part 139 for all Part 139 airport operators. Although non-certificated
24 airports are not required to use wind cones, the FAA recommends these airports use the
25 guidance contained in this AC to develop such standards for the continued enhancement
26 of aviation safety.

27 4 **Principal Changes.**

28 The AC incorporates the following principal changes:

- 29 1. Added the reference in paragraph 2.1.3 for Engineering Brief 67, *Light Sources*
30 *Other Than Incandescent and Xenon for Airport and Obstruction Lighting Fixtures.*
- 31 2. Reformatted Figure 5-1, Figure 5-2, and Figure 5-3.
- 32 3. Updated the Application paragraph.
- 33 4. The format of the document has been updated in this version, and minor editorial
34 changes have been made throughout.

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

39 Figures in this document are schematic representations and are not to scale.

40 5 **Use of Metrics.**

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

43 6 **Where to Find this AC.**

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

47 7 **Feedback on this AC.**

48 If you have suggestions for improving this AC, you may use the Advisory Circular
49 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 CLASSIFICATION80 1.1 **Scope.**

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

83 1.2 **Wind Cone Assemblies Classification.**84 1.2.1 Types.

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

87 L 807 mounted on rigid supporting structures |
88 (typical assemblies are shown in Figure 5-2)

89 1.2.2 Styles.

90 Style I-A externally lighted

91 Style I-B internally lighted (typical internally lighted wind cone is shown in Figure
92 5-3)

93 Style II unlighted

94 1.2.3 Sizes.

95 Size 1 8 feet (2.5 m), for use with Type L 806 and L 807 assemblies.

96 Size 2 12 feet (3.75 m), for use with Type L 807 assemblies.

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CHAPTER 2. REFERENCED DOCUMENTS99 2.1 **General.**

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

101 2.1.1 FAA Advisory Circulars.

102 Copies of FAA Advisory Circulars may be obtained from:

103 https://www.faa.gov/airports/resources/advisory_circulars/104 AC 150/5300-13 *Airport Design*105 AC 150/5345-43 *Specification for Obstruction Lighting Equipment*106 AC 150/5345-45 *Low-Impact Resistant (LIR) Structures*107 AC 150/5345-53 *Airport Lighting Equipment Certification Program*108 2.1.2 Federal Standard.109 Copies of Federal specifications and standards may be obtained from www.dsp.dla.mil110 FED STD 191A *Textile Test Methods*, or current version111 2.1.3 FAA Engineering Briefs.

112 Copies of FAA Engineering Briefs may be obtained from:

113 https://www.faa.gov/airports/engineering/engineering_briefs/114 Engineering Brief 67 *Light Sources Other Than Incandescent and Xenon for Airport*
115 *and Obstruction Lighting Fixtures*

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CHAPTER 3. EQUIPMENT REQUIREMENTS118 3.1 **Environmental Conditions.**

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

121 3.1.1 Temperature.

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

123 3.1.2 Wind.

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

125 3.2 **Fabric Windsocks.**126 3.2.1 Fabrication.

127 The fabric windsock must be:

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

135 3.2.2 Dimensions.

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

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

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

142 3.2.3 Fabric.

143 Fabric for the windsock may be made of cotton, a synthetic material, or a blend of the
144 two, and may be coated. **The** fabric must be water repellent. **The color** of the windsock
145 fabric may be natural (white), yellow, or orange **and will be** specified by the purchaser.
146 No lettering or logos **are** allowed on the windsock. The manufacturer **will** certify that
147 the fabric meets the following requirements:

- 148 • Minimum breaking strength: warp - 150 pounds (667 N); filling - 150 pounds (667
149 N). **Method 5102, “Strength and Elongation, Breaking of Woven Cloth; Cut Strip**

150 **Method**” of FED-STD-191A can be used to determine the minimum breaking
151 strength.

- 152 • “Good” or “Excellent” rating for colorfastness as determined by Method 5671,
153 “Colorfastness of Textile Materials to Weather; Accelerated Weathering Method” of
154 FED-STD-191A.

155 3.3 **Framework.**

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

166 3.4 **Supporting Structures.**

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

169 3.4.1 Type L-806.

170 The type L-806 support must be of low-mass, and designed for easy installation and
171 maintenance. When firmly anchored, the frangible support must withstand a moment of
172 350 pound-feet (475 N m) without damage and fail before a moment of 700 pound-feet
173 (950 N m) is reached by a force applied parallel to and 6 feet (1.8 m) above the surface
174 to which the support is attached. Alternatively, a support meeting the requirements of
175 AC 150/5345-45, *Lightweight Approach Light Structure*, may be used.

176 3.4.2 Type L-807.

177 The type L-807 support may be hinged at its base or near its middle so the wind cone
178 and light fixture can be serviced from the ground. When the support is mounted in
179 place, it must withstand, without damage, a moment of not less than 3200 pound-feet
180 (4340 N m) when the force is applied parallel to and 16 feet (4.8-m) above the surface
181 to which the support is attached. This support may be used only where allowed by
182 airport design standards published in AC 150/5300-13, *Airport Design*.

183 3.5 **Windsock Movement.**

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

187 3.6 **Photometric Requirements.**

188 Place and aim light fixtures to minimize objectionable glare to aircraft pilots. Install
189 wiring from the base of the supporting structure to the light fixture in the structure or in
190 electrical conduit. Ensure electrical cable is of proper type and size for its application.

191 3.6.1 Style I-A.

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

196 3.6.2 Style I-B.

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

204 3.7 **Obstruction Light.**

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

209 3.8 **Painting.**

210 Apply one prime, one body, and one finish coat of paint to all exposed metal parts of
211 the wind cone assembly, except reflecting surfaces of light fixtures. The prime coat will
212 be appropriate for the metal being painted. The finish coat will consist of a colorfast
213 orange color paint.

214 3.9 **Equipment Parts and Instructional Manual.**

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

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

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CHAPTER 4. EQUIPMENT QUALIFICATION REQUIREMENTS224 4.1 **Qualification Procedures.**

225 Procedures for qualifying equipment to be furnished under the federal grant assistance
 226 program for airports are contained in [AC 150/5345-53](#), *Airport Lighting Equipment*
 227 *Certification Program*.

228 4.2 **Qualification Tests.**229 4.2.1 General.

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

232 4.2.2 Windsock Cone Attachment.

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

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

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

239 4.2.3 Support Rigidity.

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

243

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)

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

246 4.2.4 Windsock Movement.

247 Test the windsock movement around the vertical axis. **Ensure** the windsock moves
 248 freely and align with a 3-knot (5.6 km/hr or 3.5 mph) wind as specified in paragraph
 249 [3.5](#). The wind test must be run at no less than 6 equally spaced points about the vertical
 250 axis.

251 4.2.5 Photometric Test252 4.2.5.1 **Style I-A, Externally Lighted Wind Cone.**

253 **Test the illumination** at the throat, trailing end, and center points of the
254 upper surface of the extended fabric wind cone at 30-degree intervals
255 throughout a complete horizontal rotation of the wind cone. **Ensure the**
256 **illumination at the test points are not less than a minimum of 2 foot**
257 **candles as noted in paragraph 3.6.1.** Style I-B, Internally Lighted Wind
258 Cone.

259 **Test the internally lighted wind cone** for luminance while fully extended.
260 Luminance measurements must be taken from 1 foot away from the throat
261 to 11 feet for Size 2, or 7 feet for Size 1, away from the throat at 1-foot
262 intervals and 45-degree increments around the circumference of the wind
263 cone. **Ensure the** spot-size for the luminance measurement **is** 1.5 inches in
264 diameter. **Assure the** average luminance on the top and lateral surfaces of
265 the windsock **has an average luminance of 10 to 30 ft-lamberts (fL) and a**
266 **minimum luminance at any point of 2 ft-lamberts (fL)** as noted in
267 paragraph 3.6.2.

268 4.2.6 Windsock Extension.

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

271 4.2.7 Windsock Fabric.

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

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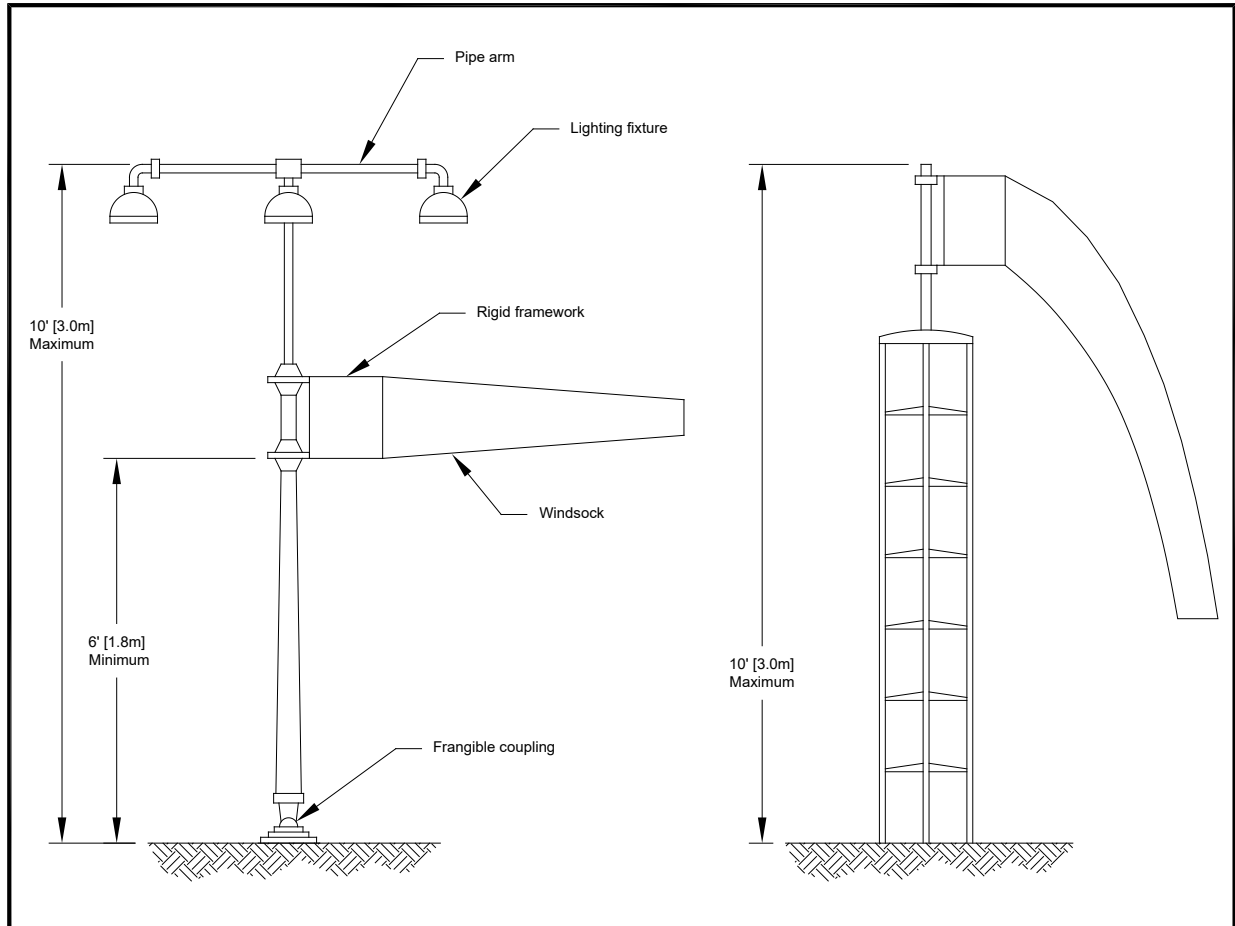
CHAPTER 5. PRODUCTION TEST REQUIREMENTS

277 5.1 Production Tests.

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

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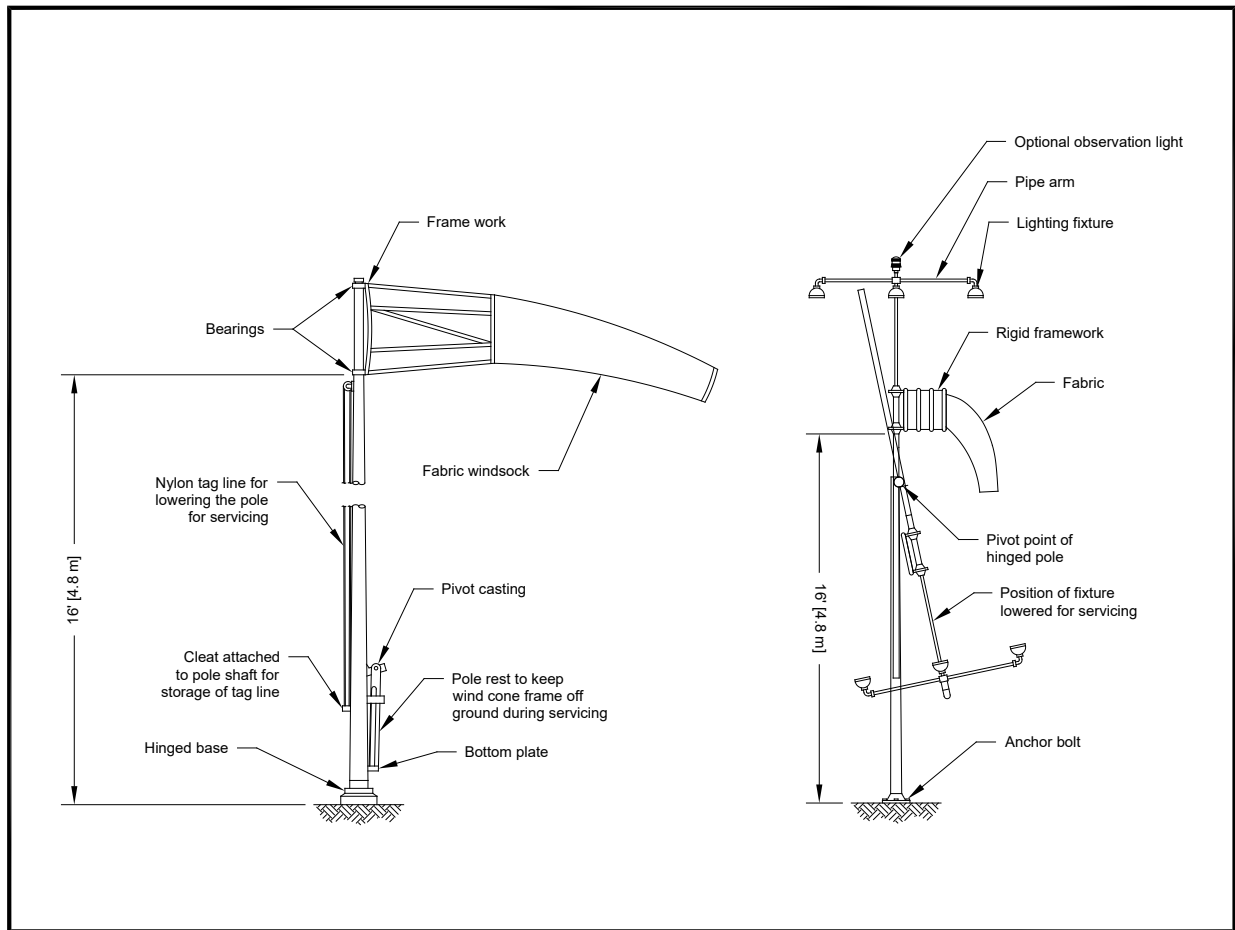
Figure 5-1. Typical Type L-806 Supports



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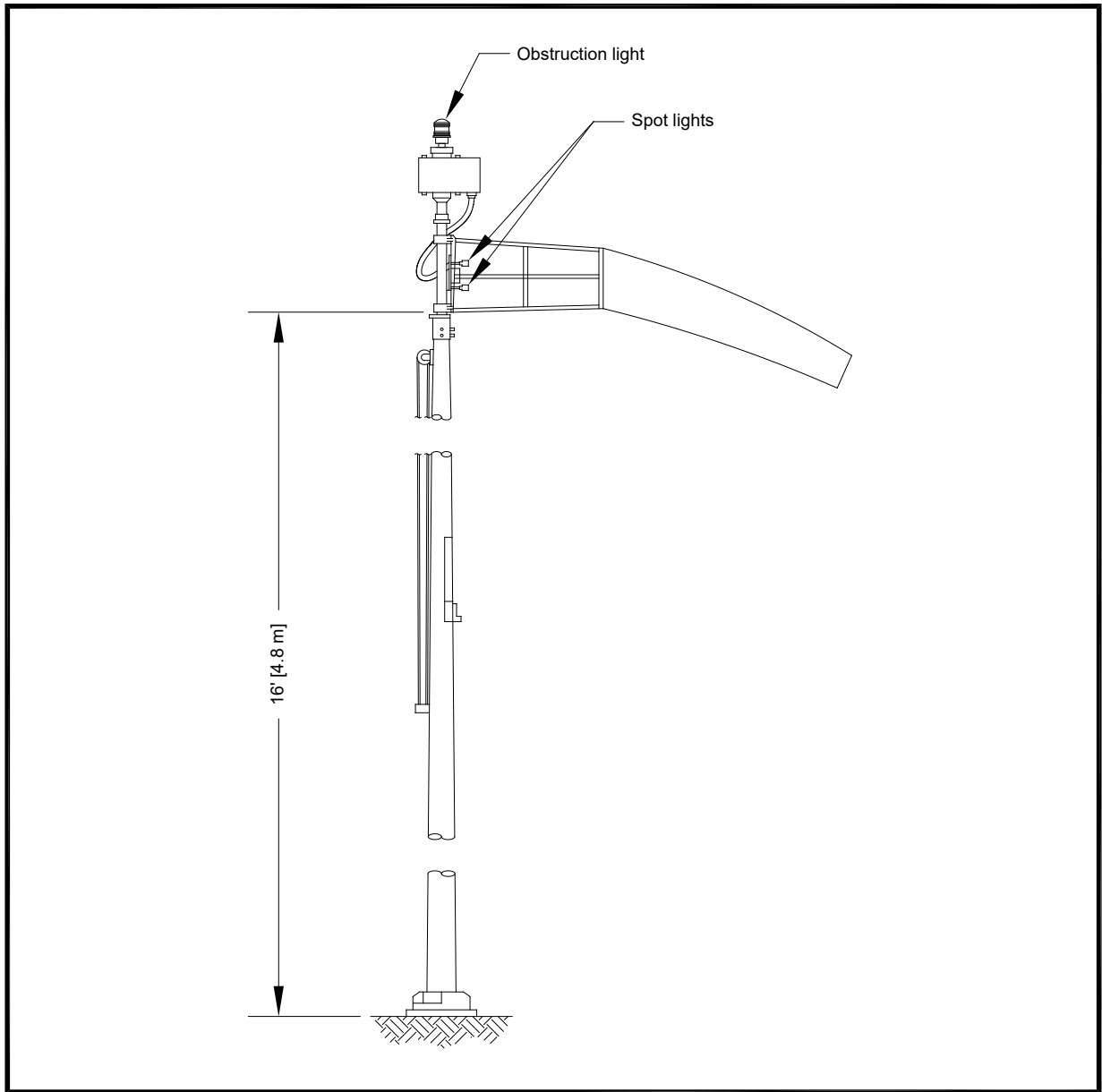
Figure 5-2. Typical Type L-807 Supports



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Figure 5-3. Typical Internally Lighted Wind Cone



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Advisory Circular Feedback

If you find an error in this AC, have recommendations for improving it, or have suggestions for new items/subjects to be added, you may let us know by (1) mailing this form to Manager, Airport Engineering Division, Federal Aviation Administration ATTN: AAS-100, 800 Independence Avenue SW, Washington DC 20591 or (2) faxing it to the attention of the Office of Airport Safety and Standards at (202) 267-5383.

Subject: AC 150/5345-27F

Date: _____

Please check all appropriate line items:

An error (procedural or typographical) has been noted in paragraph _____ on page _____.

Recommend paragraph _____ on page _____ be changed as follows:

In a future change to this AC, please cover the following subject:
(Briefly describe what you want added.)

Other comments:

I would like to discuss the above. Please contact me at (phone number, email address).

Submitted by: _____

Date: _____