

Federal Aviation Agency



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SUBJECT : SPECIFICATION FOR L-829 INTERNALLY LIGHTED AIRPORT
TAXI GUIDANCE SIGN

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1. **PURPOSE.** This circular describes the subject specification requirements and is published by the Federal Aviation Agency for the guidance of the public. The use of this specification is required for project activity under the Federal-aid Airport Program.
 2. **CANCELLATION.** This advisory circular replaces FAA Specification L-829, "Internally Lighted Airport Taxi Guidance Sign," dated October 15, 1955. No substantive changes have been made to the prior specification in placing it in the Advisory Circular System.
 3. **DESCRIPTION OF PUBLICATION.** The specification requirements presented are for an internally lighted sign fixture for the guidance of taxiing aircraft on an airport.
 4. **APPLICABLE SPECIFICATIONS.** The following specifications, as referred to hereinafter, of the issues in effect on the date of application for qualification (paragraph 11) are applicable to this specification. In case of conflict between this specification and the applicable specifications, this specification shall govern.
 - a. **FAA Specifications.** Copies of FAA specifications may be obtained from the Federal Aviation Agency, Distribution Section, HQ-438, Washington, D. C. 20553.
 - (1) Specification for L-809 Airport Light Base and Transformer Housing (AC 150/5345-6).
 - (2) L-823 - Plug and Receptacle, Cable Connectors.
 - (3) L-833 - Individual Lamp Series-to-Series Type Insulating Transformer for 600 Volt or 3000 Volt Series Circuits.
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- (4) L-834 - Individual Lamp Series-to-Series Type Insulating Transformer for 5000 Volt Series Circuit.

b. Federal Specifications. Copies of Federal specifications may be obtained from the appropriate regional General Service Administration office.

- (1) J-C-00103 - Cable, Power, Electrical, (Rubber-Insulated, General Purpose) and Wire, Electrical, (Rubber-Insulated, General Purpose).

- (2) QQ-A-359 - Aluminum Alloy Plate and Sheet 3003.

- (3) QQ-A-591 - Aluminum Alloy Special Shaped Section.

- (4) QQ-A-601 - Aluminum Alloy Sand Castings.

- (5) WW-C-581 - Conduit, Metal, Rigid; and Coupling, Elbow, and Nipple, Electrical Conduit: Zinc-Coated.

c. American Society for Testing and Materials (ASTM) Specification. Copies of the ASTM specification may be obtained from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania, at the published price.

- (1) Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Ordinary Uses.

5. MATERIALS.

- a. All sheet aluminum used in the construction of the housing shall conform to Federal Specification QQ-A-359.
- b. All cast aluminum used in the construction of the housing shall conform to Federal Specification QQ-A-601, Alloy 43, Temper "F." Copper-bearing hardware in contact with aluminum shall be cadmium, nickel, or zinc plated.
- c. All plastic material for panels shall be of a quality similar and equal to Rohm and Haas Plexiglas.

6. WORKMANSHIP. Workmanship shall be in accordance with highest quality commercial practice covering this class of work.

7. TYPE. The sign fixture shall be built in two types. The two types are as follows:

- a. Type I Series - For operation with 6.6 ampere, 60 cycle series lamps.
- b. Type II Multiple - For operation with 120 volt lamps.

8. PERFORMANCE REQUIREMENTS.

- a. The fixture shall be designed for operation from a 6.6 ampere series circuit or directly from a 120 volt multiple circuit.
- b. The entire unit, when installed with mounting columns and base plates, shall be designed and constructed for continuous service under the following operating conditions:
 - (1) Temperature - Any ambient temperature from a minimum of -45° F. to a maximum of +120° F. at sea level.
 - (2) Weather - Continuous outdoor operation under all normal weather conditions.
 - (3) Wind - Wind velocities up to 100 miles an hour shall not cause any discernible permanent deformation of any part of the unit.
- c. The translucent portion of the panel shall have a transmission of not less than 20%.
- d. When operated with specified lamps at rated current or voltage, the resultant brightness should be within the range of 30 to 60 foot-lamberts.

9. DETAIL REQUIREMENTS.

- a. Base Assembly. The base, if required, shall conform to FAA Advisory Circular AC 150/5345-6. The base is not a part of this specification.
- b. Insulating Transformers.
 - (1) Series Circuits. The transformer for 6.6 ampere series supply circuits shall conform to FAA Specification L-833 or FAA Specification L-834. The transformers are not a part of this specification.
 - (a) One to two lamp sign(s) shall use one 30-45 watt, L-833, series-to-series, 6.6 ampere transformer.
 - (b) Two to four lamp signs shall use one 100 watt, L-834, Type I series-to-series, 6.6 ampere transformer.

- (c) Five to eight lamp signs shall use one 200 watt, L-834, Type II, series-to-series, 6.6 ampere transformer.
- (2) Multiple Circuits. No transformer is required for 120/240 volts multiple supply circuits.
- c. Housing. The housing shall be designed for receiving and securely holding the removable face plates for the sign markings. The housing with the face plates in their positions shall provide a weatherproof enclosure of ample strength and rigidity.
 - (1) Construction.
 - (a) The housing shall be constructed of aluminum with reinforcing members where necessary. The top, bottom, and end sections shall be enclosed with aluminum of not less than 0.0625 inch in thickness. The housing shall be designed so as to produce individual signs as required.
 - (b) Single panel unit construction, capable of extension by attachment or multiple panel unit construction, will be permissible. For multiple panel units or attached single panel units, the standard face plates shall be not more than 14½ inches center-to-center.
 - (c) The height of the housing shall be approximately 15 inches and the width shall be 8 inches from face-to-face. (See Figure 2.) A 2-inch nominal border shall be maintained above and below the cutout number or letters.
 - (d) The housing shall provide 1/4-inch wide tracks or channels for the vertical edges of the face plates so that the face plates can be inserted or removed manually in the field from above the unit without the aid of special tools. The tracks or channels shall not cover or extend more than 1/2-inch over the inside edge of the face plates nor more than 5/8-inch over the outside edge of the face plates. In addition, on the bottom section, an inside raised ridge or flange not more than 1/2-inch or less than 3/8-inch high shall be provided for the bottom edge of the face plate. This inside ridge or flange shall be designed to help prevent entrance of moisture, sand, or dirt under the face plate. The above provisions are required to insure interchangeability of sign face plates among signs of the various approved manufacturers.

- (e) Joints and edges of the housing shall be fastened by welds, rivets, or other approved methods so as to form a rigid enclosure. Provision shall be made in the bottom section for one or more mounting plates for slip fitters according to size of signs. The mounting plates shall be designed to provide adequate bearing capacity for the sign. Signs composed of one panel or two panels will require only one central mounting plate. Three or more panel signs will require additional mounting plates equally spaced in accordance with the one or two panel mounting plate arrangement. (See Figure 2.)
 - (f) The mounting plate(s) shall be constructed so as to form a slip fitter(s) for receiving a 2-inch standard pipe column. The slip fitter(s) shall have not less than two set screws. A minimum of two weep holes shall be provided in the bottom of the housing in each panel section to provide adequate drainage of water from the interior.
 - (g) The top cover of the housing shall be secured with not less than four suitable heavy-duty, trunk latch type fasteners.
- (2) Sockets. One socket for each panel section shall be provided and shall be rigidly mounted on a wiring channel or other suitable support. The arrangement of the sockets shall be such that the lamp center will be located approximately in the center of the panel section approximately 4 inches from the face of either side panel. Current carrying parts of the sockets shall be plated and no material shall be used which carbonizes during flashover. Multiple sockets shall be medium screw base and series sockets shall be medium prefocus base. The sockets shall provide screw terminals for connection to the incoming leads and shall have a rating suitable for service intended.
- (3) Wiring.
- (a) Number 14 AWG flexible rubber insulated weatherproof wire, conforming to Federal Specification J-C-00103, Type RH, shall be used for wiring the fixture. Wires shall be neatly run and fastened by clips or any other acceptable method so as to be mechanically secure and not subject to abrasion.
 - (b) For Type I signs (for operation with 6.6 ampere series lamps) of two or more panels, a suitable terminal block shall be furnished and shall be mounted not less than 1½ inches above the inside of the bottom of the sign. For Type II units (for operation with 120 volt medium screw base lamps), a suitable terminal block, fuse holder, and fuse shall be furnished. The fuse holder shall be an

automotive Type 3AG or equal. The fuse shall be rated 3 amperes and shall be $1\frac{1}{2}$ inches long by $\frac{1}{2}$ inch diameter. The terminal block and the fuse holder shall both be mounted not less than $1\frac{1}{2}$ inches above the inside of the bottom of the sign.

- (c) The supply leads of the Type I series fixture shall have a connecting plug, conforming to Figure 1a of FAA Specification L-823, vulcanized to it for connecting to the transformer secondary receptacle. The lead shall be of sufficient length to provide an extension outside of the pipe column of 8 inches, plus or minus 1 inch, to the face of the connecting plug. A cable clamp shall be provided near the cable point of entry into the housing to prevent strain on the terminal block or socket terminals.

d. Sign Face Plates.

- (1) Sign face plates shall be constructed of aluminum. They shall be 14 inches square and have a thickness of not more than 0.2187 inch nor less than 0.1562 inch. Each plate shall be either in the form of a blank panel or with specified characters cut out for providing an illuminated letter, number, or symbol. The cutout shall be in accordance with the grid template guide as shown on Figure 1 of this specification. This 14 by 14 grid may be reproduced to actual scale of 14 inches square which will produce all characters in the exact proportions and dimensions required. The height of the letters and numbers shall be $10\text{-}\frac{3}{4}$ inches with a stroke dimension of $\frac{3}{4}$ inch. The symbols shall be in the same proportion as shown on the grid. Where required, astragals or ribs of the face plate aluminum shall be left to hold in place center portions of the cutout numbers, letters, or symbols. Such astragals or ribs shall be approximately $\frac{3}{8}$ inch wide.
- (2) On the back of each cutout plate, there shall be attached, by means of suitable holding clamps or other devices, a removable 12-inch by 12-inch plastic panel. (See Figure 2.) The material for the panel shall be orange-yellow plastic, $\frac{1}{8}$ inch thick, similar or equal to Rohm and Haas Plexiglas No. 2068.
- (3) The clamps or other devices used along the edges of the plastic panel shall be designed to permit nominal expansion or contraction of the plastic panel within the temperature ranges specified in paragraph 8b(1) without causing buckling of the plastic.

As an additional precaution against buckling and to prevent excessive entrance of dirt, sand, and water through the cutout symbols of the aluminum face plate, not less than two bolts or screws shall be used where needed to hold the center section of the plastic panel firmly against the aluminum face plate. Oversize holes shall be drilled in the plastic for these bolts or screws, and suitable cushion spacers shall be used in order to allow for slight movement of the plastic panel under conditions causing expansion and contraction of the material.

- (4) With the plastic panel fastened in place on the aluminum face plate, a minimum of 1/2 inch clearance around all inside edges of the face plate shall be provided. This clear border is to be maintained to permit the face plates to fit into the channels or tracks in all positions. Suitable strips of felt or other cushioning material shall be cemented to the inside or outside of the face plate along the sliding surfaces to prevent rattling when in place in the tracks or channels.
- (5) As an alternate, the sign plate may be constructed entirely of plastic material so fabricated to produce the required translucent letters on a black background. Such plastic face plates shall be completely interchangeable with the aluminum face plates described above. In either method used, all light leakage around the outside edges of the sign plates must be effectively stopped.

e. Mounting Assembly. The mounting assembly shall consist of the number of breakable couplings and base plates required according to the size of the signs. The overall height of the unit, mounted in place, shall not exceed 30 inches nor be less than 20 inches above ground level. All parts of the mounting assembly shall be of nonferrous metal or of ferrous metal suitably protected against corrosion. Aluminum sand castings shall conform to Federal Specification QQ-A-601, Alloy 43, Temper "F", or Alloy 214, Temper "F", and aluminum die castings to Federal Specification QQ-A-591, Alloy 13, A13, or 360. *

- (1) The breakable coupling shall have a 2-inch tapered male thread for mounting on the base plate. This thread shall conform to the requirements of ASTM Specification A120. The coupling shall have a "shearing groove" - produced by scoring, molding, etc. - so that it will withstand a static load of 300 pounds applied perpendicular to the axis of the coupling at a point 12 inches from the shearing groove and shall break cleanly at the groove when a static load of 500 pounds is applied at the same position. In addition, deflection at a point 12 inches from the shearing groove shall not be more than 1/2 inch when a static load of 300 pounds is applied as described above. The breakable coupling shall have a hexagonal section between the thread and the shearing groove to facilitate removal of a broken coupling.

The breakable coupling shall also be provided with one or more drainage holes near the shearing groove.

- (2) The base plate shall be cast or fabricated to fit the base shown on Figure 1 of Advisory Circular AC 150/5345-6. The plate shall be designed to receive the threaded end of the breakable coupling specified above, and means shall be provided for attaching a disconnecting receptacle, specified as Figure 1c in FAA Specification L-823, to the bottom surface of the base plate to obtain a watertight seal.
- (3) A rubber gasket for the base flange, if required, shall be supplied to obtain a watertight seal with the base cover plate. This gasket shall have a minimum thickness of 1/8 inch and shall fit the bolt hole circle of the base plate.

f. Lamps.

- (1) Series - 30-watt, 6.6 ampere, C-2V filament, T-10 clear bulb, 1-1/2 inch light center length, 3-5/16 inch maximum overall length, 1000 hour, medium prefocus base.
- (2) Series 325 lumen - 6.6 ampere, C-8 filament, A-21 clear bulb, 2-3/4 inch light center length, 5-5/16 inch maximum overall length, 2000 hour, medium prefocus base.
- (3) Multiple 25 watt - 120 volt, C-9 filament, A-19 clear, white or frosted bulb, 2-1/2 inch light center length, 3-5/16 inch maximum overall length, 1000 hour, medium screw base.

g. Painting and Finish.

- (1) All exterior metal surfaces of the housing, including aluminum face plates, shall be painted with one coat of high-quality, exterior-type, black primer paint and two coats of high-quality, exterior-type, lusterless black enamel.
- (2) For increased daytime legibility of the signs, each cutout numeral, letter, or symbol shall be completely outlined by a 3/8-inch wide stripe of orange-yellow, high-quality, exterior-type enamel painted on the black aluminum or black plastic face plate. This shall include the painting of any astragals or ribs holding the cutout portions and also all inside edges adjacent to the plastic panel. The orange-yellow color of the enamel shall match the orange-yellow color of the plastic panel. The striping shall produce the effect of numerals, letters, and symbols with a 1-1/2 inch wide stroke in daylight when the sign is unlighted. At night, when the sign is internally lighted, only the 3/4-inch wide stroke will be visible.

- (3) All interior surfaces, excluding plastic panels, shall be painted with one coat of high-quality, outdoor-type white primer, and one coat of high-quality, outdoor-type white enamel. The white enamel shall possess a high reflectance factor.

- h. Parts List and Installation Instructions. A complete parts list and installation instruction shall be furnished with each unit. Sufficient drawings or illustrations shall be provided to indicate clearly the method of installation.

10. TESTING.

a. Qualification Testing.

- (1) The taxi guidance sign shall be checked for its ability to withstand anticipated wind velocity or propeller or jet blasts up to practicable limits without discernible permanent deformation. A static load equal to 1/2 pound per square inch over the front surface of the sign shall be applied horizontally on the face of the sign for a period of 10 minutes. This test shall be made with the unit completely assembled and rigidly held in position by the base assembly.
 - (2) The weatherproof requirement of the unit shall be determined as follows. The sign shall be operated for at least 10 minutes and then a stream of water, from a hose of not less than 0.5 inch nor more than 0.75 inch nominal inside diameter, shall be played on the unit from a distance of not less than 15 feet nor more than 20 feet. The pressure shall be sufficient to throw the water 15 feet above the nozzle. The stream shall be directed against each vertical side and the top of the fixture for a period of not less than 2 minutes. The fixture shall be considered weatherproof if it continues to operate satisfactorily during and after this test and there is no breakage of lamps or plastic, or no excessive amount of water collects in the bottom portion of the fixture.
- b. Additional inspection and tests shall be made as deemed necessary by the Federal Aviation Agency, Airports Service, Washington, D. C. 20553, to determine compliance with this specification.

11. QUALIFICATION.

- a. The manufacturer shall furnish a taxi guidance sign to a disinterested testing laboratory to be tested as described in paragraph 10 to obtain certification regarding the ability to manufacture equipment meeting the requirements of this specification. The disinterested testing laboratory shall be a laboratory acceptable to the Federal Aviation Agency, Airports Service, Washington, D. C. 20553. The

manufacturer shall furnish 2 copies of the testing laboratory's reports to the Airports Service for review and approval consideration. Upon approval of test reports which show satisfactory certification of compliance, the Airports Service will list the name of the qualified manufacturer and a description of their equipment in the Advisory Circular AC 150/5345-1, "Approved Airport Lighting Equipment." The cost of the testing shall be borne by the manufacturer offering equipment for qualification.

- b. A copy of the plastic manufacturers' material certification shall also be furnished.
- c. In addition to the required testing laboratory reports, the manufacturer shall furnish a certified statement that all of the dimensional and material requirements as specified in this specification have been complied with. A checklist indicating applicable paragraphs may be used.
- d. Parts lists and installation instructions shall be submitted to the Federal Aviation Agency, Airports Service, Washington, D. C. 20553, for review.
- e. At any time after approval has been granted under the above conditions, a certified copy of factory test reports on the latest production equipment produced under this specification shall be made available by the manufacturer upon written request by the Federal Aviation Agency, Airports Service, Washington, D. C. 20553.

12. HOW TO GET THIS PUBLICATION.

- a. Order copies of this publication from:

Federal Aviation Agency
Distribution Section, HQ-438
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- b. Identify the publication in your order as:

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Specification for L-829 Internally Lighted Airport Taxi
Guidance Sign
Dated 10/15/63

- c. There is no charge for this publication.


Cole Morrow, Director
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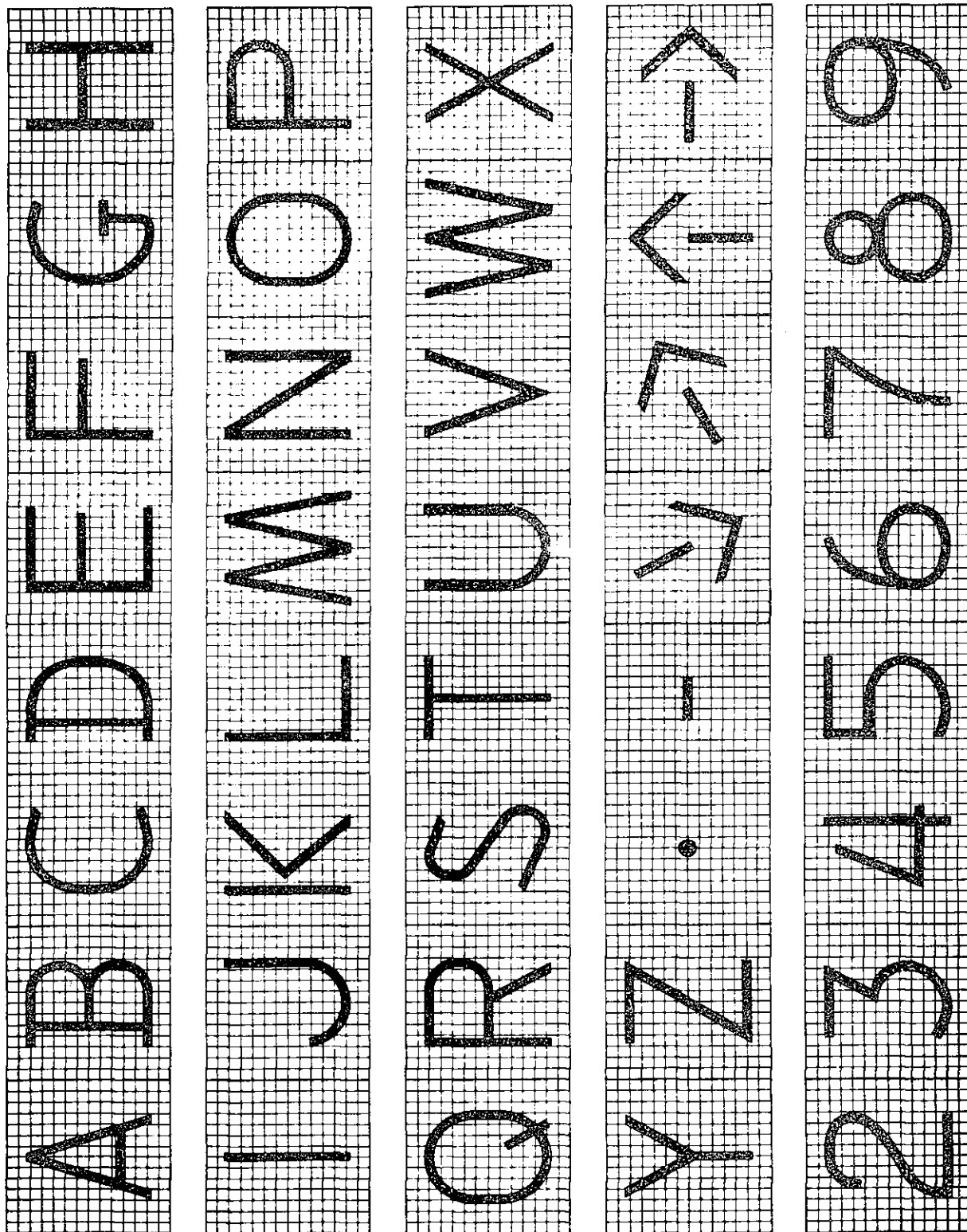
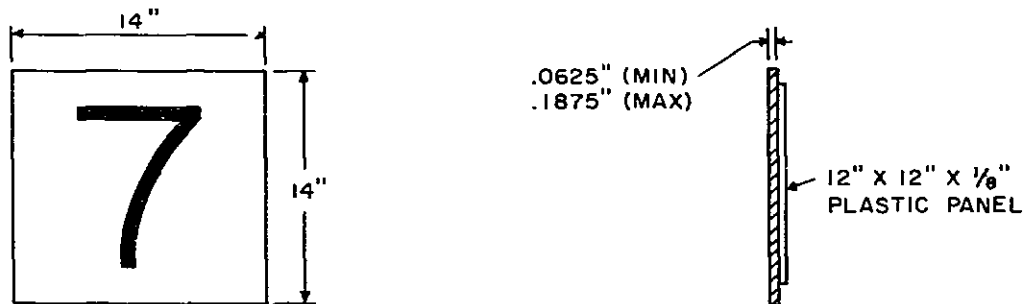
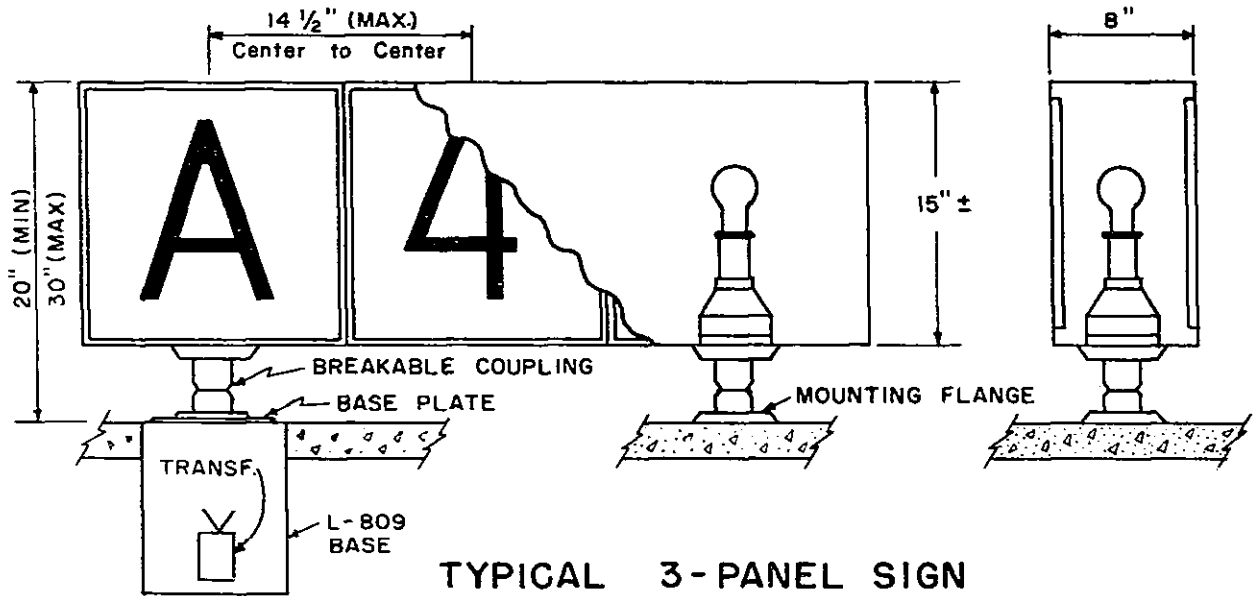
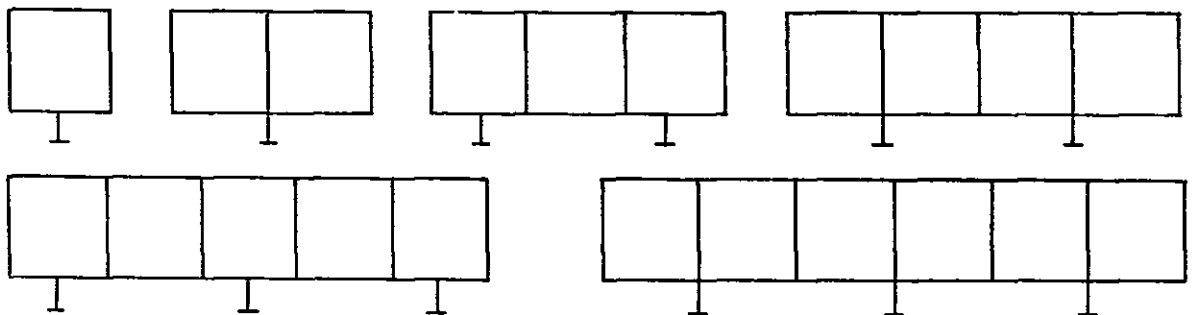


FIGURE 1. ALPHABET FOR FAA TAXIWAY GUIDANCE SIGNS



TYPICAL FACE PLATE WITH PLASTIC PANEL



MOUNTING ARRANGEMENTS

FIGURE 2