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FAA/DOD L-857
DATE: 10/26/70

ADVISORY CIRCULAR

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

SUBJECT: FAA SPECIFICATION L-857, AIRPORT LIGHT BASES, TRANSFORMER HOUSINGS, AND JUNCTION BOXES

1. PURPOSE. This circular describes specification requirements for airport light bases, transformer housings and junction boxes for the guidance of the public.

2. DESCRIPTION OF SPECIFICATION. This equipment specification establishes the preformance requirements and pertinent construction details for airport light bases and transformer housing designed for installation in traffic and nontraffic areas of an airport. Details are included for junction boxes suitable for use in airport pavements.

3. CANCELLATIONS. The following advisory circulars are cancelled.

   a. AC 150/5345-6, Specification for L-809, Airport Light Base and Transformer Housing.

   b. AC 150/5345-32, Specification for L-837 Large-Size Light Base and Transformer Housing.

4. HOW TO OBTAIN THIS CIRCULAR. Obtain additional copies of this circular AC 150/5345-42, FAA Specification L-857, Airport Light Bases, Transformer Housings, and Junction Boxes from the Department of Transportation Distribution Unit, TAD-484.3, Washington, D. C. 20590.

Chester G. Bowers
Director, Airports Service

Initiated by: AS-580

DEPARTMENT OF TRANSPORTATION

FEDERAL AVIATION ADMINISTRATION SPECIFICATION

LIGHT BASE AND TRANSFORMER HOUSING

1. SCOPE AND CLASSIFICATION.

1.1 Scope. - This specification covers the requirements for watertight metal containers fabricated to serve as underground housings for aviation lights and associated transformers and power supplies, or as junction boxes for power and control cables.

1.2 Classification. - Two types of light bases and transformer housings are covered by this specification.

1.2.1 Type. - Light Bases and transformer housings with the following distinctive features are covered by this specification.

1.2.1.1 Type I. - For use in places not usually subjected to aircraft or surface vehicle loads and employing a flat gasket between the cover or light and the base flange for sealing.

1.2.1.1.1 12 inch nominal inside diameter base conforming to Figure 1.

1.2.1.1.2 16 inch nominal inside diameter base conforming to Figure 1.

1.2.1.1.3 Extension to 12 inch nominal inside diameter base conforming to Figure 2.

1.2.1.1.4 Extension to 16 inch nominal inside diameter base conforming to Figure 2.

1.2.1.2 Type II. - For use in places that are or may be subjected to aircraft or surface vehicle loads and employing metal-to-metal contact between the cover or light and the base flange for sealing.

1.2.1.2.1 10 inch nominal inside diameter base conforming to Figure 3 of this specification.

1.2.1.2.2 12 inch nominal inside diameter base conforming to Figure 3 of this specification.

1.2.1.2.3 Extension to 10 inch nominal inside diameter base conforming to Figure 4.

1.2.1.2.5 5 inch nominal outside diameter junction box conforming to Figure 5.

1.2.1.2.6 Extension to 5 inch nominal inside diameter base conforming to Figure 6 of this specification.

2. APPLICABLE DOCUMENTS.

2.1 Military, Federal, and FAA publications. The following documents of the issues in effect on the date of application for qualification, paragraph 5, form a part of this specification and are applicable to the extent specified herein.

2.1.1 Military Specifications.

2.1.1.1 MIL-P-26915 (USAF). PRIMER COATING, ZINC DUST PIGMENT FOR STEEL SURFACES.

2.1.1.2 MIL R-5847. RUBBER, SILICONE, HIGH AND LOW TEMPERATURE RESISTANT

2.1.2 MILITARY STANDARDS.

2.1.2.1 MIL STD 10. SURFACE ROUGHNESS, WAVINESS AND LAY.

2.1.2.2 MIL STD 105. SAMPLING PROCEDURE AND TABLE FOR INSPECTION BY ATTRIBUTES.

2.1.3 FEDERAL SPECIFICATIONS.

2.1.3.1 QQ-P-416. PLATING, CADIUM (ELECTRODEPOSITED).

2.1.3.2 QQ-Z-325. ZINC COATING, ELECTRODEPOSITED, REQUIREMENT FOR.

2.1.3.3 ZZ-R-765.- RUBBER, SILICON: LOW AND HIGH-TEMPERATURE AND TEAR RESISTANT.

2.1.4 AMERICAN SOCIETY FOR TESTING MATERIAL (ASTM) SPECIFICATIONS.

2.1.4.1 ASTM-A153. STANDARD SPECIFICATION FOR ZINC COATING (HOT DIP) ON IRON AND STEEL HARDWARE.

2.1.4.2 ASTM-A385. RECOMMENDED PRACTICE FOR PROVIDING HIGH QUALITY ZINC COATINGS (HOT DIP) ON ASSEMBLED PRODUCTS.

2.1.4.3.ASTM-A386. STANDARD SPECIFICATIONS FOR ZINC COATING (HOT DIP) ON ASSEMBLED STEEL PRODUCTS.

2.1.5 FAA DRAWING. D5225. ADAPTER PLATE FOR LB LIGHT BASES.

2.2 SOURCE OF PUBLICATIONS.

2.2.1 Copies of Military specifications and standards may be obtained from the Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, Pennsylvania 19120.

2.2.2 Information on obtaining copies of Federal specifications may be obtained from General Services Administration offices in Washington, D. C., Seattle, San Francisco, Denver, Kansas City, Chicago, Atlanta, New York, Boston, Dallas, and Los Angeles.

2.2.3 Copies of ASTM specifications may be obtained from the American Standards Association, Incorporated, 10 East 40th Street, New York, New York 10016.

2.2.4 Copies of FAA Drawings may be obtained from the Federal Aviation Administration, System Standards Branch, RD-420, Washington, D. C. 20590.

3. PERFORMANCE REQUIREMENTS.

3.1 General. - The light base and transformer housing shall be suitable for continuous underground service embedded in concrete or buried in the ground without encasement.

4. DETAIL REQUIREMENTS.

4.1 Base Design of Type I bases. - The design of the base shall conform to Figures 1 and 2.

4.1.1 Cover flange. - The cover flange shall be fabricated from commercial quality steel plate necessary to meet the test requirements of paragraph 5. The dimensions of the flange and its bolt circle shall be as shown on Figure 1 or 2. The flat surface of the flange shall lie between two parallel planes perpendicular to the axis of the cylindrical body and separated by not more than 0.030 inch. The flange shall be continuously welded to the body to provide a watertight seal with the bottom flange on the extension.

4.1.2 Body. - The entire body, including sides and bottom, shall be fabricated from commercial quality sheet steel necessary to meet the test requirements

of paragraph 5. The body may be formed from one continuous piece or may be constructed of two or more pieces. If the latter construction is utilized, the seams shall be watertight and the seam strength shall equal or exceed that of the original metal. The dimensions of the housing shall be as shown on Figures 1 or 2 of this specification. Two,two-inch conduit couplings shall be provided near the bottom of the housing by continuous welding to the body. The location and size of hubs as shown in Figure 1 shall be considered standard, but the location, number, and size of the hubs may vary to meet special conditions. Sharp edges on the inside of the body where entrance hubs meet the inside surface of the housing shall be broken or ground down to eliminate cutting cable insulation at these points. The length of the body section as shown in Figure 1 or 2 of this specification shall be considered standard, but the length may vary to meet special conditions. Extensions shall have a flange instead of a solid bottom as in Figure 2.

4.1.3 Protective coating. The entire base, before the addition of electrical hardware and performing the tapping operations, shall be treated after fabrication for corrosion protection by hot-dip galvanizing. Burrs and sharp edges shall be removed prior to, and after galvanizing. Any such removal after galvanizing shall not impair galvanized coating. The minimum weight of coating shall be in accordance with ASTM-A386,Class A (1.8 to 2 ounces per square foot), and shall be applied in accordance with ASTM-A385. Tapped holes, of any material other than a zinc dust primer meeting MIL-P-26915 (USAF) shall not be permitted for touch up. Cover flange shall be wiped smooth to a flatness of $\pm$ .010 inches. The use of dust primer,in accordance with MIL-P-26915 (USAF),shall not exceed ten percent of total area.

4.1.4 Protective Shipping Cover. - A protective shipping cover, bolted to all six tapped bolt holes, shall be furnished to provide protection during shipment and installation. The cover shall be made of plywood or metal. A special cover requiring special thickness and/or material for installation requirements may be furnished, but shall not be equal to $\frac{1}{2}$ inch thick exterior grade plywood in strength. A polyethylene gasket of 3 mills thickness shall be used between cover and flange.

4.1.5 Grounding lug. A steel lug shall be welded to the interior wall of each light base, before galvanizing, approximately 8 inches above the bottom of the base. The details of the grounding lug as shown in Figures 1 and 2 are standards, but the location may vary to meet specific conditions. A bronze or copper ground connector shall be fastened to the steel lug after galvanizing.

4.2 Base Design of Type II bases. - The design of the base shall conform to Figures1 and 2 for metal-to-metal contact using gasket as shown in Figure 7. For "O" ring gasket applications, see Figures 3, 4, 5, and 6.

4.2.1 Top Flange. - The top flange shall be fabricated from commercial quality steel plate or bar necessary to meet the test requirements in paragraph 5. The dimensions of the flange, bolt circle, and "O" ring groove shall be as shown in Figure 3, 4, 5, and 6. The top face, outside and inside diameter, and "O" ring groove shall be machine finished as shown in Figures 3, 4, 5, and 6. The flat surface of the flange shall lie between two parallel planes perpendicular to the axis of the cylindrical body and separated by not more than 0.01 inch. Surface finishes shall be determined as roughness height ratings in micro-inches in accordance with Military MIL-STD-10.

4.2.3 Middle flange. The middle flange shall be fabricated from commercial quality steel plate necessary to meet the test requirements in paragraph 5. The dimensions of the middle flange shall be as shown in Figure 3.

4.2.4 Lower body section. - The entire lower body section including sides and bottom, shall be fabricated from commercial quality steel sheet. The body may be formed from one continuous piece or may be constructed of two or more pieces. If the latter construction is utilized, the seams shall be watertight and the seam strength shall equal or exceed that of the original metal. The dimensions of the lower body section shall be as shown in Figure 3. Two, two-inch conduit couplings shall be provided near the bottom of the housings by continuous welding to the lower body section. The lower body section shall be continuously welded to the middle flange. The location and size of hubs as shown in Figure 3 shall be considered standard, but optional size, location, and number of hubs can be obtained. The length of the lower body section as shown in Figure 3 shall be considered standard, but optional lengths can be obtained. Sharp edges on the inside of the body, where entrance hubs meet the inside surface of the body, shall be broken or ground down to eliminate cutting cable insulation at these points.

4.2.5 "O" ring gasket. - The "O" ring gasket shall meet dimensions and requirements as shown in Figures 3, 4, 5, and 6. The "O" ring shall be molded in one piece from silicone rubber in accordance with MIL-R-5847 or ZZ-R-765.

4.2.6 Bolts and washers. Bolts, suitable for use in the threaded holes of the top flange, and the middle flange if a diaphragm is specified, shall be supplied with each base assembly. The bolts and washers shall conform to the dimensions shown in Figure 3, 4, 5, and 6 and shall be fabricated from 18-8 stainless steel.

4.2.7.1 Shipping & Installation Cover. - One, 3/4-inch thick exterior grade plywood cover conforming to dimensions shown in Figure 3 shall be furnished with each base to protect the top flange during shipment, handling and installation. The edges of the covers and part of the top and bottom surface shall be coated with a uniform thickness of paraffin wax. A polyethylene gasket of 3 mills thickness shall be used for shipping and installation.

4.2.7.2 Permanent cover. - When the base is to be used or exposed to use without a light fixture, a steel cover conforming to dimensions shown in Figure 3, 4, 5, and 6 shall be furnished. The cover shall be fabricated from commercial quality steel that is galvanized and capable of meeting the load requirement in Paragraph 5.1.2. A polyethylene gasket of 3 mills thickness shall be used for shipping and installation.

4.2.8 Protective coating. The top flange and top or body extension section after assembly, machining and drilling; and, the diaphragm, before attaching the sealed wire leads, shall be plated for corrosion protection. This plating shall be zinc complying with Class 1, Type I of Federal Specifications QQ-P-416. The middle flange and lower body section before the addition of electrical hardware and performing tapping operations, shall be treated after fabrication for corrosion protection by hot-dip galvanizing. Any such removal after galvanizing shall not impair galvanized coating. The minimum weight of coating shall be in accordance with ASTM-A386, Class A (1.8 to 2 ounces per square foot), and shall be applied in accordance with ASTM-385. Tapped holes after galvanizing shall be protected by poly-urethane varnish. The use of any material other than a zinc dust primer meeting MIL-P-26915 (USAF) shall not be permitted for touch-up, and shall not exceed ten percent of the total area.

4.2.9 Protective painting. - After the protective plating has been applied to the top flange and top or body extension section assembly, and this has been welded to the galvanized middle flange and lower body section assembly, all inside surfaces of the top or body extension section, including the underside of the top flange, as well as the weld joint between the sections, shall be given one coat of zinc dust primer complying to Military Specification MIL-P-26915 (USAF).

4.2.10 Grounding lug. A steel lug shall be welded to the interior wall of the lower body section approximately 8 inches above the bottom of the base. The details of the grounding lug, as shown in Figures 3, is standard; but, the location may vary to meet specific conditions. A bronze or copper ground connector shall be fastened to the steel lug after galvanizing.

4.2.11 Diaphragm. If a diaphragm is required, it shall be as shown in Figure 3. It shall be fabricated from commercial quality steel plate. After protective plating, two leads shall be sealed to assure a water and air tight seal. The seal and wire shall be installed to prevent water from entering the lamp compartment. The connection on the top side of the diaphargm shall be with a brass #6 screw terminal for each lead. The wire lead insulation below the diaphragm shall be rated for 125 degree centigrade service. The wire size shall be copper No. 12 AWG with at least 19 strands. The length of the leads shall be at least equal to the distance from the middle flange to the bottom of the base. A silicone gasket, as shown in Figure 3, shall be supplied with each diaphragm. The gasket shall conform to MIL-R-5847 or ZZ-R-765. Six seal washers conforming to Federal Aviation Administration Drawing D5225, detail A, shall also be supplied.

4.2.12 Drain Hole. If specified, a drain hole shall be provided in the bottom of the base. The drain hole shall be a 3/4 inch minimum diameter, tapped hole with a plug accessible from inside the base.

5. QUALITY ASSURANCE PROVISIONS.

5.1 Qualification testing. - The manufacturer shall furnish a base assembly to an independent testing laboratory, acceptable to the Federal Aviation Administration, Airports Service, Washington, D. C. 20590, for testing in accordance with the tests specified herein. This testing is required to certify the manufacturer's ability to produce a base meeting the requirements of this specification. Each standard type of unit shown in Figures 1, 2, 3, 4, 5, and 6 shall be subjected to qualification tests. When approved, the name of the qualified manufacturer and a description of his equipment will be included in AC 150/5345-1B, Approved Airport Lighting Equipment. The manufacturer shall bear all testing costs.

5.1.1 Leakage test. - This test shall be performed after the base has undergone the load test described in paragraph 5.1.2. A steel cover plate conforming to the bolt circle of the base flange, shall be securely bolted to the base using the specified flat or "O" ring gasket. An internal air pressure of 12 PSI $\pm$ 2 PSI shall be maintained within the base by use of proper pressure fittings and plugs in the hubs. An approved bubble test material (high foam detergent producing a low surface tension) shall be brushed on the entire assembly and around the flange. The pressure shall be held for a period required to carefully examine the entire light base for air bubbles. If a diaphragm is required, the base shall be further tested with the cover removed, and the diaphragm in place with gasket and seal washers. Ten PSI air pressure shall be held in the lower section by introducing air through one of the hubs. A bubble test similar to the exterior of the base shall be made on the entire surface of the diaphragm including the sealed lead connections. The base shall be considered unsatisfactory if a leakage is evident.

5.1.2 Load test. - The base and cover plate assembly as described in paragraph 5.1.1 shall be placed on a flat steel plate mounted in a standard testing machine. The load shall be applied to the top part of the base through a block of rubber with a diameter equal to the cover plate, 1½ inches thick, and having a shore A hardness of 55 to 70. A total load of 100,000 pounds shall be applied uniformly over the area of the rubber at a rate not greater than 10,000 pounds per minute. The base shall be considered unsatisfactory if there is any permanent deformation or cracking of material or coating.

5.1.3 Visual inspection. - Each unit shall be visually inspected for quality of workmanship amd material. Particular attention shall be given to smoothness and continuity of welds, flatness and smoothness of the flange surface, complete and uniform application of the protective coating, freedom of excess zinc and absence of burrs and sharp edges.

5.1.5 Protective plating test.- Zinc plating shall be tested by appropriate method described in Federal Specification QQ-Z-325. Cadmium plating shall be tested by appropriate method described in Federal Specification QQ-P-416. The weight of the hot-dipped galvanizing shall be tested by the appropriate method described in ASTM Specification A153.

5.1.6 Insulation resistance test.- Each base provided with the diaphragm specified in paragraph 4.2.11 shall be subjected to an insulation resistance test, voltage of 1000 volt, 60 H_z. The test voltage shall be applied at least one minute between each #6 screw terminal and the metal base. Failure of the unit to withstand this test voltage shall be cause for rejection.

5.2 Production testing.- Samples shall be selected at random from production units before receiving protective coating to be submitted to the leakage test. Military Standard 105 shall be used for determining the sampling frequency. The leakage test as described in paragraph 5.1.1 shall be performed. Rejection rates as described in Military Standard 105 will set sample frequency and any leaks will be repaired after air is evacuated from base and subjected to another test after repair. Records of all testing will be maintained for a period of at least two years. Visual and dimensional checks will be carried out, by sampling, in accordance with Military Standard 105.

6. PREPARATION FOR DELIVERY.

6.1 Packing.

6.1.1 Type I packing.- Each unit shall be individually packed as follows: The flange surface of each light base shall be protected by a 3/4-inch thick exterior grade plywood cover of flange diameter with a polyethylene or wax paper shipping gasket, 3 mills minimum thickness, and bolted to the flange by means of six, 3/8-inch, 16 x 1¼ inches long, cadmium plated steel, hexhead machine bolts, seated to 25 inch-pounds torque. Additionally, the hubs should be protected with an anti-seize compound and standard metal thread protectors.

6.1.2 Type II packing.

6.1.2.1 Light Bases. - Each unit shall be individually packed. The flange surface of each light base shall be coated with a liquid wax. The flange should also be protected by a 3/4-inch thick exterior grade plywood cover of a 3/4-inch steel, zinc plated cover, of 1/8-inch greater diameter than the top flange with a polyethylene gasket, 3 mills minimum thickness, and bolted to the top flange with all the bolts required in the top flange. These shipping bolts are to be 3/8-inch, 16 x 3/4-inches long, cadmium plated steel, hexhead machine bolts, seated to 25 inch-pounds torque. The

cover holes shall be counter-bored 1/4 inch deep and 1-1/8 inches in diameter. The edges,and a minimum of 1 inch on each surface of the cover, shall be coated with paraffin wax. The required number of stainless steel hexhead bolts and lock washers, as well as the "O" ring gasket, shall be packed separately and placed within the base before closing with the cover. Additionally, the hubs shall be protected with an anti-seize compound and standard metal thread protectors. The diaphragm described in 4.2.11 shall be packed separately. A container for the seal washers and bolts and a container for the gasket, shall be included with each diaphragm. The seal of the diaphragm shall be adequately protected from damage during shipment.

6.1.2.2 Junction Boxes. - Each unit shall be individually packed. The shipping bolts shall be 1/4-inch,hexhead cadmium plated machine bolts, 3/4 inch long. The "O" ring gasket shall be packed separately and be placed within the junction box package. Rubber grommets shall be supplied in place.

6.2 Marking.

6.2.1 Type I Marking. - Each light base shall have the following information on the outer cylinder wall.

Consignees name and address.
Component name and part number.
Federal stock number (when required).
Specification number.
Contract number and date (when required).
Manufacturer's name and address.

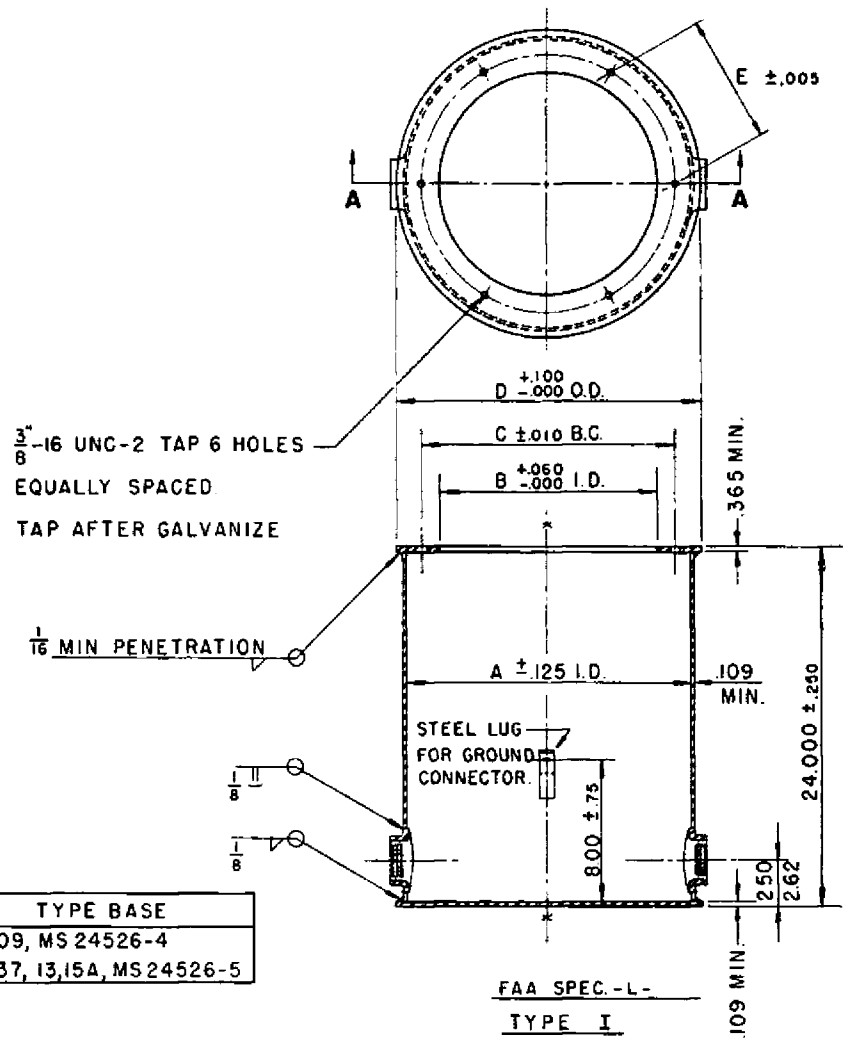
6.2.2. Type II Marking. - Each light base shall have the following information stenciled on the cover.

Consignees name and address.
Component name and part number.
Federal stock number (when required).
Specification number.
Contract number (when required).
Manufacturers name and address.
Indication centerline of light fixture.

The first six items above shall also appear on each diaphragm and junction box package.

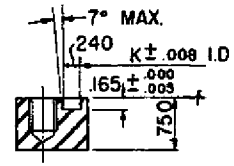
NOTES:

1. BOLT HOLES TO BE DRILLED OR PUNCHED BEFORE GALVANIZING.
2. TWO 2" HALF COUPLINGS OR FLANGES 180° ±1° APART AND WITH AN ANGULAR TOLERANCE OF 1° FROM BEING PERPENDICULAR TO X-X AXIS.
3. CONDUIT HUBS TO BE LOCATED ON BOLT HOLE AXIS A-A.



NOM. I.D.	A	B	C	D	E	TYPE BASE
12	12.375	8.000	10.250	13.500	5.125	L-809, MS 24526-4
16	16.250	12.375	14.250	17.375	7.125	L-837, 13,15A, MS 24526-5

FIGURE 1. TYPE I BASE - 12" and 16" DIAMETER FOR OFF TRAFFIC USE



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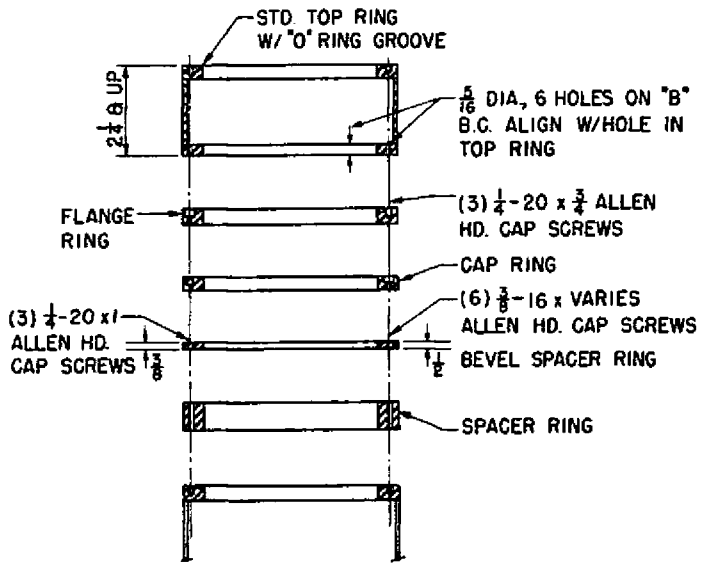
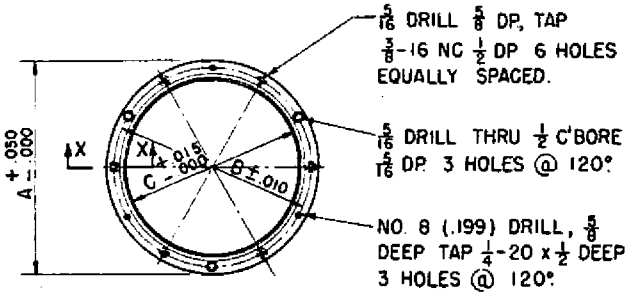
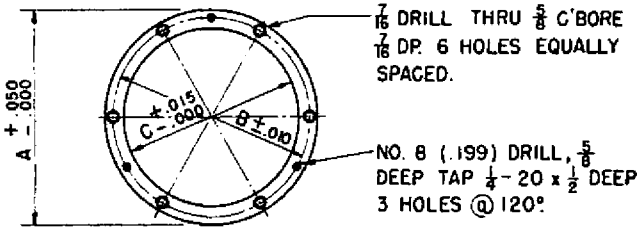
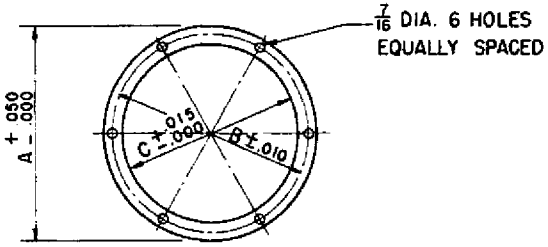




FLANGE RING
¾ THICK



CAP RING
¾ THICK



SPACER RING
⅛ TO 2¼ THICK

NOM. I.D.	A	B	C	K
10	10	9.250	8.000	8.145
12	12	11.250	10.000	10.145

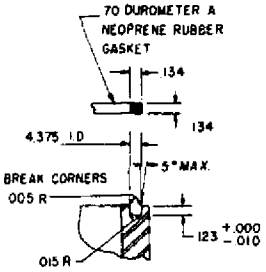
FIGURE 4. TYPE II BASE EXTENSION

NOTES:

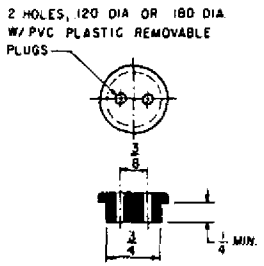
BOX SHALL BE PLATED W/ZINC PER QQZ-325A.

INSIDE TO BE COATED W/ZINC DUST PRIMER PER MIL-P-26915A.

COVER SHALL BE HOT DIPPED GALVANIZED.



"O" RING DETAIL



RUBBER GROMMET

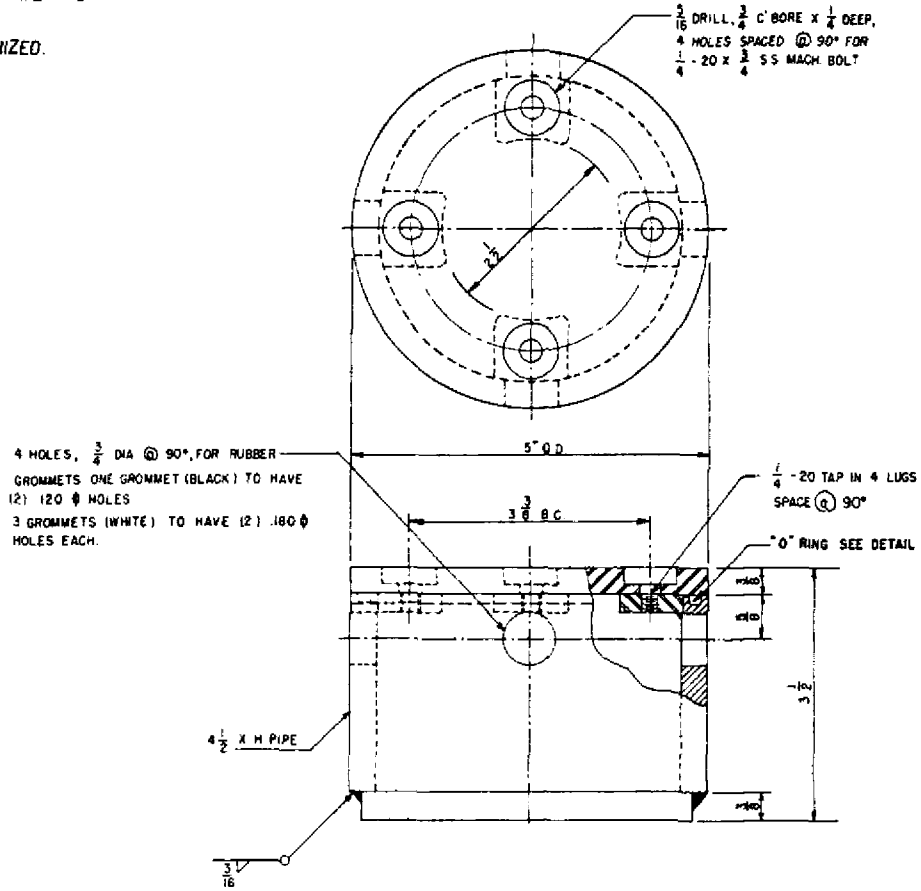


FIGURE 5. TYPE II BASE JUNCTION BOX - 5" DIAMETER FOR IN TRAFFIC USE

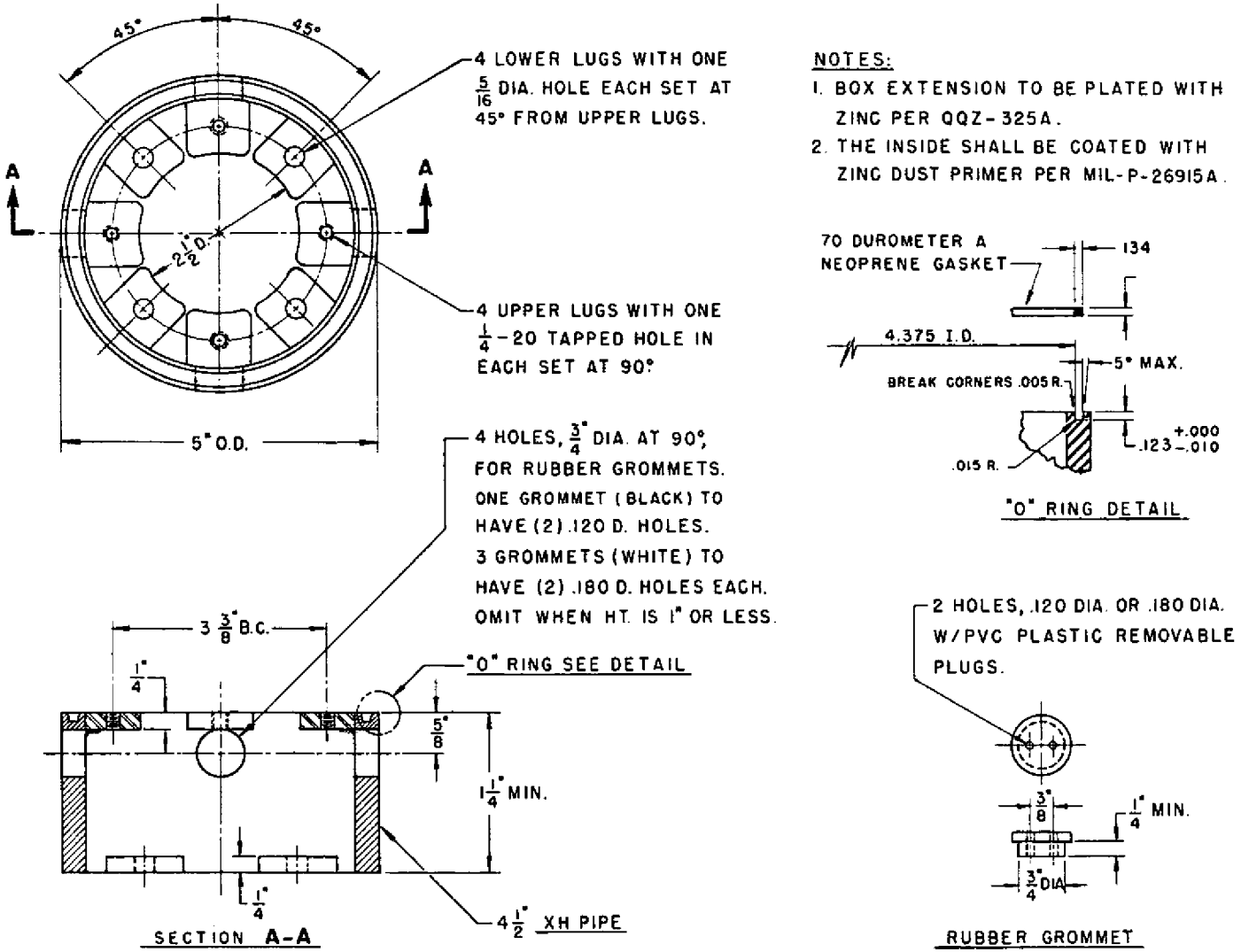


FIGURE 6. JUNCTION BOX EXTENSION - 5" DIAMETER

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