II. ROADWAY ILLUMINATION ASSEMBLIES (cont.)

A. General (cont.)

12. Alternate material equal to or better than material specified may be substituted with the approval of the Engineer.

13. Installation of High Strength Bolts. The tightening of nuts on high strength bolts shall be in accordance with the item "Structural Bolting."

14. Roadway Illumination Assembly poles shall be erected plumb and true. Top of foundation shall be struck level and shims used to plumb pole, except that for shoe base poles leveling nuts may be used. Leveling nuts shall not be used under transformer bases. Grout shall not be placed between base plate or flange and the foundation.

15. In each pole, continuous color-coded stranded No. 12 AWG copper Type XHHW or other approved XLP conductors shall be connected to the line side of each ballast.

16. Acorn nuts will not be allowed for attaching pole to transformer base or foundation. Nut covers will not be allowed.

17. Fabrication tolerances shall be as shown on Fabrication Tolerances Table.

B. Transformer Base

1. Transformer base shall be cast from aluminum, ASTM B-108 or B-26 Alloy 356.0-T6, or other material approved by the Engineer, and shall be furnished or with four washers or lugs as recommended by the manufacturer. Transformer base bolt circles (Top and Bottom) shall match bolt circles for poles and foundations shown on RID (3).

2. Transformer base shall be approximately 15-20 inches high and shall have a door approximately 13" x 8" x 9/4" or as otherwise approved by the Engineer. Screw or bolts for attachment of door to base shall be stainless steel. Four machine bolts with four nuts, eight flat washers and four lock washer, galvanized ASTM A-153 Class C or D, or B-695 Class 50, shall be provided with each transformer base for connecting the pole. Bolts shall be ASTM A325 or approved equal. Nuts shall be ASTM A-563 grade DH galvanized. A 1/2-13 NC female threaded grounding lug shall be provided inside the transformer base near the bottom.

3. The X-base shall be made from extruded aluminum channel and aluminum plate. The base breakaway features shall rely on bolt shear and not on bolt torque. Bolt shall have torque controlled break-off hex-head. Bolt shall be Aluminum Association type 2024-T4 aluminum. X-base channel shall be connected with aluminum bolts. Bolt shall be left hand thread and shall not be interchangeable with any other bolt not designed specifically for use with the X-base.

4. All breakaway bases shall meet the breakaway requirements of the AASTHO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals," latest edition, and shall have been tested by FHWA-approved methods. All bases shall have been structurally tested to meet or exceed the full designed plastic moment capacity of the pole. Certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished shall be submitted with shop drawings. Shop drawings shall show breakaway base model number and manufacturer's name or logo.

5. Bases shall be stamped, incised or by other approved permanent means, marked to show fabricators name or logo, and model number. Such information shall be placed in a readily seen location, inside or outside the base, but shall not be placed on the door.

6. Doors for transformer bases shall be made of plastic, fiberglass or other non-aluminum material approved by the Engineer. Transformer bases shall be cleaned by grit blast cleaning after heat treatment. Certification by the manufacturer of heat treatment shall be furnished with transformer bases. The certification shall show the metal alloy and temper and that the base meets those requirements, chemical and physical. The certification shall also show the material ASTM specification. Transformer bases shall be cast with a removable tab bar for material testing. Some bars may have been removed by the manufacturer for testing.

C. All Luminaires.

1. The luminaire housing shall be cast or drawn from a non-ferrous alloy and shall be free of cracks and excessive porosity. All nuts, crews, clips, washers and attaching hardware shall be made of stainless steel, steel electro-zinc-plated, minimum thickness 0.0002 inch with olive green drab or yellow chromate conversion coating, steel coasted with an acidic chromate-phosphate-binder system primer, top coated with a polytetrafluoroethylene modified silicon primer, bright metallic in color, meeting the requirements of General Motors automotive specification GM 1654M, or other approved conversion coatings except that brackets may be made from pre-galvanized steel. All threaded surfaces used in the housing shall be lubricated with a silicone grease.

2. The slipfitter shall securely clamp the luminaire to the mast arm. A positive means of vertical adjustments shall be provided. The refractor or lens shall be clear glass. The optic assembly shall be provided with resilient gaskets and so constructed that a positive seal against weather and other contaminants will be maintained. The luminaire shall be designed to permit easy removal of the refractor from the luminaire but shall provide a positive means of preventing an unintentional separation. The latch shall provide a positive means of maintaining closure of the luminaire. The socket shell shall be nickel plated and shall be rigidly attached to a high grade porcelain mogul base which shall extend and enclose the metal shell. A locking means shall be incorporated in the shell of the socket to positively resist the removal of the lamp. Reflectors shall be polished aluminum with Alzak or equal coating and shall not be painted.

3. Mast-arm mounted luminaires shall be provided with a leveling indicator which is clearly visible from the ground. Leveling indicator shall be sensitive to one (1) degree (maximum) changes in position at any point within five (5) degrees (minimum) level position. Unless otherwise directed by the Engineer, mast-arm mounted luminaires will be installed in the level position.

4. Underpass luminaires shall be fused internally. Fuses shall be 10 amp time-delay type.

D. High Pressure Sodium Vapor Luminaires

1. Photometrics

a. The U/P (SPL-CO) (.15KW)S (TY 1) and (TY 2) underpass luminaires shall be 150 watt high pressure sodium, IES TYPE M-C with flat tempered glass lens. The fixtures shall provide a minimum measured intensity of .2 footcandles in a rectangular area measuring 80 feet x 30 feet, when mounted 20 feet above the midpoint of either long side of the surface area

b. The 250-watt mast arm mounted luminaire shall be IES Type semi-cutoff or cutoff and, when mounted 40 feet above the midpoint of either long side of a rectangular area 200 feet by 50 feet, shall provide a measured minimum intensity of 0.2 footcandle at any point on the surface of this area. Light intensities measured in footcandles along a line parallel to and 20 feet in from the long side of the previously defined rectangular area above which the luminaire is mounted shall decrease at a rate not to exceed 0.8 footcandle in any ten foot interval along the aforementioned line from 10 to 70 feet on both sides of the luminaire and shall not be less than 0.6 footcandle at any point along such line.

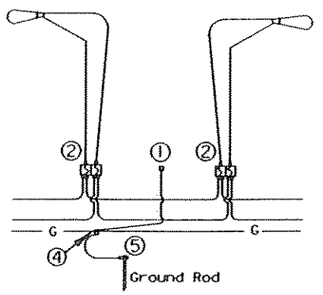
The maximum to minimum horizontal illuminance uniformity ratio shall not exceed 20:1 within the above mentioned rectangular area.

c. The 400-watt mast arm mounted luminaire shall be IES Type semi-cutoff or cutoff and, when mounted 50 feet above the midpoint of either long side of a rectangular area 240 feet by 70 feet, shall provide a measured minimum intensity of 0.2 footcandle at any point on the surface of this area. Light intensities measured in footcandles along a line parallel to and 30 feet in from the long side of the previously defined rectangular area above which the luminaire is mounted shall decrease at a rate not to exceed 0.8 footcandle in any ten foot interval along the aforementioned line from 10 to 90 feet on both sides of the luminaire and shall not be less than 0.6 footcandle at any point along such line.

The maximum to minimum horizontal illuminance uniformity ratio shall not exceed 20:1 within the above mentioned rectangular area.

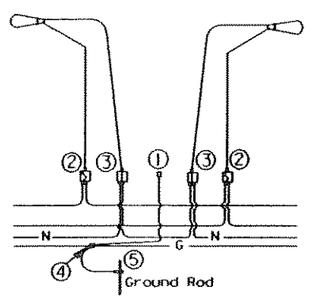
d. The luminaires shall meet the photometric requirements shown above, when energized at 100 percent of rated line voltage. Test will be run with the fixture in the level position as indicated on leveling indicator.

Fabrication Tolerances Table		
Part	Dimension	Tolerance
Pole Asssembly	Shaft length	± 1"
	I.D. of outside piece of slip fitting pieces	+ 1/8 " - 1/16 "
	O.D. of inside piece of slip fitting pieces	+ 1/32 " - 1/8 "
	Shaft diameter, other	+ 3/16 "
	Out of "round"	1/4 "
	Straightness of shaft	± 1/4 " in 10 ft
	Twist in shaft	4° in 50 ft
	Perpendicular to baseplate	1/8 " in 24"
	Pole centered on baseplate	± 1/4 "
	Location of Attachments	± 1/4 "
Arm Assembly	Arm Length	± 3"
	Arm Rise	± 1 3/4 " in 10 ft
	Arm Diameter	± 3/16 "
	Overall length or width	± 1/4 "
	Thickness	+ 1/4 " - 1/16 "
	Deviation from flat	1/8 " in 12"
	Spacing between holes	± 3/32 "
	Anchor bolt hole size	± 1/16 "
Anchor Bolt	Length	+ 1" - 1/4 "
	Threaded length	+ 1 1/2 " - 1/8 "
	Galvanized length (If required)	+ 8" - 1/4 "
Miscellaneous	Bolt hole spacing	± 1/16 "
	Strut location in truss arms	± 1 1/2 "



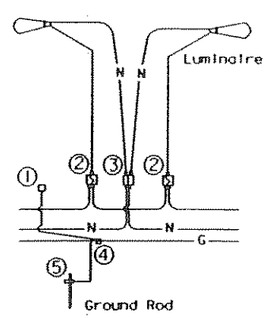
FOR THREE-WIRE CIRCUIT-CENTER GROUNDED

LUMINAIRES SERVED AT 480V ON 240/480 VOLT SERVICE OR LUMINAIRES SERVED AT 240V FOR FOR 120/240 VOLT SERVICE.



FOUR-WIRE CIRCUIT-CENTER GROUNDED

LUMINAIRES SERVED AT 240V (240/480 VOLT SERVICE)



THREE WIRE CIRCUIT-OUTSIDE GROUNDED

LUMINAIRES SERVED AT 480V ON 480 VOLT 2 WIRE SERVICE OR LUMINAIRES SERVED AT 240V ON 240 VOLT 2 WIRE SERVICE.

NOTES:

(1) Pole Bonding Connector Blockburn TTC3 or Weaver TGC3 or equal.

(2) Fused Connector- Hamac Flood Seal Series, Bussman HEB Series; Gould GEB Series, or equal. All fuses shall be time-delay types, 10 Amp (Littlefuse FLQ, Bussman FNQ or equal).

* (3) Un-fused Connector- Hamac Flood Seal Series, Bussman HEB Series; Gould GEB Series, or equal. Dummy / Neutral fuse shall be Bussman NTS-R-30 or equal.

(4) Split Bolt or other connector.

(5) Ground Rod Clamp - Blockburn GG58H, Burndy GKP635, or equal.

*For Transformer Base Poles. On Shoe Base Poles omit un-fused connector for neutral conductor.

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

ROADWAY ILLUMINATION DETAILS

RID(2)-93

FILE: rid2d93.dgn	DN: TxDOT	CK: TxDOT	DW: RS	CK: TxDOT			
5-93 10-93				FEDERAL AID PROJECT			SHEET
	18	6		STP 96(830) NM			87
	COUNTY			CONTROL	SECTION	JOB	HIGHWAY
	ROCKWALL			1014	03	041	FM 78

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