

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	472-84639	2008	61	142

NOTE:

WHENEVER THE PLAN SPECIFICATIONS CONFLICT WITH THE STANDARD KANSAS DEPARTMENT OF TRANSPORTATION SPECIFICATIONS, LATEST EDITION, THE PLAN SPECIFICATIONS SHALL GOVERN.

CONSTRUCTION:

LIGHT STANDARDS SHALL BE DESIGNED TO COMPLY WITH THE 2001 EDITION OF THE A.A.S.H.T.O. PUBLICATION, STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR THE HIGHWAY SIGNS, LUMINAIRES, TRAFFIC SIGNALS, AND INTERIMS. USE FATIGUE CATAGORY II. SEE STANDARD SPECIFICATIONS, LATEST EDITION, SECTION 801.

LIGHT STANDARDS:

(A) STEEL STANDARDS: THE LIGHT STANDARDS SHALL COMPLY WITH THE REQUIRMENTS OF A.S.T.M. 607 WITH THE EXCEPTIONS AND/OR ADDITIONS AS LISTED IN THE STANDARD KANSAS DEPARTMENT OF TRANSPORTATION SPECIFICATIONS, LATEST EDITION, SECTION 1606.2. THE LIGHT STANDARDS WITH 40' MOUNTING SHALL BE ONE (1) SECTION. THE DIAMETER OF THE STANDARDS SHALL BE SHOWN ON THE DETAIL SHEETS.

(a) BASE: THE BASE SHALL BE EITHER A ONE (1) PIECE STEEL BASE COMPLYING WITH THE REQUIRMENTS OF A.S.T.M. A-27, GRADE 65-35, A STEEL FORGED BASE COMPLYING WITH THE REQUIRMENTS OF A.S.T.M. A-568, CLASS C OR A PLATE BASE COMPLYING WITH THE REQUIRMENTS OF A.S.T.M. A 36-77A. THE BASE SHALL BE SECURED TO THE BOTTOM SECTION BY TWO (2) CONTINUOUS ELECTRIC ARC WELDS.

(b) MASTARMS: THE MASTARMS SHALL BE FABRICATED FROM 2" STANDARD PIPE MEETING THE REQUIRMENTS OF A.S.T.M. A-53 OR A.S.T.M. A-35.

(c) FINISH: THE BASE, MASTARMS, AND LIGHT STANDARDS SHALL BE GALVANIZED ACCORDING TO ASTM A-123.

(B) ALUMINUM STANDARDS: STANDARDS SHALL CONFORM TO THE PLAN DRAWINGS AND SPECIFICATIONS. THE SHAFT SHALL BE SPUN FROM ONE PIECE OF SEAMLESS TUBING (A.S.T.M. B-429) ALUMINUM ASSOCIATION ALLOY 6063-T6, WITH MINIMUM NOMINAL WALL THICKNESS OF 0.188 INCH FOR 40' MOUNTING HEIGHT. AFTER FABRICATION IT SHALL HAVE MECHANICAL STRENGTH OF NOT LESS THAN T6 TEMPER. THE SHAFT SHALL HAVE NO LONGITUDINAL NOR CIRCUMFERENTIAL WELDS EXCEPT AT THE LOWER END JOINING THE SHAFT TO THE BASE.

(a) BASE: A ONE-PIECE CAST ALUMINUM (A.S.T.M. B-108 ALLOY S.G. 70A-T6) ANCHOR BASE OF ADEQUATE STRENGTH, SHAPE AND SIZE BE SECURED TO THE LOWER END OF THE SHAFT BY TWO (2) CONTINUOUS WELDS. THE BASE SHALL TELESCOPE THE SHAFT AND THE ONE WELD SHALL BE ON THE INSIDE OF THE BASE AT THE END OF THE SHAFT WHILE THE OTHER WELD SHALL BE ON THE OUTSIDE AT THE TOP OF THE BASE. (THE TWO (2) WELDS SHALL DEVELOP THE DESIGN STRENGTH OF THE POLE ASSEMBLY.)

(b) MASTARMS: SINGLE MEMBER TYPE: THE BRACKET ARM ASSEMBLY SHALL CONSIST OF A TAPERED ALUMINUM ARM, OVALIPTIC IN SHAPE AT THE POLE END AND TAPERING TO A MINIMUM OF 2 1/4" O.D. AT THE LUMINAIRE END, MADE OF (A.S.T.M. B-429) ALUMINUM ASSOCIATION ALLOY 6063-T6 TUBING.

TRUSS TYPE MEMBER: THE UPPER AND LOWER MEMBERS SHALL BE 2" IPS ALUMINUM PIPE, (A.S.T.M. B-429) ALUMINUM ASSOCIATION ALLOY 6063-T6.

(c) FINISH: ALL HARDWARE (BOLTS, NUTS, AND WASHERS - BUT NOT INCLUDING ANCHOR BOLTS) NOT OTHERWISE SPECIFICALLY DESIGNATED IN THE SPECIFICATIONS, SHALL BE ALUMINUM OR STAINLESS STEEL. ALL MATERIALS SHALL BE FURNISHED IN NATURAL ALUMINUM COLOR, POLE SHAFTS SHALL BE FURNISHED WITH A POLISHED SURFACE.

ELECTRICAL MATERIAL:

(A) PHOTO CELL : PHOTO-ELECTRIC CONTROL SHALL BE SOLID STATE TYPE, 1000 W/1800 VA, SINGLE POLE, SINGLE THROW, TWIST LOCK MOUNTING, 105 TO 300 VOLT OPERATION. THE OPERATING LEVELS SHALL BE 1.6 FT. C. ON AND 0.4 FT. C. OFF, WITH AN ALLOWABLE 0.5 FT. C. VARIANCE ON OR OFF. THE PHOTO-ELECTRIC CONTROL SHALL HAVE A MINIMUM OF 30 SECOND TIME DELAY AND FAIL IN THE ON MODE.

(B) DUCT: THE DUCT FOR SECONDARY CABLE UNDERGROUND SHALL BE POLYETHYLENE DUCT WITH MINIMUM TENSILE STRENGTH OF 3100 P.S.I. DUCT TO PROVIDE FOR 40% MAXIMUM FILL. THE DUCT SIZED SHALL MEET A. S. T. M. D3485 (LATEST REVISION).

(C) CONDUCTOR: CONDUCTOR SHALL BE STRANDED ANNEALED COPPER MEETING THE REQUIRMENTS OF A.S.T.M. B-8 AND A.S.T.M. B-33.

(a) SECONDARY CABLE (INDUCT): SECONDARY CABLE SHALL BE COPPER SINGLE CONDUCTOR CABLE FOR OPERATION AT 600 VOLTS MAXIMUM. MATERIAL SHALL MEET THE APPLICABLE REQUIREMENTS OF I.C.E.A. STANDARD S-19-81, WITH THERMOPLASTIC INSULATION OF GRS-RUBBER BASE MEETING APPENDIX K(A) OF I.C.E.A. AND LISTED BY U.L. AS TYPE USE-2 FOR DIRECT BURIAL; OR, MATERIAL SHALL MEET THE APPLICATION REQUIREMENTS OF I.C.E.A. STANDARD S-66-524, WITH THERMO-SETTING INSULATION OF CROSS LINK POLYETHYLENE MEETING REQUIREMENTS OF COLUMN "A" OF I.C.E.A. AND LISTED BY U.L. AS TYPE USE-2.

(D) LUMINAIRES: ALL LUMINAIRES SHALL BE SUPPLIED WITH HIGH POWER FACTOR BALLAST.

150 WATT LUMINAIRES: 150 WATT LUMINAIRES SHALL HAVE A HOUSING OF ALUMINUM ALLOY CASTING WITH AN INTEGRAL SLIPFITTER FOR A 2 INCH BRACKET MOUNTING WITH A NATURAL UNPAINTED ALZAK ALUMINUM REFLECTOR. THE BALLASTS SHALL BE A VOLTAGE AUTO-REGULATOR TYPE FOR HIGH PRESSURE SODIUM AT A VOLTAGE OF 480 VOLTS. THE REFRACTORS SHALL BE ACRYLIC WITH TYPE III LIGHT DISTRIBUTION.

(E) SODIUM LUMINAIRE IGNITORS: ALL HPS LUMINAIRES SHALL BE EQUIPPED WITH THE FOLLOWING:

HIGH PRESSURE SODIUM IGNITORS: ELECTRONIC IGNITOR FOR THE IGNITION OF HIGH PRESSURE SODIUM (HPS) VAPOR LAMPS. THE IGNITOR SHALL BE DESIGNED TO DIRECT THE HIGH VOLTAGE SPIKE DIRECTLY TO THE LAMP WITHOUT BEING DIRECTED TO THE LAMP THROUGH THE BALLAST WINDINGS. THE IGNITOR SHALL BE CAPABLE OF BEING USED WITH ALL BRANDS AND TYPES OF 60 HERTZ HPS BRANDS. THE IGNITOR SHALL BE DESIGNED SO THAT CYCLING OF EXTINGUISHED LAMP SHALL NOT ADVERSELY AFFECT THE IGNITOR OR BALLAST. THE IGNITOR SHALL BE BE TOTALLY EPOXY ENCAPSULATED IN A METAL CAN AND SHALL BE OPEN CIRCUIT TESTED FOR A PERIOD OF 48 HOURS WITH POWER APPLIED AT ELEVATED TEMPERATURES TO 100°C WITH CONSTANT MONITORING OF CASE TEMPERATURES. THE IGNITOR SHALL HAVE A TWO (2) MINUTE TIME DELAY. IF THE LAMP DOES NOT START, THE IGNITOR WILL BE SHUT OFF UNTIL THE POWER TO THE LUMINAIRES IS RESET BY THE PHOTO CONTROL. THE IGNITOR SHALL BE WARRANTED AGAINST DEFECTIVE MATERIALS AND WORKMANSHIP FOR A PERIOD OF NOT LESS THAN FIVE (5) YEARS FROM THE SHIPPING DATE.

(F) LAMPS

(a) 150 WATT LAMPS: 150 WATT LAMPS SHALL BE 16,000 LUMEN, HIGH PRESSURE SODIUM.

(G) ENCLOSURE: THE ENCLOSURE CABINET SHALL BE CONSTRUCTED OF 5082 ALLOY ALUMINUM 0.125" THICK. THE CABINET SHALL BE OF CLEAN CUT DESIGN HAVING NO SHARP EDGES, CORNERS OR PROJECTIONS. THE CIRCUITING SHALL BE SERVICEABLE BY MEANS OF A FULL LENGTH HINGED DOOR WITH PADLOCK PROVISIONS. THE ENCLOSURE SHALL HAVE 600 VOLT RATED MOLDED CASE MAIN AND SECONDARY BREAKERS, TWIST-LOCK PHOTO-CELL SOCKET, AND MECHANICALLY HELD CONTACTORS. THE EQUIPMENT WITHIN THE ENCLOSURE SHALL BE WIRED PRIOR TO DELIVERY. THE ENCLOSURE SHALL HAVE A METER VIEW WINDOW AND A GLASS TO ALLOW LIGHT TO THE PHOTO-CELL.

(A) MAIN AND SECONDARY BREAKERS: THE MAIN AND SECONDARY BREAKERS SHALL HAVE A MOUNTING DIMENSIONS OF 1-3/8" WIDE X 4-1/2" HIGH MOUNTING HOLES SHALL BE POSITIONED TO ACCOMMODATE A BREAKER 2-3/4" WIDE SIDE BY SIDE. SEE ENCLOSURE DETAIL SHEET.

GENERAL MATERIALS AND NOTES:

(A) MISCELLANEOUS HARDWARE: MISCELLANEOUS HARDWARE THAT REQUIRES GALVANIZING OR ELECTROPLATING SHALL CONFORM TO THE STANDARD KANSAS DEPARTMENT OF TRANSPORTATION SPECIFICATIONS, LATEST EDITION, SECTION 1703.2 (a).

(B) METALLIC CONDUIT: METALLIC CONDUIT SHALL BE RIGID STEEL CONDUIT MEETING THE REQUIREMENTS OF AMERICAN STANDARD SPECIFICATION C-80.1. TRENCHING FOR CONDUIT WILL NOT BE PERMITTED THROUGH EXISTING PAVEMENT. JACKING WILL NOT BE PERMITTED IN DISTRICT ONE UNLESS APPROVED BY THE ENGINEER IN CHARGE OF CONSTRUCTION.

(C) METALLIC CONDUIT FITTINGS: METALLIC CONDUIT FITTINGS SHALL BE ZINC COATED AND SHALL MEET THE REQUIREMENTS OF AMERICAN STANDARD SPECIFICATION C-80.1.

(D) NON-METALLIC CONDUIT:
D.1 RIGID POLYVINYL CHLORIDE MEETING THE REQUIREMENTS OF FEDERAL SPECIFICATIONS NO. L.P. 1036A, TYPE II, ELECTRICAL CLASS 2, GRADE C. EACH LENGTH SHALL BEAR THE UNDERWRITERS, INC. LABEL. NON-METALLIC CONDUIT FITTINGS SHALL BE FABRICATED FROM POLYVINYL CHLORIDE HAVING THE SAME CHEMICAL AND PHYSICAL PROPERTIES AS THE CONDUIT WITH WHICH IT IS TO BE USED. EACH SHALL BEAR THE UNDERWRITERS, INC. LABEL. THE JOINTS SHALL BE MADE IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.

D.2 FIBERGLASS CONDUIT: CONDUIT SHALL BE FIBERGLASS REINFORCED EPOXY MANUFACTURED USING THE FILAMENT WINDING PROCESS. CONDUIT, ELBOWS AND FITTINGS SHALL BE MANUFACTURED FROM THE SAME RESIN/HARDNER/ GLASS SYSTEMS MANUFACTURED BY THE SAME FILAMENT WOUND SYSTEM. ALL CONDUIT AND FITTINGS SHALL MEET UL1684. ALL CONDUIT SHALL BE NON-TAPERED. THE JOINTS SHALL HAVE THREADED BELL AND SPIGOT ENDS. THE CONDUIT WILL BE JOINED TOGETHER USING A TWO PART EPOXY ADHESIVE CREATING A TIGHT LOCK JOINT. THE CONDUIT WALL THICKNESS WILL BE 1.8 mm FOR 19 mm - 100 mm AND 2.4 mm FOR 125 mm AND 150 mm. ALL CONDUITS SHALL BE MANUFACTURED TO IPS PIPE SIZES. FOR UNDERGROUND USE ONLY.

(E) GROUND: GROUND WIRE SHALL BE A #6 AWG SOLID BARE COPPER WIRE AND ARRANGEMENT SHALL BE AS NOTED ON PLANS.

(F) ANCHOR BOLTS: ANCHOR BOLTS SHALL CONFORM TO THE STANDARD KANSAS DEPARTMENT OF TRANSPORTATION SPECIFICATIONS, LATEST EDITION, SECTION 1613, TYPE I FOR LIGHT STANDARDS, TYPE II FOR TOWERS.

(G) BREAK-AWAY CABLE CONNECTORS: THE CONNNECTORS SHALL PROVIDE A FUSED WATERPROOF WIRING CONNECTION THAT WHEN SUBJECTED TO STRAIN CONSISTANT WITH A KNOCKDOWN WILL SEPARATE WITHOUT DAMAGE TO WIRING. WHEN SEPARATION OCCURRS, THE CONNECTORS SHALL HAVE NO CONTACTS EXPOSED TO PRESENT A SHOCK HAZARD. THE CABLE CONNECTORS SHALL MEET AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS (LATEST EDITION), ARTICLE 12.5.3 (C). CONNECTOR INSTALLATION SHALL BE AS DIRECTED BY THE MANUFACTURER.

(H) FRANGIBLE BASE: FRANGIBLE BASE SHALL BE CAST ALUMINUM TO MEET MEET THE STANDARDS OF THE LATEST A.A.S.H.T.O. STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, AND TRAFFIC SIGNALS. THE FRANGIBLE BASE SHALL ACCOMMODATE A 12-1/2" BOLT CIRCLE TOP AND BOTTOM. THE FRANGIBLE BASE SHALL HAVE HIGH DENSITY PLASTIC DOORS. THE COLOR SHALL BE PIGMENTED THROUGHOUT TO GIVE THE APPEARANCE OF ALUMINUM. THE DOORS SHALL WITHSTAND TEMPERATURE EXTREMES OF -70° TO 150° F. AND ARE COMPOUNDED WITH U.V. INHIBITORS.

(I) JUNCTION BOX: JUNCTION BOX SHALL BE MADE OF 14 GAUGE SHEET METAL (STEEL) WITH WELDED SEAMS, KNOCKOUTS AND WEATHERPROOF SCREW COVER. BOXES SHALL BE HOT DIPPED GALVANIZED IN ACCORDANCE WITH A.S.T.M. A-123 OR ELECTROPLATED WITH A MINIMUM THICKNESS OF 0.4 MIL AFTER FABRICATION. THE SURFACE OF THE JUNCTION BOX WHICH COMES IN CONTACT WITH CONCRETE SHALL BE COVERED WITH ALUMINUM COLORED BUTYL RUBBER SEALANT (CAULKING COMPOUND).

(J) WEDGE TYPE STUD BOLT ANCHORS: THE CONTRACTOR SHALL INSTALL TWO 3/8" X 3" WEDGE TYPE ANCHORS FOR CONDUIT CLAMPS. THE ANCHORS SHALL BE WEDGE TYPE MADE FROM CARBON STEEL MEETING AISI 12L14 STEEL. THE MINIMUM EMBEDDED DEPTH SHALL BE 1-3/4".

(K) CONDUIT CLAMPS WITH CLAMP BACKS: THE CONTRACTOR SHALL INSTALL 2" CONDUIT CLAMPS WITH A COMPATIBLE CLAMP BACK. CLAMPS SHALL BE HEAVY DUTY STEEL TO SECURE THE 2" RIGID CONDUIT TO STRUCTURE. CONDUIT CLAMPS ARE TO BE SPACED AT 6' INTERVALS.

(L) CABLE GRIP SUPPORTS: THE CONTRACTOR SHALL INSTALL ONE (1) CABLE SUPPORT GRIP IN EACH ROADWAY LIGHTING POLE. THE CABLE SUPPORT GRIP SHALL BE MADE OF HIGH GRADE, NON-MAGNETIC TIN COATED BRONZE STRAND. THE CABLE SUPPORT GRIP SHALL BE CAPABLE OF SECURING TWO (2) #10 AWG TYPE USE-2 CABLES IN A VERTICAL POSITION HOLDING THE WEIGHT OF THE CABLES AND CABLE CONNECTORS OFF THE LUMINAIRE ASSEMBLY. SEE ROADWAY LIGHTING DETAILS SHEET.

(M) ALL WELDS SHALL BE SMOOTH CLEAN DENSE DEPOSIT THAT WILL EXCLUDE MOISTURE AND CONFORM TO A.W.S. SPECIFICATION D.1 (LATEST REVISION). FIELD WELDS WILL NOT BE ALLOWED.

(N) GROUND RODS SHALL BE COPPERCLAD STEEL, 3/4" DIAMETER BY 10' LONG.

Plotted By : drp
Plot File : I:\2006\06655\COPYIES to CUT\Elec\61-he207.dgn
Plot Date : 1/17/2008

NO.	DATE	BY	APP'D
3			
2	10/5/2007	Per KDOT Standard Spec Book 2007	vh CAL
1	4/3/2007	New AASHTO Specifications	vh CAL

KANSAS DEPARTMENT OF TRANSPORTATION
CONSTRUCTION AND MATERIAL
REQUIREMENTS FOR
HIGHWAY LIGHTING (CONVENTIONAL)

DESIGNED		CHECKED		APP'D	
JFF	JFF	JFF	JFF	BRIAN D. GOWER	TRACED
DESIGN CK.	CAL	DETAIL CK.	CAL	QUAN. CK.	TRACE CK.