| STATE | PROJECT NO. | YEAR | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|---|
| KANSAS | 472-8407I | 2005 | L4.I0 | |

NOTE:
WHENEVER THE PLAN SPECIFICATIONS CONFLICT WITH THE STANDARD KANSAS DEPARTMENT OF TRANSPORTATION SPECIFICATIONS, 1990 EDITION, THE PLAN SPECIFICATIONS SHALL GOVERN.

CONSTRUCTION:
SEE STANDARD SPECIFICATIONS, 1990 EDITION, SECTION 801.

TOWERS:
THE TOWERS SHALL BE HIGH STRENGTH STEEL MEETING THE REQUIREMENTS OF A.S.T.M. A-595 GRADE A OR A.S.T.M. A-572, GRADE 60 OR ABOVE AND COMPLYING WITH THE KANSAS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS, 1990 EDITION, SECTION 1606. THE TOWERS SHALL BE DESIGNED TO COMPLY WITH THE CURRENT EDITION OF THE A.A.S.H.T.O. PUBLICATION, STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR THE HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS. THE TOWER SHALL BE GALVANIZED IN ACCORDANCE WITH THE REQUIREMENTS OF A.S.T.M. A-123. THE TOWER SHALL BE ASSEMBLED BY TELESCOPING ON THE JOB SITE. THE BASE PLATE SHALL BE MADE OF STEEL PLATE HAVING ESSENTIALLY THE SAME CHEMICAL COMPOSITION AS THE TOWER AND SHALL BE DESIGNED TO WITHSTAND THE FULL BENDING MOMENT OF THE SHAFT.

IN CONJUNCTION WITH THE SHOP DRAWINGS, WELD DETAILS AND WELD PROCEDURES MUST BE APPROVED BY KDOT IN ADVANCE OF FABRICATION BY THE MANUFACTURE.

ALL WELDING SHALL CONFORM TO A.W.S. SPECIFICATION D1.1 (LATEST REVISION).

AN INSPECTION REPORT SHALL ACCOMPANY THE SHIPMENT OF TOWERS TO THE PROJECT TO ATTEST COMPLIANCE WITH WELDING INSPECTION ACCORDING TO A.A.S.H.T.O. SPECIFICATION 1.4.2.

ALL TOWERS WILL BE VISUALLY INSPECTED BY A REPRESENTATIVE OF THE KANSAS DEPARTMENT OF TRANSPORTATION FROM THE REGIONAL MATERIALS LAB AND A TEST REPORT COMPLETED PRIOR TO ASSEMBLY.

LOWERING DEVICE:
MAIN SUPPORT ASSEMBLY: THE MAIN SUPPORT ASSEMBLY SHALL BE FABRICATED FROM WELDABLE STRUCTURE STEEL AND SHALL BE ATTACHED TO THE SHAFT BY SLEEVING AND SECURED BY STAINLESS STEEL SET SCREWS OR OTHER SIMILAR ATTACHING MEANS. THE MAIN SUPPORT ASSEMBLY SHALL HAVE SIX (6) HOISTING SHEAVES AND ROLLERS FOR THE POWER CABLE. THE SHEAVES SHALL BE OIL IMPREGNATED, SINTER BRONZE BUSHINGS OVER STAINLESS STEEL SHAFT, OR PERMANENTLY SEALED BALL BEARINGS WITH INNER FIXED RACES. THE MAIN SUPPORT ASSEMBLY SHALL ALSO INCLUDE THREE (3) MECHANICAL LATCHING DEVICES. THE MAIN SUPPORT ASSEMBLY SHALL BE HOT DIPPED GALVANIZED IN ACCORDANCE WITH A.S.T.M. A-123, OR ELECTROPLATED WITH A MINIMUM THICKNESS OF 0.4 MIL..

LUMINAIRE RING: THE LUMINAIRE RING SHALL BE CONSTRUCTED OF WELDABLE STRUCTURE STEEL WITH THREE (3), TWO (2) INCH NORMAL STEEL PIPE MASTARMS. IT SHALL BE PREWIRED TO DISTRIBUTE POWER TO THE LUMINAIRES FROM THE MAIN POWER CABLE SUPPLY. A TWIST LOCK RECEPTACLE SHALL BE PROVIDED ON THE LUMINAIRE RING TO ALLOW TESTING OF LUMINAIRES WHILE IN THE LOWERED POSITION. THE LUMINAIRE RING SHALL HAVE SPRING LOADED INTERCONNECTED CENTERING ROLLER ARMS OR AN APPROVED DESIGN TO PROVIDE STABILITY AND KEEP THE RING CONCENTRIC AROUND THE POLE DURING RAISING AND LOWERING. THE STEEL USED SHALL COMPLY WITH THE REQUIREMENTS OF A.S.T.M. A-36. THE MASTARM SHALL BE SECURED TO THE LUMINAIRE RING BY AN APPROVED METHOD. THE LUMINAIRE RING SHALL BE HOT DIPPED GALVANIZED IN ACCORDANCE WITH A.S.T.M. A-123, OR ELECTROPLATED WITH A MINIMUM THICKNESS OF 0.4 MIL..

HOISTING ASSEMBLY: THE LUMINAIRE RING SHALL BE RAISED AND LOWERED BY THREE (3) SYMMETRICALLY PLACED 7 X 19-3/16 INCH DIAMETER, ZINC ELECTROPLATED STEEL AIRCRAFT CABLES LOCATED INSIDE THE POLE SHAFT, AND ATTACHED TO THE LUMINAIRE RING. THE RAISING AND LOWERING SHALL BE OPERATED BY A WINCH ASSEMBLY WITH A 7 X 9-1/4 INCH DIAMETER ZINC ELECTROPLATED STEEL AIRCRAFT CABLE MEETING THE REQUIREMENTS OF FEDERAL SPECIFICATIONS RR-W-410 AND SHALL BE CAPABLE OF RAISING AND LOWERING A MINIMUM OF SIX (6) LUMINAIRES ON THE RING ASSEMBLY AT AN APPROXIMATE RATE OF 10 FEET PER MINUTE. THE WINCH ASSEMBLY SHALL ACCEPT A PORTABLE POWER UNIT COMPATIBLE TO THE LD-5 SERIES LOWERING DEVICE.

PORTABLE POWER UNIT: THE PORTABLE POWER UNIT SHALL BE ONE-HALF (1/2) INCH, HEAVY DUTY, REVERSIBLE DRILL U.L. APPROVED, BEING EQUIPPED WITH A TORQUE LIMITING SAFETY CLUTCH. THE PORTABLE POWER UNIT SHALL BE ARRANGED FOR REMOTE CONTROL OPERATIONS. THE PORTABLE P0WER UNIT SHALL BE CAPABLE OF OPERATING THE LD-5 SERIES LOWERING DEVICE.

STEP DOWN TRANSFORMER: STEP DOWN TRANSFORMER SHALL BE 1.5 KVA, SINGLE PHASE WITH A PRIMARY VOLTAGE OF 480 VOLTS AND A SECONDARY VOLTAGE OF 120/240 VOLTS. TRANSFORMER SHALL BE PROVIDED WITH A CARRYING CASE AND THE NECESSARY SERVICE RECEPTACLES.

A FIVE (5) FOOT SECTION OF TOWER CABLE SHALL BE PROVIDED FOR EACH TOWER FOR TESTING LUMINAIRES WHILE THE LUMINAIRE RING IS IN THE LOWERED POSITION. IT SHALL BE EQUIPPED WITH THE APPROPRIATE RECEPTACLES.

TOWER POWER CABLE: TOWER POWER CABLE SHALL BE 600 VOLT, •10 AWG THREE CONDUCTOR, STRANDED, EXTRA-FLEXIBLE COPPER CONDUCTOR TYPE SO CORD WITH CHLOROSULFONATED POLYETHYENE JACKET, OR OTHER APPROVED.

CIRCUIT BREAKER FOR BASE OF TOWER: THE CIRCUIT BREAKER SHALL BE 15 AMP, SINGLE THROW, DOUBLE POLE, WITH 100 AMP FRAME FOR 480 VOLT OPERATION.

SERVICE RECEPTACLE: SERVICE RECEPTACLE SHALL BE WEATHERPROOF, TWIST LOCK, 600 VOLT RATED.

ELECTRICAL MATERIAL:

(A) PHOTO-ELECTRIC CONTROL: PHOTO-ELECTRIC CONTROL SHALL BE SOLID STATE TYPE, 1000 W / 1800 VA MAX., SINGLE POLE, DOUBLE THROW, TWIST LOCK MOUNTING, 100-300 VOLT OPERATION. THE OPERATING LEVELS SHALL BE .30 FC ON - .60 FC OFF WITH A ALLOWABLE .05 FC VARIANCE ON OR OFF. THE PHOTO ELECTRIC CONTROL SHALL HAVE A MINIMUM OF A 45 SECOND TIME DELAY OFF.

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

(A) SECONDARY CABLE: 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.

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

(D) SAFETY SWITCH: SAFETY SWITCH SHALL BE 480 VOLT, 15 AMP, SINGLE THROW DOUBLE POLE, FRONT OPERATED, FUSED, HEAVY DUTY, IN A N.E.M.A. TYPE 3R ENCLOSURE.

(E) LUMINAIRES: ALL LUMINAIRES SHALL BE SUPPLIED WITH HIGH POWER FACTOR BALAST.

(A) 1000 WATT TOWER: 1000 WATT TOWER LUMINAIRES SHALL HAVE A HOUSING OF A SINGLE PIECE ALUMINUM ALLOY CASTING WITH AN INTEGRAL SLIPFITTER FOR TWO (2) INCH BRACKET MOUNTING WITH A NINE (9) INCH LIGHT CENTER. THE BALLAST SHALL BE A PEAK LEAD AUTO TRANSFORMER TYPE AT A VOLTAGE OF 480 VOLTS. THE LUMINAIRE SHALL OPERATE AS AN OPEN VENTILATED UNIT PERMITTING FREE FLOW OF AIR UPWARD FOR CLEANING AND COOLING. THE REFLECTORS SHALL PROVIDE A SYMETRIC PATTERN WITH A MAXIMUM CANDLE POWER OF A 60-65 DEGREE VERTICAL BEAM NADIR, OR OTHER APPROVED.

(B) 250 WATT SIGN LUMINAIRE: 250 WATT SIGN LUMINAIRE SHALL HAVE DIE CAST ALUMINUM HOUSING WITH A BUILT-IN BALLAST OF 480 VOLTS. THE LUMINAIRE SHALL HAVE A HYDROFORMED ALZAK ALUMINUM HOUSING REFLECTOR AND GLASS REFRACTOR WITH INNER PRISMS TO PROVIDE MAXIMUM UNIFORMITY.

PERFORMANCE SPECIFICATION: THE 250 WATT SIGN LUMINAIRE SHALL PROFORM WITHIN THE FOLLOWING STANDARDS ON A 18' WIDE BY 10' HIGH SIGN PANEL MOUNTED 1' DOWN AND 4' OUT FROM THE SIGN FACE:

| | |
|---|---|
| MAX/MIN | 7:1 |
| AVG/MIN | 3:1 |
| MAX | 25 FC |
| LLF | .72 |

(C) 150 WATT UNDERDECK LUMINAIRE: 150 WATT UNDERDECK LUMINAIRE SHALL HAVE A SINGLE PIECE CAST ALUMINUM HOUSING WITH BUILT-IN REGULATOR BALLAST AND PRISMATIC LIGHT CONTROLLING REFRACTOR MADE OF SHOCK RESISTING GLASS.

(F) LAMPS

(A) 1000 WATT TOWER LAMPS: 1000 WATT TOWER LAMPS SHALL BE A MINIMUM OF 110,000 LUMEN, METAL HALIDE.

(B) 250 WATT LAMPS: 250 WATT LAMPS SHALL BE 11,200 LUMEN, CLEAR MERCURY VAPOR.

(C) 150 WATT LAMPS: 150 WATT LAMPS SHALL BE 16,000 LUMEN, HIGH PRESURE SODIUM.

(G) ENCLOSURE: THE ENCLOSURE CABINET SHALL BE CONSTRUCTED OF 5052 ALLOY ALUMINUM .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 240 VOLT RATED MOLDED CASE MAIN AND SECONDARY BREAKERS, TWIST-LOCK PHOTO-CELL SOCKET, AND MERCURY 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" W X 4-1/2" H. MOUNTING HOLES SHALL BE POSITIONED TO ACCOMODATE 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 SPECIFICATIONS, 1990 EDITION, SECTION 1703 (C).

(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-METALIC CONDUIT: NON-METALIC CONDUIT SHALL BE 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.

(E) NON-METALIC CONDUIT FITTINGS: 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 MANUFACTURER'S RECOMMENDATIONS.

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

(G) ~~ANCHOR BOLTS:~~ ANCHOR BOLTS SHALL CONFORM TO THE STANDARD SPECIFICATIONS, 1990 EDITION, SECTION 1613, TYPE I FOR LIGHT STANDARDS, TYPE II FOR TOWERS.

(H) JUNCTION BOX: JUNCTION BOX SHALL BE MADE OF FOURTEEN (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).

(I) ~~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".

(J) 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.

(K) ALL WELDS SHALL BE SMOOTH CLEAN DENSE DEPOSIT THAT WILL EXCLUDE MOISTURE AND CONFORM TO A.W.S. SPECIFICATION D1.1 (LATEST REVISION). FIELD WELDS WILL NOT BE ALLOWED.

| NO. | DATE | REVISIONS | BY | APP'D |
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| 3 | | | | |
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KANSAS DEPARTMENT OF TRANSPORTATION
CONSTRUCTION AND MATERIAL
REQUIREMENTS FOR
HIGHWAY LIGHTING

~~TEPOE~~ 4/19/93

| | | | |
|---|---|---|---|
| FHWA APPROVAL 06/01/93 | | APP'D LINDA G. VOSS | |
| DESIGNED KG | DETAILED DC | QUANTITIES | TRACED |
| DESIGN CK. | DETAIL CK. LGV | QUAN. CK. | TRACE CK. |