

GENERAL NOTES POWER ADJUSTMENTS

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

274
384

LAKE COUNTY
LAK-2-14.22

SPECIFICATIONS

THE OHIO STANDARD SPECIFICATIONS SHALL GOVERN WHERE APPLICABLE UNLESS SHOWN OR NOTED TO CONTRARY IN THESE CONTRACT PLANS.

GENERAL SCOPE OF CONTRACTOR'S RESPONSIBILITY

THE CONTRACTOR SHALL FURNISH AND INSTALL ALL POLE LINE AND LIGHTING EQUIPMENT, UNDERGROUND DUCTS, WIRES, CABLES, GUYS, TRANSFORMERS, CROSS ARMS, INSULATORS, TIE WIRES, CLAMPS, BRACES, AND ALL APPURTENANCES, INCLUDING ALL MATERIALS AND LABOR NECESSARY TO COMPLETE THE POWER ADJUSTMENTS AS SHOWN ON THE PLANS.

THE CONTRACTOR SHALL REMOVE ALL BUILDING METERS AND SERVICE SWITCHES, POLES, LINE CONDUCTORS, GUYS, SERVICE DROPS, TRANSFORMERS AND STREET LIGHTS AS REQUIRED AND AS SHOWN ON THE PLANS. ALL STREET LIGHTS, POLES, METERS, SWITCHES, AND TRANSFORMERS REMOVED, AND NOT REUSED SHALL REMAIN THE PROPERTY OF THE CITY OF PAINESVILLE AND SHALL BE PLACED AS DIRECTED.

THE CONTRACTOR SHALL SCHEDULE WORK TO AVOID INTERFERENCE WITH GENERAL ROADWAY CONSTRUCTION.

THE CONTRACTOR SHALL INITIATE CONTACT WITH RESPONSIBLE OFFICIALS OF THE CITY OF PAINESVILLE, ELECTRICAL DEPARTMENT, RELATIVE TO THE DISRUPTING OF SERVICE TO ANY DISTRIBUTION LINE. ANY INTERRUPTION TO ELECTRICAL SERVICE SHALL BE SCHEDULED AND APPROVED WITH THE CITY OF PAINESVILLE, BOTH AS TO TIME AND DURATION, BEFORE MAKING SUCH INTERRUPTION.

THE TEMPORARY LINE ON NEWELL STREET SHALL BE INSTALLED AND CONNECTED BEFORE DEMOLITION OF THE EXISTING LINE.

THE REBUILT SECTION OF THE OVERHEAD LINE SHALL BE BUILT TO 12 KV REQUIREMENTS FOR FUTURE CONVERSION FROM 7.2 KV TO 12 KV OPERATION.

ALL OVERHEAD ELECTRICAL LINE WORK SHALL COMPLY WITH APPLICABLE PROVISIONS OF THE NATIONAL ELECTRICAL SAFETY CODE.

PROTECTIVE GROUNDING OR LOCK-OUT OF DISTRIBUTION LINES SHALL BE ACCOMPLISHED FOR SAFETY.

THE CONTRACTOR SHALL ALSO COOPERATE CLOSELY WITH ALL OTHER CONTRACTORS WHO MAY SUBSEQUENTLY BE ASSIGNED TO PERFORM WORK IN THE AREA OF THIS LIGHTING CONTRACT.

ALL THE ELECTRICAL WORK SHALL, EXCEPT AS MODIFIED HEREIN OR ON THE DRAWINGS, CONFORM TO THE REQUIREMENTS OF THE STATE OF OHIO, DEPARTMENT OF HIGHWAYS, CONSTRUCTION MATERIALS AND SPECIFICATIONS, JANUARY 1, 1959, ITEM S-25, ELECTRICAL EQUIPMENT.

POLES

ALL POLES SHALL BE WESTERN RED CEDAR, AND SHALL COMPLY WITH AMERICAN STANDARD 05.1, AND SHALL BE OF LENGTH AND CLASS INDICATED ON THE PLANS. ALL POLES SHALL BE FULL LENGTH PENTACHLOROPHENOL TREATED. EACH POLE SHALL BE MARKED IN ACCORDANCE WITH THE REQUIREMENTS OF AMERICAN STANDARD 05.1, SUCH MARKING BEING TEN (10) FEET FROM THE BUTT OF THE POLE.

POLES SHALL BE CAREFULLY SELECTED FOR STRAIGHTNESS.

POLES SHALL BE ROOFED, GAINED, AND BORED BEFORE TREATMENT.

GAINS SHALL BE CUT IN FACE OF POLE AND GAINED SURFACES SHALL BE IN APPROXIMATELY PARALLEL PLANES.

NOMINAL SPACING OF GAINS ON THE SAME SURFACE SHALL BE FOUR (4) FEET.

MINIMUM SPACING BETWEEN LINE CONDUCTOR CROSSARMS AND GAINS FOR BUCKARMS SHALL BE 2 FEET.

MINIMUM SPACING OF GAINS BETWEEN 4 KV AND 12 KV SYSTEMS SHALL BE FOUR (4) FEET.

ALL DIMENSIONS ARE CENTER TO CENTER.

POLES (Continued)

POLES SHALL BE SET TO FOLLOWING MINIMUM DEPTHS:

POLE LENGTH	SETTING DEPTH
30 FT.	5 FT. 6 IN.
35 "	6 " 0 "
40 "	6 " 6 "
45 "	7 " 0 "
50 "	7 " 6 "

AS FAR AS PRACTICABLE, POLES SHALL BE SET TO MAINTAIN AN EVEN GRADE; CONSECUTIVE POLES SHOULD NOT VARY MORE THAN FIVE (5) FEET IN HEIGHT.

POLES SHALL BE SET IN HOLES OF AMPLE SIZE AND THE SIZE OF THE HOLE AT THE BOTTOM SHALL BE LARGE ENOUGH TO PERMIT THE PROPER USE OF TAMPERS. WHEN BACKFILLING, A MINIMUM OF THREE (3) TAMPERS SHALL BE USED TO EACH SHOVELER TO INSURE THAT EARTH IS PACKED TIGHTLY. NO LAYER OF EARTH GREATER THAN SIX (6) INCHES SHALL BE THROWN IN WITHOUT BEING TAMPED HARD BEFORE NEXT LAYER IS THROWN IN. SURPLUS EARTH SHALL BE PACKED IN A CONICAL SHAPE AROUND POLE AND PACKED TIGHTLY FOR DRAINAGE.

POLES IN STRAIGHT RUNS SHALL BE CAREFULLY ALIGNED WITH CROSS ARMS AT RIGHT ANGLES TO THE RUN.

WHERE DIRECTION OF LINE CHANGES, CROSS ARMS SHALL BISECT ANGLE OF CHANGE.

FOR POLES PLACED IN I-13 CONCRETE SIDEWALK, PLACE PER DETAIL ON SHEET NO. 268.

CROSSARMS AND FITTINGS

ALL CROSSARMS SHALL BE STRAIGHT GRAINED, AIR OR KILN DRIED, STANDARD CROSSARM-GRADE DOUGLAS FIR OR SOUTHERN PINE, PENTACHLOROPHENOL TREATED.

THE VERTICAL AND LONGITUDINAL STRENGTH OF CROSSARMS SHALL CONFORM TO THE REQUIREMENTS OF NATIONAL BUREAU OF STANDARDS HANDBOOK H 30.

CROSSARMS SHALL BE STRAIGHT TO WITHIN 1/10 INCH PER FOOT.

CROSSARMS SHALL BE DRILLED FOR PINS, THROUGH BOLTS, BRACE BOLTS, AND DOUBLE ARMING BOLTS AS APPLICABLE TO THE INSTALLATION.

HOLES PROVIDED FOR THROUGH BOLTS AND DOUBLE-ARMING BOLTS SHALL BE 1 1/16-INCH IN DIAMETER. HOLES PROVIDED FOR BRACE BOLTS SHALL BE 7/8-INCH DIAMETER.

STANDARD CROSSARMS SHALL BE 3 1/2-INCH x 4 1/2-INCH BY 5 FEET, 7 INCHES. 3 1/2-INCH x 4 1/2-INCH BY 8-FOOT CROSSARMS SHALL BE USED, AS SHOWN ON PLANS.

NOMINAL SIDE PIN SPACING SHALL BE 14 1/2 INCHES.

NOMINAL CENTER PIN SPACING SHALL BE 30 INCHES.

PROVIDE CLIMBING SPACE OF NOT LESS THAN 30 INCHES FOR 4 KV CONSTRUCTION AND 36 INCHES FOR 12 KV CONSTRUCTION.

CROSSARMS SHALL BE BOLTED TO POLES BY MEANS OF 5/8-INCH THROUGH BOLTS, UTILIZING SQUARE WASHERS AT BOTH ENDS. THROUGH BOLTS SHALL EXTEND AT LEAST 1/8 INCH AND NOT OVER 2 INCHES BEYOND THE NUT WHEN INSTALLATION IS COMPLETE.

CROSSARM BRACES SHALL BE 1 1/2-INCH BY 1/2-INCH STEEL, LENGTH OF BRACES SHALL BE APPROXIMATELY 28 INCHES, OVERALL. BRACES SHALL BE BOLTED TO CROSSARMS BY MEANS OF 3/8-INCH CARRIAGE BOLTS, WITH ROUND WASHER INSERTED BETWEEN BOLT HEAD AND CROSSARM. AFTER THE CROSSARM HAS BEEN CAREFULLY ALIGNED, THE BRACES SHALL BE SECURED TO THE POLE BY MEANS OF A 1/2-INCH BY 4-INCH LAG SCREW. BUCK ARMS SHALL BE INSTALLED AT CORNERS AND JUNCTION POLES. DOUBLE CROSS ARMS SHALL BE PROVIDED AT DEAD-ENDS, ANGLES, AND CORNERS AS REQUIRED TO PROVIDE ADEQUATE VERTICAL AND LONGITUDINAL STRENGTH. DOUBLE CROSSARMS SHALL BE SECURELY HELD IN POSITION BY MEANS OF FOUR (4) DOUBLE-ARMING BOLTS. EACH DOUBLE-ARMING BOLT SHALL BE EQUIPPED WITH FOUR NUTS AND FOUR SQUARE WASHERS.

NEUTRAL OR MSL DEAD END BRACKET

SHALL BE RIGID TYPE INSULATED CLEVIS EQUAL TO JOSLYN J 193 ON 5/8" DIAMETER THROUGH BOLT.

NEUTRAL OR MSL SPOOL BOLT

SHALL BE 5/8" THROUGH BOLT AND PORCELAIN SPOOL. JOSLYN J 2390 LINE BOLT AND J 151 SPOOL.

PINS

ALL PINS FOR INSULATORS SHALL BE STEEL, ONE PIECE, FORGED, WITH LEAD THREADS, AND SHALL BE DESIGNED TO CARRY THE FULL STRENGTH OF THE PIN BODY TO THE TOP. THEY SHALL BE OF THE LONG SHANK TYPE AND SHALL BE EQUIPPED WITH LOCK WASHERS AND SQUARE NUTS AT THE BOTTOM OF THE CROSSARMS. DIAMETER OF SHANK SHALL BE NOT LESS THAN ONE (1) INCH. LEAD THREADS SHALL BE SECURELY BONDED TO THE STEEL AND CAREFULLY FORMED TO FIT THE INSULATOR THREADS. LEAD TOPS SHALL BE DESIGNED TO PREVENT LOCALIZED PRESSURE ON THE INSULATOR TOP WHEN IT IS TURNED DOWN TOO TIGHTLY. PIN BASES SHALL BE OF ADEQUATE DIAMETER TO INSURE MAXIMUM RESISTANCE TO STRAIN. PINS SHALL HAVE A HEIGHT ABOVE THE ARM ØF NOT LESS THAN 4 1/2 INCHES. PINS SHALL HAVE CROSSARM SADDLES.

PINS ON POLE TOPS SHALL BE ON POLE TOP BRACKETS OF 4" X 1/2" FLAT STEEL WITH TWO 13/16 HOLES FOR THROUGH BOLTS, JOSLYN NO. J2040 OR EQUAL.

ALL PINS SHALL COMPLY WITH THE STRENGTH REQUIREMENTS OF THE NATIONAL BUREAU OF STANDARDS HANDBOOK H 30, THREADS SHALL BE OF PROPER DESIGN AND DIMENSIONS FOR THE INSULATOR TO BE INSTALLED THEREON.

INSULATORS

ALL INSULATORS SHALL BE BROWN-GLAZE, WET-PROCESS PORCELAIN.

PIN TYPE INSULATORS SHALL BE AS FOLLOWS:

- a. 4 KV - NOMINAL RATING 6.6 KV, NEMA STANDARD, EEI - NEMA CLASS 55-2.
- b. 12 KV - NOMINAL RATING 13.5 KV, NEMA STANDARD, EEI - NEMA CLASS 55-3, RADIO FREED.

DEAD END INSULATORS SHALL BE AS FOLLOWS:

- a. 4 KV (ACSR) - 7 1/2" DIAMETER, CLEVIS-TONGUE TYPE, NEMA STANDARD, EEI-NEMA CLASS 52-2. INSTALL ON 2" X 1/4" STEEL EYELET WITH 5/8" PIN AND BRASS COTTER AND PINCO, OR EQUAL, STRAIGHT LINE STRAIN CLAMPS.
- b. 12 KV (ACSR) - 10 INCH DIAMETER, CLEVIS (COPPER) TONGUE TYPE, 2 INSULATORS PER TERMINATION, NEMA STANDARD, EEI - NEMA CLASS 52-4. HARDWARE SAME AS UNDER (a) ABOVE.
- c. 4 KV COPPER - TYPE 708, STRAIN INSULATOR, NEMA STANDARD, EEI - NEMA CLASS 54-4. INSTALL USING "RELIABLE", OR EQUAL, STRAIGHT THROUGH DEAD ENDS WITH FLEXIBLE PHOSPHOR BRONZE BAIL, AND FLEXIBLE STRAIN CLEVIS EQUAL TO JOSLYN TYPE B.
- d. GUY INSULATORS - TYPE 506, NEMA STANDARD, EEI - NEMA CLASS 54-3.

SECONDARY RACKS

SECONDARY RACKS SHALL BE 3 SPOOL, STEEL, BACKS NOT LIGHTER THAN 1/8", CLEARANCE BETWEEN CONDUCTORS 8 INCHES. INSULATORS SHALL BE ROUND AND SMOOTH, 5/8" BUTTON HEAD BOLT WITH NON-FERROUS COTTER PIN, EXTENDED BACK TYPE, ATTACH WITH 5/8" THROUGH BOLTS (TWO PER RACK) JOSLYN J 1268 OR EQUAL.

GUYING

GUYS SHALL BE INSTALLED WHERE INDICATED ON THE PLANS AND AS OTHERWISE REQUIRED WHEREVER CONDUCTOR TENSIONS ARE NOT BALANCED AS AT CORNERS, ANGLES, AND DEAD ENDS.

SPAN GUYS OR HEAD GUYS SHALL BE PROVIDED WHERE A CHANGE IN SIZE OR NUMBER OF CONDUCTORS CREATES A TOTAL UNBALANCED PULL WHEN FULLY LOADED IN EXCESS OF 10% OF THE TOTAL BREAKING STRENGTH OF THE CONDUCTORS IN THE LIGHTLY LOADED SPAN.

NEUTRAL CONDUCTORS SHALL BE ON CROSSARM OR ON POLE BRACKET AS NECESSARY TO PROVIDE EVENLY LOADED CROSSARMS.

GUYS SHALL BE ATTACHED AS NEAR AS PRACTICABLE TO THE CENTER OF THE CONDUCTOR LOADS TO BE SUSTAINED. GUY WIRE SHALL BE EXTRA-GALVANIZED.

WHERE A SINGLE GUY WILL NOT PROVIDE THE REQUIRED STRENGTH WITHOUT EXCEEDING 87% OF ULTIMATE STRAND STRENGTH, 2 GUYS SHALL BE PROVIDED.

GUYING (Continued)

EACH GUY SHALL HAVE A 506 GUY INSULATOR AT 8 FEET FROM POLE. PROVIDE SECOND INSULATOR ON SPAN GUYS CROSSING ROADWAYS OR FOREIGN FACILITIES 8 FEET FROM SECOND POLE

GUY TERMINATIONS SHALL BE MADE BY TAPERED GRIP STRAND TERMINAL, RELIABLE "STRAND VISE" OR EQUAL.

ANCHORS SHALL BE CONE TYPE.

GUY RODS SHALL BE 3/4-INCH DIAMETER X 7 FEET LONG, TWIN EYE, "COPPERWELD".

EACH ANCHOR GUY SHALL HAVE A GUY GUARD HEAVY TYPE, 8 FEET LONG, JOSLYN J 1605 OR EQUAL.

GUYS SHALL BE ATTACHED BY 3/4" DIAMETER THROUGH BOLTS, ANGLE EYE TYPE OR STRAIGHT (FOR-SPAN GUYS).

EACH ANCHOR GUY OVER 4000LB SHALL HAVE LEFT PLATE WITH 1/2" X 4" LAG SCREW.

ANCHOR GUY COMPONENTS SHALL BE AS FOLLOWS:

MAXIMUM STRENGTH	COMPONENTS
17,400 LB.	2-3/8" EXTRA-HIGH STRENGTH STRAND, 19" CONE
10,000 LB.	1-3/8" " " " " " " 16" "
7,600 LB.	1-3/8" HIGH STRENGTH STRAND, 12" "
5,400 LB.	1-3/8" SIEMENS-MARTIN STRAND, 10" "
2,660 LB.	1-1/4" " " " " " " 10" "
1,500 LB.	1-1/4" " " " " " " 8" "

SPAN GUYS SHALL HAVE STRAND AS FOR ANCHOR GUYS.

ANCHOR GUY LEADS SHALL BE AS INDICATED ON THE PLANS.

LINE CONDUCTORS

COPPER PRIMARY BASE CONDUCTORS SHALL BE HARD DRAWN COPPER, FEDERAL SPECIFICATION QQ-W-336.

WEATHERPROOF COPPER WIRE SHALL BE USED WHERE INDICATED ON PLANS, FEDERAL SPECIFICATION J-C-145.

ALUMINUM CONDUCTOR, STEEL-REINFORCED (ACSR) SHALL BE USED AS NOTED ON PLANS, AMERICAN STANDARD C 7.22, USING A CORROSION INHIBITOR WITH ALL TAPS & SPLICES.

SPLICES UNDER TENSION SHALL BE MADE MECHANICALLY AND ELECTRICALLY SECURE BY MEANS OF SLEEVE OR TENSION LINE SPLICES. SLEEVES, CONNECTORS AND LINE SPLICES SHALL BE MADE OF MATERIALS THAT WILL NOT ADVERSELY AFFECT THE CONDUCTORS ON WHICH THEY ARE USED. SPLICES UNDER TENSION SHALL HAVE A BREAKING STRENGTH AT LEAST EQUAL TO THE CONDUCTOR IN WHICH THEY ARE MADE.

LINE WIRES SHALL BE TIED TO INSULATORS IN AN APPROVED MANNER. TIE WIRES FOR COPPER WIRES SHALL BE SOFT COPPER OF SAME SIZE AND INSULATION AS LINE WIRES.

TIE WIRES FOR ACSR CONDUCTORS SHALL BE STRONG ALUMINUM-ALLOY TIE WIRE OVER ARMORED ALUMINUM STRIP, RODS, OR EQUIVALENT AT INSULATOR SUPPORTS AND WHEREVER REQUIRED TO PREVENT DAMAGE TO CONDUCTORS. ALUMINUM ARMOR SHALL COMPLY WITH RECOMMENDATIONS OF MANUFACTURER.

CARE SHALL BE TAKEN IN HANDLING AND STRINGING CONDUCTORS TO GUARD AGAINST CUTS, SCRATCHES, OR KINKS. CONDUCTORS SHALL NOT BE DRAWN OVER ROUGH GROUND IN SUCH A WAY AS TO BE INJURED.

WHERE WEATHERPROOF OR POLYCHLOROPRENE-COVERED CONDUCTORS ARE SPLICED, TAPPED, OR HAVE COVERING INJURED, THEY SHALL BE COVERED WITH WEATHERPROOF TAPE.

INITIAL STRINGING SAG - #2 BARE HARD DRAWN COPPER

Temp. Deg. F.	SAG IN INCHES		
	SPAN IN FEET		
	100	125	150
30	6	11	13
60	10	15	18
90	14	20	24