



**Specifications for
Residential Underground Electric
Transformer Installations
Served from a Pole in a
Wye Primary Voltage Configuration**

SPECIFICATIONS
FOR
RESIDENTIAL UNDERGROUND ELECTRIC
TRANSFORMER INSTALLATIONS
SERVED FROM A POLE IN A WYE
PRIMARY VOLTAGE CONFIGURATION
SUPPLEMENTING
GENERAL
SPECIFICATIONS
FOR
ELECTRIC INSTALLATIONS
(BLUE BOOK)

Pike County Light and Power Company

105 Schneider Lane

Milford, Pennsylvania 18337

These specifications will be revised or amended as required in keeping with developments and progress of the industry. The most recent published edition should always be referenced when making installation decisions regarding your electric service project. All previous editions are outdated and invalid. Additional copies of this Blue Book can be obtained at any of the Company's Office listed below.

This most current edition of the General Specifications for Electrical Installations (Blue Book), Specifications for Electric Installations (Red Book) and the Electric Meter Approved Equipment List can be found on the Company's website at <http://pclpeg.com/contractor-resources/>

All applications for new, upgrade, and relocation of electric service will be coordinated through the Company Office. Copies of this "Blue Book" are also available at:

105 Schneider Lane
Milford, PA 18337

Telephone Number 1 (570) 832-2988
Fax Number 1 (570) 832-2989

Call Before You Dig

For your safety and protection, the Utility Notification Service provides details on the location of underground electric wires, gas lines and communication cables. To prevent damage to underground equipment and avoid personal injury or find yourself with an unnecessary repair bill, please call:

Pennsylvania One Call

In Pennsylvania or out-of-state call: **811** or 1-800-242-1776
Pennsylvania code requires 3-10 working days notice.

Gas Emergencies Call

1-855-855-2268

High Voltage Proximity Clearances

If you're starting work in proximity to overhead high-voltage lines, it's your responsibility to notify the utility in writing at least five (5) business days before the job is scheduled. If the notification is made by regular mail, there must be three (3) additional days notice. All correspondence for **Pike County Light & Power Co.** should be directed to the PCLP Office.

TABLE OF CONTENTS

	<u>Page</u>
I. INTRODUCTION	1
II. CODES, STANDARDS AND WIRING ADEQUACY	2
III. APPROVAL AND INSPECTIONS	2
IV. SCOPE OF CUSTOMER WORK	4
V. TRANSFORMER PAD LOCATION	5
VI. TRANSFORMER FOUNDATION	5
VII. TRENCH AND CONDUIT WORK	5
VIII. GROUNDING	7
IX. PRIMARY CABLE	7
X. PRIMARY CABLE TERMINATIONS	9
XI. SECONDARY (SERVICE) CABLE	10
XII. METERING	10
XIII. ENERGIZATION PROCEDURE	11
XIV. BACKFILL AND GRADING	11
XV. SPECIFICATIONS FOR CONCRETE	12

ABBREVIATIONS:

N.E.C. - National Electrical Code, NFPA 70, Latest Edition
N.E.S.C. - National Electrical Safety Code, ANSI C2, Latest Edition
UL - Underwriter's Laboratory
EPR - Ethyl Propylene Rubber

SYMBOLS:

| - Denotes revision in left margin of text
..... - Denotes revision in a Figure

I. INTRODUCTION

This supplement provides specifications for customers requesting electric service from the Company to be supplied to a single phase transformer installation. It applies to a normal installation served by a single underground primary feeder circuit from an overhead line. Installations requiring dual feeders, multiple transformers, or emergency generators must be provided in advance to the Company's representative for recommendations and approval. Manufacturer's equipment drawings for installations, not normally covered in this specification, must be submitted to the Company's Representative prior to fabrication or construction. (See Section III of these specifications for details).

Information concerning the service location, route of the primary service lateral and other data applicable to the specific installation will be furnished by the Company's representative. For this purpose, the customer must furnish two (2) prints of the final site plan with approval by the governmental authorities having jurisdiction, showing underground utilities (drains, sewers, etc.) and roads, either existing or proposed. Also, the customer must provide a drawing showing sufficient detail to locate doors, windows, fire escapes, etc., either existing or proposed, in the area of the requested service location. Specific information furnished by the Company shall be subject to change if significant changes are made in the design or scheduling of the project by the customer. These requirements do not cover the customer's complete electrical installation design, but are concerned only with those items in which the customer, his consulting engineer, electrical contractor, equipment manufacturer and the Company have a mutual interest. When supplemental information is required, the customer shall direct all

inquiries and correspondence to company representative coordinating the installation.

II. CODES, STANDARDS AND WIRING ADEQUACY

The customer's electric service equipment and its installation shall be in accordance with the latest Company Specifications for the Installation, the latest edition of the National Electrical Code (N.E.C.), National Electrical Safety Code (N.E.S.C.) and all applicable ordinances and codes. When differences in Company Specifications or Standards or Governmental ordinances or Codes occur, the more stringent requirements shall govern the installation. Any deviation from the preceding must be approved by the Company and other agencies having jurisdiction over the installation.

Responsibility for design and construction in conformance with all codes rests with the owner. If the customer does not follow the above codes and standards, the customer will be expected to make any necessary changes at their expense before service is provided.

III. APPROVAL AND INSPECTIONS

The customer must submit their plans to the Company before ordering equipment or starting work to ensure that the proposed design for the installation conforms to Company requirements. The customer must furnish, for review by the Company, information as follows:

- A. Manufacturer's equipment drawings for the installation; showing electrical one-line diagrams and characteristics of protective equipment, when applied; physical arrangement and clearances; and particularly, the installation details for metering transformers and equipment.

- B. Manufacturer specifications for manual or automatic electrical transfer switches when proposed to be installed.
- C. A final approved site plan drawing showing all underground utilities (drains, sewer, gas, electric, etc.) roads and requested service entrance location. Also, a drawing showing sufficient detail to locate doors, window, fire escapes, etc., either existing or proposed in the vicinity of the requested service location.

Fabrication of equipment or project construction should not proceed without approvals from the Company and other agencies having jurisdiction.

The Company requires inspections of the primary service installation.

A pre- inspection checklist is included as the last page of this specification. At the completion of the installation, the customer/contractor **must** fax a copy of the checklist to the number on the bottom of the checklist prior to scheduling any inspections with the company representative. **NOTE: for each inspection checklist issued and submitted properly, the Company will perform the initial inspection at no charge. For any re-inspections required for non-compliance or non-completion, a re-inspection fee will be assessed to the responsible party.**

In addition to the Company inspections, it is the customer's responsibility to arrange for inspection by the Board of Fire Underwriters' or the authority having jurisdiction. Before service can be provided, the customer will furnish a certificate (Cut-In Card) of satisfactory evidence as to the safe condition of their wiring.

IV. SCOPE OF CUSTOMER WORK

The customer shall provide all materials (unless otherwise specified), labor and equipment required for completion of the installation as specified herein and as called for in the drawings or as directed by the Company's representative. The customer shall include items incidental to the work not specifically mentioned herein so as to make the finished work fully complete and satisfactory in every respect.

In general, the customer's work will consist of the following major items and the specific notations with respect to these shall apply.

Installation or construction of the following:

- A. 1. Transformer pad
- 2. Duct or conduit work
- 3. Grounding
- *4. Primary cable installation (including terminations)
- *5. Secondary cable installation
- 6. Metering
- B. Excavation and backfill
- C. Grading

** For all residential customers, primary terminations and secondary connections will be completed in the transformer by the Company.*

V. TRANSFORMER PAD LOCATION

The customer shall provide property and necessary rights-of-way (where applicable) on which to construct the transformer foundation. The location should be mutually agreed upon by the Company and the customer. It shall be located at least 10'-0" from any building or structure. The installation shall be in accordance with Fig. 2. The following minimum horizontal clearances from other underground facilities are as follows:

- A. 20' - 0" from any fuel storage facility (above ground included).
- B. 10' - 0" from water pipes (wells included) and any other pressurized liquid filled pipe.
- C. 5' - 0" from non-pressurized pipes (e.g., storm drains, sewer, etc.)
- D. 5' - 0" from gas services and communication cables.

The customer must provide and maintain a permanent unobstructed access to the transformer pad. Shrubbery may be planted around the transformer as directed on the label of the transformer.

SPECIAL NOTE: THE TRANSFORMER PAD MUST BE LOCATED BETWEEN 4'-0" AND 10'-0" OF THE ACTUAL DRIVEWAY LEADING TO THE HOUSE OR BARN. THE SHORT SIDE OF THE BOX MUST FACE TOWARDS THE DRIVEWAY.

VI. TRANSFORMER FOUNDATION

The customer shall supply, install, own and maintain the fiberglass pad foundation for the transformer.

VII. TRENCH AND CONDUIT WORK

If the customer desires to install their primary wire in conduit, instead of direct burying in sand as preferred by the Company, the following is required.

The customer shall furnish, own, install and maintain all duct and conduit (if applicable) associated with the transformer installation in accordance with Fig. 1.

The primary and secondary conduits shall enter the transformer installation as per

Fig. 2. All conduits are to be installed according to the latest N.E.C. and N.E.S.C. requirements. Underground primary conduits shall have a minimum cover as specified in Fig. 1.

When paralleling water and sewer utilities all underground electric conductors/conduit(s) shall have a minimum horizontal clearance of ten (10) ft. from a water or sewer line and one (1) ft. separation when crossing.

Spare conduits (when applicable) must be capped or plugged and a corrosion-resistant pull line of 200 pounds (minimum) breaking strength shall be installed in conduits until needed. Metallic pull wires are not acceptable.

Riser Pole Requirements:

Where a Customer's underground service (0 - 34,500 volts) "rises" on a Company distribution pole with a **WYE** primary circuit voltage (2400/4160 volts or 7620/13200 volts or 19920/34500 volts), the customer installed conduit shall be UL approved: rigid metal conduit, or intermediate rigid metal conduit, or Schedule 80 rigid nonmetallic PVC conduit or equivalent. The Customer is also required to install a UL approved PVC conduit coupling that will connect to the Company's Schedule 40 rigid nonmetallic PVC conduit.

The minimum conduit size & bends at the riser pole, utilizing the primary cables discussed in Section IX of this specification, are as follows and shall be installed in accordance with Fig. 3:

1. 15KV construction: 10ft. of a two inch (2" minimum) riser, with an 18" minimum bend.
2. 35KV construction: 10ft. of a three inch (3" minimum) riser, with a 36" minimum bend.

The Company will complete the installation on the riser pole.

VIII. GROUNDING

The customer shall furnish, own (unless otherwise specified), install and maintain a ground grid consisting of No. 2/0 Awg bare (tinned preferred) copper with two 5/8" x 8'-0" long **copperweld** ground rods as shown Fig. 2. **The ground grid installation is to be at least 18" below final grade elevation.** All below grade UL listed splices in this ground grid are to be made with a Amp Wrench-Lok connector, cadweld or thermoweld process, "Ampact Fired On" connectors or compression connectors that have been approved by the Company's representative for direct burial use.

For metallic primary conduits at a riser pole (two maximum), the customer shall provide and install a No. 2 (minimum) Awg. stranded copper conductor to an N.E.C. approved conduit grounding clamp(s). Conductor shall be a minimum of five (5) feet long for the Company to make the interconnection to the Company installed ground rod.

IX. PRIMARY CABLE

The customer shall furnish, install, own and maintain the primary cable installation. The customer shall determine the cable length required for the installation, allowing 50ft. for the riser pole, 15ft. for the transformer pad and 30ft. for any interim pull box installed.

All primary cables are to be manufactured and tested to meet the latest requirements of Insulated Cable Engineers Associated (ICEA), and Association of Edison Illuminating Companies (AEIC) No. CS6-87, and appropriate Company specifications for 15KV or 35KV cable.

For your convenience, a 15KV material list is included in this specification as the next to the last page. For 35KV installations, a separate 35KV list will be provided upon request.

For 13.2/7.62KV voltage, the primary cable will be 15KV rated, shielded, 175 mil EPR insulated cable with a full concentric neutral and an overall semi-conducting polyethylene jacket, with three (3) extruded red stripes.

The conductor size is #2 Awg. Aluminum. Cable is to be Kerite URD (SPS-HTK), or Okonite Okoguard URD-J, or approved equivalent.

For 34.5/19.9KV voltage, the primary cable will be 35KV rated, shielded, 345 mil EPR insulated cable with a full concentric neutral and an overall semi-conducting polyethylene jacket, with three (3) extruded red stripes. The conductor size is 1/0 Awg. aluminum. Cable is to be Kerite URD (SPS-HVK), Okonite Okoguard URO-J, or approved equivalent. Any deviation from the above must be approved by the Company.

Manufacturer's specifications for proposed cables must be submitted to Pike County Light & Power company representative, for review and written approval prior to purchase and installation to insure compatibility with the Company's distribution system.

All cable ends must be sealed at all times and resealed when cut to prevent contamination of the cable by moisture and dirt. An appropriate heat shrink seal is recommended.

Jacketed concentric neutral primary cable is to be installed direct buried (**Company preferred**), or in metallic conduit or in non-metallic conduit according to the latest N.E.C., N.E.S.C. or Company requirements.

For direct buried installations, a 2" sand padding is to be installed below the primary cable and 6" of sand is to be installed above the primary cable installation, the full width of the trench.

If required by the N.E.C. or N.E.S.C., a 2" x 12" planking is to be placed on top of the sand padding and centered over the cable. The trench is to be backfilled to grade elevation, as referenced to in Fig. 1.

X. PRIMARY CABLE TERMINATIONS

The customer shall supply the primary cable termination kits for the transformer and riser pole for the Company to install. **All termination kits shall be left with either Company representative or in a heavy plastic bag in the transformer pad & protected from water damage.**

The termination's at the riser pole must be outdoor type stress cones.

- | | |
|--------------------------|---|
| For 15KV primary cable - | 3M Co. Cat. No. 7642-S-2-2 or Company approved equivalent for #2 AWG conductor. |
| For 35KV primary cable- | 3M Co. Cat. No. 5646-1/0 or Company approved equivalent for #1/0 AWG conductor. |

The terminations at the padmount transformer(s) shall be:

- | | |
|------------------------------|---|
| For 15KV primary cable - (*) | Elastimold Loadbreak Elbow, Cat. No. 166LR-A-5220 or Company approved equivalent for #2 AWG conductor. |
| For 35KV primary cable - (*) | Elastimold Loadbreak Elbow, Cat. No. 376LR-K-240 or Company approved equivalent for #1/0 AWG conductor. |

() For prevention of moisture contamination to the cable, cable sealing kits are required to be installed with Elastimold primary cable elbow terminations. 15KV sealing kits for #2 - #210 AWG conductor are to be 3M Co. Cat. No. 8452; 35KV sealing kits for #1/0 AWG conductor are to be 3M Co. Cat. No. 8453 or Company approved equivalents.*

Any deviation from the preceding Company approved termination kits must be approved by the Company prior to purchasing them.

XI. SECONDARY (SERVICE) CABLE

The customer shall furnish, install, own and maintain the secondary cable installation. The customer's cable shall be a 600 volt insulated stranded cable sized and installed in accordance with the N.E.C. The customer shall leave a 15ft. (minimum) coil of the cable for the Company to make the connections to the transformer.

XII. METERING

ALL METER INSTALLATIONS SHALL BE INSTALLED OUTDOORS.

Secondary Metering 120/240 volts. 300 ampere services and below:

The customer shall furnish, install and own the meter pan. The Company will supply and install the kilowatt-hour meter.

Secondary Metering 120/240 volts. 400 ampere services and above:

The customer shall furnish, install own and maintain a current transformer (C.T.) cabinet and ten point meter pan. The Company will install the kilowatt-hour meter and the current transformers in the C.T. cabinet and the Company will wire the secondary C.T. connections.

The Company Representative has a current list of approved manufacturers for the above metering equipment that must be adhered to: or go online to

<http://pclpeg.com/contractor-resources/>

XIII. ENERGIZATION PROCEDURE

The Company Engineering Department will inspect each installation upon notification that the customer has completed their work. Such notification should be initiated by the customer faxing in their Pre-Inspection Checklist and calling their company representative.

If the inspection is rejected, the company representative will notify the customer's representative of the corrective action required for approval of the installation. A reinspection of the installation will be conducted upon completion of the corrective action required.

Upon receipt of both the Company approval notice and the Underwriter Inspection Certificate (Cut-In Card)*, the installation will then be scheduled for energization by the Company.

** Certificate of satisfactory evidence as to the safe condition of the wiring from the Authority having jurisdiction.*

XIV. BACKFILL AND GRADING

The customer and/or contractor shall assume the responsibility of backfilling and grading the installation. Refer to Fig. 1.

XV. SPECIFICATIONS FOR CONCRETE

A. Concrete Work

Any concrete construction work shall be in accordance with the recommendation of the American Concrete Institute as stated in their Bulletin ACI 318, latest revision and as specified herein.

Materials:

1. Portland Cement:

Portland Cement shall conform to the latest edition of the "Standard Specification for Portland Cement" of the American Society for Testing Materials, Designation: C150, Type I, II and III.

2. Metal Reinforcement:

Wire for concrete reinforcement shall conform to the requirements of the "Standard Specifications for Cold-Drawn Steel Wire for Concrete Reinforcement, A.S.T.M.: A-82, latest edition, and the applicable Company specification.

C. Concrete Quality:

The equipment pads have been designed for concrete having a minimum ultimate comprehensive strength at 28 days of 3000# per square inch, and all concrete, except as otherwise noted or specified, shall be designed to meet or exceed this requirement.

All concrete exposed to weathering shall have a minimum air content as shown in A.C.I. 318, latest edition, Section 4.2.5.

15KV WYE RESIDENTIAL MATERIAL LIST
RISER POLE SYSTEM CONNECTION POINT
(SINGLE PHASE ONLY)

CUSTOMER: _____

Mfg.	Cat No.	PCLP's M&S No.	Description	Co. Supply Quantity	Cust Supply Quantity	Price Per Unit/ Ft	Cost
		128-045	2" Galv. 90D 24" Radius Steel Bend		1		
		165-017	2" Galv. Steel Conduit		... 10 1/2		
Amp Inc.	83749 - 3	170-130	WRENCH-LOK Ground Connector		2		
T&B/Blackburn	6258	266-045	5/8" X 8' Copperweld Ground Rod		2		
		330-085	#2 AWG Cu. 600 Volt Insulation		5 Ft.		
Rome Cable		330-092	#2 AWG Cu. Bare Tinned				
Rome Cable		330-094	#2/0 AWG Cu. Bare Tinned		35 Ft		
Elastimold	160 - DRG	402-030	15 KV Ground Protective Cap	1			
Okonite or Kerite	O&R Spec. No. 62386	422-023	#2 AWO AL Conductor 15 KV		*** As Required		
Gibbons or T&D/Blackburn	GB -5885 3903- BU	425-015	2" Steel Conduit Ground Connector		** 1		
Carlton or Cantex	49011 A52CA12	427-020	2" PVC Conduit - Sch. 40, UL Listed (Trench Only)		As Required		
3M	7642-S-2-2	432-054	#2 AWG Terminator 15 KV		* 1		
Elastimold	166LR-A-5220	441-030	#2 AWG Loadbreak Elbow 15 KV		*1		
Elastimold	1601A4	451-030	15 KV Loadbreak Bushing Well Insert	2			
Highline or Nordic	HL-48 GS-37-43-32CE	452-010	Fiberglass Box Pad		1		
Highline	HL- 48 -2EP	452-020	Cover for above Box Pad				
Elastimold	164J3R- CS646	477-022	15KV Three Way Junction (LBC-3)				
3M	5411-CI-21	466-023	#2 AWG 15 KV In-Line Splice				
3M	SJ-1	466-180	Sealing Kit for above In-Line Splice				
Homac	ASC2TN	938-036	#2 AWO Barrel Connector for above In-Line Splice				
Carlton	E942J	801-020	Coupling 2" PVC to Steel		** 1		
Carlton	UA5DJB	824-002	(for xfmr pad entry) 2" PVC 22.5 Degree - 24" Radius Bend		1		
Raychem	ESC-3 -A	855-010	Heat Shrink Cable End Cap	3			
Burndy or T&B/Blackburn	GRC58 JAB518H	881-001	5/8" Ground Rod Clamp		** 1		
AB Chance or Cooper Power	508743 DF13L3	960-002	Screw, Lag 3/8" X 3"		6		
3M	8452	961-002	15 KV Cable Sealing Kit		* 1		
Utilities Service Co.	9024	973-012	2" Galvanized Steel Pipe Strap		3		

* LEAVE THESE ITEMS WITH THE UNDERGROUND DEPT. AT TIME OF MATERIAL PURCHASE.

** NOT REQUIRED IF SCH. 80, UL LISTED, PVC CONDUIT IS INSTALLED ON RISER POLE.

*** WHEN CALCULATING CONDUCTOR LENGTH, ADD 65 FT. TO THE LINEAR LENGTH.

(SOFT. FOR THE POLE & 15 FT. FOR THE TRANSFORMER PAD)

NOTE: The above items may be purchased from either Pike County Light & Power or:

1. Swift Electrical Supply, Nanuet, N.Y. 1(845) 623-3425

Sub Total: _____

Sales Tax: _____

Grand Total: _____

