

**RED BOOK**

**SPECIFICATIONS FOR  
RESIDENTIAL  
&  
NON RESIDENTIAL  
PADMOUNTED TRANSFORMER  
INSTALLATIONS  
SUPPLEMENTING  
GENERAL SPECIFICATIONS  
FOR ELECTRIC INSTALLATIONS**



105 Schneider Lane  
Milford, PA 18337

These specifications, which protect the mutual interests of the Customer and the Company, will be revised or amended as required in keeping with developments and progress of the industry. The latest revisions should always be used. Additional copies of this booklet and any revisions thereof may be obtained at the Company's Office. Previous editions are outdated and invalid.

This specification (aka Red Book), the General Specifications for Electric Installations (aka Blue Book) and the Electric Meter Approved Equipment List can be found at <http://pclpeg.com> by clicking on:

- Contractor Resources

Revisions are indicated by vertical marginal rules on the affected pages. In some cases, minor editorial changes are not so indicated.

**New Construction Services Field Offices:**

All new projects and copies of this book will be coordinated through the New Construction Services Field Office at the location listed below:

105 Schneider Lane Milford, PA 18337  
(570) 832-2988

## **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.

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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:

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

# SPECIFICATIONS FOR RESIDENTIAL & NON-RESIDENTIAL TRANSFORMER INSTALLATIONS

## I. INTRODUCTION

This supplement provides specifications for customers requesting electric service from the Company for a single phase or three phase padmounted 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, primary/secondary switchgear, or switching/ emergency generators must be referred to the Company's Engineering Department for recommendations and approval. Manufacturer's equipment drawings for installations, not normally covered in this specification, must be submitted to the Company's Engineering Department 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 who will obtain technical data from the Engineering and Operating Departments. For this purpose, the customer must furnish four 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 coordinating the installation.

## II. DEFINITIONS

1. **Company** means Pike County Light & Power, and Subsidiaries.
2. **Cost or Expense** shall include all labor, material, and other applicable charges, including overheads required for the work to be performed by Company personnel.
3. **Customer** is used to designate either a present or a prospective user of the Company's electric service.
4. **Electrical Installation** refers to the total electrical wiring and equipment installed on the customer's premises.
5. **Ground** is a conducting connection between an electric circuit or equipment and earth, or some conducting body which serves in place of the earth.
6. **Hertz** is cycles per second of an alternating current supply.

7. **Line** is a system of poles, wires and equipment, or the equivalent below grade ducts, conduits, cables, etc., used for the distribution of electricity. It may be located above or below ground, on/in a street, highway, alley or on a private right-of-way.
8. **Multiple-Occupancy Building** is a structure (including row houses) enclosed within exterior fire walls, of fire walls built, erected, and formed of component structural parts, and designed to contain two or more individual dwelling, or commercial units for permanent occupancy.
9. **Power Quality** is the concept of powering and grounding sensitive equipment in a manner that is suitable to the operation of that equipment.
10. **Recommended** means desired, but not mandatory.
11. **Service** means the conductors and equipment for delivering energy from the Company's distribution line to the wiring system of the premises served.

A) **Service drop** refers to that portion of the overhead conductors between the Company's distribution line and the first point of attachment on the customer's facilities.

B) **Service entrance conductors from an overhead system** are the conductors between the terminals of the customer's service equipment and a point, outside the building, where joined by connection to the service drop.

C) **Service entrance conductors from an underground system** are the conductors between the meter and the customer's service equipment.

D) **Service equipment** is the necessary customer owned equipment, usually consisting of a circuit breaker, or switch and fuses, and their accessories, located near the point of entrance of supply conductors to a building, or other structure, or an otherwise defined area, and intended to constitute the main control and means to cutoff electric supply. See Figure 12.

E) **Service lateral** is a system of underground conductors and equipment for delivering electricity from the Company's designated connection point of the distribution line to the first point of connection to the premise wiring.

F) **Service point from an overhead system** is the point of connection between the facilities of the Company and the first point of connection to the premise wiring.

G) **Service point from an underground system** is the point of connection between the service lateral and the first point of connection to the premise wiring.

12. **Shall** is defined as mandatory in nature.
13. **Short-term service** is a service which is recurrent in nature for short periods each time, either periodically each year, intermittently during the year, or at other irregular intervals.
14. **Should** is defined as desirable in nature, as contrasted with mandatory.
15. **Temporary service** is a non-recurring service intended to be used for a short time only, such as for construction or exhibit purposes, etc. The temporary facilities will be removed at such time as permanent service is provided, or no longer required.

### **III CODES, STANDARDS AND WIRING ADEQUACY**

The customer's electric service equipment and its installation shall be in accordance with the latest Company Standards 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 the preceding must be approved by the Electrical Engineering Department(s) of 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 his expense before service is provided.

### **IV. APPROVAL AND INSPECTIONS**

The customer must submit his 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.
- 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, windows, 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. Pre-inspection checklists are included with each specification. At the completion of each portion of the installation, the customer/contractor **must** fax a copy of each checklist to the number on the bottom of the checklist prior to scheduling any inspections with the Office 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. See your New Construction Services Representative for further details.**

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 of satisfactory evidence as to the safe condition of their wiring.

#### **V. 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 authorized engineering 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 regarding installation or construction of the following:

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 (including connections)
  - 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.*



**VI. 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 between 4'-0" and 10'-0" off an approved drivable surface (e.g., asphalt, concrete, grass-crete pavers, etc.). The location shall also be in accordance with the applicable and the following minimum horizontal clearances from other underground facilities:

- A. 20' - 0" from any fuel storage facility (above ground included).
- B. 100' - 0" from gas meter regulators, water pipes (wells included) and any other liquid filled pressurized pipe.
- C. 5' - 00" from non-pressurized pipes (e.g., storm drains, sewer, etc.)
- D. 5' - 00" from gas services and communication cables.

**SPECIAL NOTE FOR RESIDENTIAL CUSTOMERS: 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.**

**VII. TRANSFORMER FOUNDATION**

The customer shall install, own, and maintain the pad foundation for the transformer. It is to be constructed according to the latest Company Standards for the installation.

**NOTE: AT TIME OF PAD INSPECTION & IF APPLICABLE, CURBS & BOLLARDS AROUND THE TRANSFORMER PAD AREA MUST BE IN AT TIME OF INSPECTION, AND, WITH OR WITHOUT CURBS OR BOLLARDS, THE PAD SITE MUST BE WITHIN 6" OF FINAL GRADE.**

**VIII. TRENCH AND CONDUIT WORK**

The customer shall furnish, own (unless otherwise specified), install and maintain all duct and conduit associated with the transformer installation in accordance with the applicable Figures. The primary and secondary conduits shall enter the transformer installation as per the applicable Figure. 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 the applicable Figures.

When paralleling water and sewer utilities, all underground electric conductors/conduit(s) shall have a minimum horizontal clearance of 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 Requirement: Where a Customer's underground service 34,500 volts) "rises" on a:**

- A) Company distribution pole with a DELTA primary circuit voltage (2400 volts or 4800 volts), the customer installed service riser conduit and 90 degree long radius sweep shall be UL approved non-metallic rigid Schedule 80 PVC conduit. The Customer is also required to install a UL approved PVC conduit coupling at the top of the conduit riser. Customer installed below grade metallic conduits shall not be closer than twenty-five (25') feet from the base of the pole.
- B) Company distribution pole with a WYE primary circuit voltage (2400/4160 volts or 7620/13200 volts or 19920/34500 volts), the customer installed riser conduit(s) and 90 degree long radius sweep(s) shall be UL approved: rigid, galvanized, steel conduit, or intermediate, metal conduit, or Schedule 80 rigid, nonmetallic, PVC conduit. 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. Also, See Note 1 below.

**NOTE 1:** The minimum acceptable radius of a below- grade two (2") inch diameter, 90 degree bend at any "rising" location is 24 inches. All riser conduit bends are to be of the long radius sweep design, and must be installed to these specifications.

**NOTE 2:** The minimum radius of 90 degree" bends at the riser pole and transformer pad entries is 36" for 15kV, 48" for 35kV construction and must be installed to these specifications.

**NOTE 3:** The riser pole conduit must extend up the pole a distance of ten feet (10') above final grade elevation at the base of the pole. The Company will complete the conduit installation on the riser pole.

The remaining conduit between the 90° bend and the transformer installation must be of the same size, be either UL approved, rigid galvanized steel conduit (only if the Company's distribution system voltage is of a WYE configuration), UL approved Schedule 40 or 80, color gray, PVC conduit. or UL and Company approved fiberglass conduit. Any individual couplings installed in a conduit system must provide a completely smooth surface with no gaps or ridges between the conduits.

The minimum conduit sizes, utilizing the primary cables discussed in Section X of this specification, are as follows:

1. Two inches (2") for one conductor, 15KV construction.
2. Four inches (4") for one conductor, 35KV construction.
3. Four inches (4") for two conductors, 15KV or 35KV construction.
4. Four inches (4") for three conductors, 15KV construction.
5. Six inches (6") for three conductors, 35KV construction.

Secondary conduit size and quality are to be determined by the customer's load, site conditions and the latest edition of the N.E.C. THE MAXIMUM NUMBER OF CONDUCTORS IN ANY GIVEN CONDUIT SHALL NOT EXCEED FOUR 141, NO EXCEPTIONS.

**IX. GROUNDING**

The customer shall furnish, own (unless otherwise specified), install and maintain a ground grid consisting of No. 2/0 AWG bare str., tinned copper with 5/8" x 8'-0" long copperweld ground rods as shown on the applicable Figures. The ground grid installation is to be at 18" below final grade elevation. All below grade UL listed connectors to the ground rods are to be made with Amp Wrench-Lok connectors, cadwelds, or thermoweld processes, "Ampact Fired On" connectors or compression connectors that have been approved by the Department. Two N.E.C. and N.E.S.C. approved grounding connections shall be provided by the customer to terminate the ground cable pigtails at the transformer grounding pads.

For metallic primary conduits at a riser pole (two maximum), the customer shall provide (unless otherwise specified) and install a No. 2 AWG (minimum) 600 volt insulated copper conductor to the N.E.C. and N.E.S.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.

For metallic primary transformer pad entrance conduit(s), they shall be grounded in the same manner as the riser pole conduit(s) except the conduit(s) shall be grounded to the transformer ground wire conductor (not a ground rod) with No. 2 AWG 600 volt insulated copper conductor and shall be in accordance with the appropriate Company Standards. N.E.C. and N.E.S.C. approved grounding connections shall be provided and installed by the customer to terminate the conduit ground wires at the transformer ground conductor. Grounding of metallic secondary conduit(s), at a transformer pad entrance, shall be made by the customer in the same manner as the primary metallic conduit(s) and be in accordance with the latest edition of the N.E.C., N.E.S.C. and Company Standards.

Any metallic primary or secondary conduits (two maximum) at a riser pole, shall be grounded with a minimum of No. 2 AWG 600 volt insulated copper conductor. The customer shall supply and install approximately five (5) feet of No. 2 AWG bare str. copper to their metallic conduit(s) with N.E.C. approved conduit clamp(s). The Company will complete the connection to the Company installed 5/8" x 8'-0" copperweld ground rod.

When two or more pieces of equipment are installed within 10 Ft. of each other, all ground grids must be bonded together with Company and N.E.C. approved connectors.

**X. PRIMARY CABLE**

The customer shall furnish, install, own and maintain the primary cable installation., unless the customer qualifies for the Company's 091 Procedure. This applies only to New Jersey customers. See the attached Section XVIII and your New Construction Services Representative for specific details. The customer shall determine the cable length required for the installation, allowing additional cable for equipment such as a riser pole, transformer, junction box, switch pad or manhole.

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 13.2GRY/7.62KV voltage, the primary cable shall be 15KV rated, shielded, 175 mils EPR insulation, have a full concentric neutral and an overall semi-conducting polyethylene jacket, with three (3) equally spaced extruded red stripes. The minimum conductor size, dependent upon the customer's load, 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 shall be 35KV rated, shielded, 345 mils of EPR insulation, have a full concentric neutral and an overall semi-conducting polyethylene jacket, with three (3) equally spaced extruded red stripes. The minimum conductor size, dependent upon the customer's load is #110 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 Distribution Engineering Department.

**Manufacturer's specifications for proposed cables must be submitted to Pike County Light & Power, Distribution Engineering Department, 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, or in metallic conduit (for Grounded WYE systems only) or in non-metallic PVC 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 the applicable Figures.

#### **XI. PRIMARY CABLE TERMINATIONS**

The customer shall furnish (unless otherwise specified) all primary cable termination kits designed to fit the installed primary cable system.

The customer shall install the primary cable termination material at the transformer when such work does not come within the Company's Labor Union responsibility. The Company's New Construction Services Representative will inform the customer when this work is the responsibility of the Company.

When service is provided from an underground distribution system, the customer must consult the Company for the proper terminations. Also, it is the customer's responsibility to consult with the Company for the type of equipment designed for the job (for example, live front vs. dead front) so that appropriate material may be obtained to complete the job on schedule.

The termination's at the riser pole or at live front equipment 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 a dead front padmount transformer or equipment are to be load break type cable terminations. For customer owned equipment, the customer must also furnish primary bushing well inserts that are compatible with the elbow connector.

The terminations at dead front equipment and dead front padmount transformers shall be:

For 15KV primary cable - (\*) Elastimold Loadbreak Elbow, Cat. No. 166LR-A-5220 or Company approved equivalent for #2 AWG conductor; Elastimold Bushing Well Inserts, Cat. No. 1601A4; Elastimold Grounded Protective Dead End Cap(s) when required, Cat. No. 160-DRG; or Company approved equivalents.

For 35KV primary cable - (\*) Elastimold Loadbreak Elbow, Cat. No. 376LR-K-240 or Company approved equivalent for #1/0 AWG conductor; Elastimold Bushing Well Insert, Cat. No. 3701A4; Elastimold Dead End Insulating Cap(s) when required, Cat. No. 370DRG; or Company approved equivalents.

*(\*) For prevention of dirt and 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 #110 AWG conductor are to be 3M Co. Cat. No. 8453 or Company approved equivalents.*

The terminations and bushing well inserts must be approved by the Company's Distribution Engineering Department for the specific installation.

The Company will install the primary cable termination kits at the Company's connection point; that is, riser pole, junction box, padmount equipment, or manhole. The kits are to be delivered to the appropriate New Construction Services Field Office at least 48 hours prior to the scheduled installation date.

It is the customer's responsibility to properly identify the primary cables on all ends in accordance with the latest issue of the N.E.C.

Upon completion of the primary cable installation for secondary metered customer's, the Company will high potential test each new primary cable. For primary metered customer's, it's the customer's responsibility to have this test performed either by the Company or privately. If done privately, the Company must receive the test results prior to energization. These tests will be conducted from the customer's H.V. terminations at his service point (transformer, main switch equipment, primary meter, etc.) to the Company's connecting point, that is, riser pole, padmount equipment, junction box, or manhole. The Company does not assume any responsibility for the cable and/or accessories which fail to pass the test. The Company will not energize the cables until they have passed the above test.

## **XII. SECONDARY CABLE AND BUS DUCT**

The customer shall furnish, install, own, and maintain the secondary cable installation. The customer's cable shall be insulated stranded cable terminated at the transformer with appropriate (N.E.C. approved) compression connectors. For proper application to transformer terminals see the applicable Figure. The secondary cable installation is to conform to the latest edition of the N.E.C. and N.E.S.C. **NOTE: THE MAXIMUM NUMBER OF CONDUCTORS SHALL NOT EXCEED FOUR (4) PER ANY GIVEN CONDUIT, NO EXCEPTIONS.**

All bolted secondary wire connections to the transformer terminals are to be installed in accordance with the applicable Figure.

Secondary transformer terminals and connectors are to be insulated when electrical clearances are inadequate as determined by the Company's authorized engineering representative. See Section XIV for clearances.

Secondary feeders must include one neutral conductor in each occupied conduit. The Company's padmount transformers are not designed for overhead secondary bus duct construction. If the customer intends to use secondary bus duct on secondary metered Company owned padmount transformers, the secondary service must enter the unit underground within the secondary area limits as defined in the applicable Figure.

The customer may elect to use overhead bus duct on primary metered installations with customer owned padmount transformers. In case of failure of this non-standard transformer, time for restoration of service by the Company, if called upon by the customer, will be extensive. The customer shall be responsible for the equipment design and maintenance of the electrical system.

### **XIII. METERING**

**ALL METERING EQUIPMENT SHALL BE INSTALLED OUTDOORS UNLESS PRIOR APPROVAL IS GIVEN BY THE COMPANY.**

#### Secondary Metering 208Y/120V, 240/120V

The customer shall furnish, install, own, and maintain a current transformer cabinet\* for secondary metered installations. Depending on the service size, the customer or the Company will install the current transformers in the C.T. cabinet and the Company will wire the secondary C.T. connections.

#### Secondary Metering 480Y/277V

The customer shall furnish, install, own, and maintain a current transformer cabinet\* and voltage transformer cabinet\* according to the applicable Figures.

Depending on the service size, the customer or the Company will install the current transformers in the C.T. cabinet and voltage transformers in the V.T. cabinet.

*\* Not required for services 200 amperes and below.*

The Company will wire the secondary C.T. connections and the primary and secondary connections on the voltage transformers.

The Company will furnish the meter, current transformer(s), and voltage transformer(s) as required for the specific installation. The customer should arrange for a job meeting with the Company Metering Department through his New Construction Services Representative to determine locations, timing, and specific requirements for the metering installation.

**NOTE:** The customer will supply & install a Company approved meter pan and test block for a current transformer installation.

#### Primary Metering

When primary metering information is required, the customer should direct all inquiries and correspondence to their New Construction Services Representative.

### **XIV. CLEARANCES**

#### Electrical Clearances for Primary Voltages

The normal electrical clearances of live parts for service equipment, other than standard manufactured metal-clad switchgear are given in the following tabulation. Normal clearances shall be provided whenever practical.

Insulating barriers shall be provided between live parts and ground, and between phases for live conductors and connectors when the tabulated clearances below cannot be obtained. The insulating barrier material shall have thickness and a dielectric value to withstand full phase to phase service voltage and shall have adequate arc, heat and flame resistance as well as adequate physical strength.

<u>KV</u>	<u>Normal Phase-to-Ground Clearance</u>	<u>Normal Phase-to-Phase Clearance</u>
5	2 ½"	5"
15	7½"	13"
35	20"	35"

Electrical Clearances for Secondary Voltage

0-600V, minimum 2" phase-to-phase or phase-to-ground.

Physical or Safety Clearances

Refer to appropriate codes, regulations and standards including, but not limited to the following: Occupational Safety & Health (OSHA) regulations, latest editions of the N.E.C., N.E.S.C., High Voltage Proximity Acts and the Company Standards.

**XV. ENERGIZATION PROCEDURE**

The Company's Distribution Engineering Department will inspect each transformer upon notification that both the contractor / customer and the Company have completed the installation. Such notification should be initiated by the customer faxing in their Pre- Inspection Checklist and calling their New Construction Services Representative.

If the final transformer inspection is rejected by the Company's Distribution Engineering Department, the authorized engineering 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\*, 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.*

**XVI. BACKFILL AND GRADING**

The customer and/or contractor shall assume the responsibility of backfilling and grading the installation. Refer to the applicable Figure(s).



## **XVII. SPECIFICATIONS FOR CONCRETE**

### **A. Concrete Work**

All 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.

### **B. 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 AC.I. 318, latest edition, Section 4.2.5.

### **D. Forms and Details of Construction**

Forms for all parts of the specified concrete work shall be so constructed that finished surfaces shall conform to the shape, size, and dimensions as specified on the applicable Figure.

All forms are to be constructed and braced so that finished concrete surfaces shall be level, free from bulges, distortions or other variations.

Removal of forms shall be carried out in such a manner as to insure the complete safety and integrity of the structure. In no instance shall the supporting forms be disturbed or removed until the concrete has cured sufficiently to adequately support its own weight and any other expected construction load placed thereon.

E. Concrete Finishing

1. General:

All exposed surfaces shall be smooth and even when completed. Any and all unsightly ridges or lips, or exposed concrete shall be removed by tooling and rubbing. All loose stones and holes shall be cleaned out. The surfaces shall then be: completely soaked with water (or appropriate liquid) and the defects repaired with concrete such as to provide a smooth, even surface to the satisfaction of the Company's authorized engineering representative.

2. Defective Concrete:

All concrete work not conforming to the preceding; including physical dimension, size and shape; as shown on referenced drawings, out of alignment or level; or showing a defective surface; shall be removed and completely replaced in a manner meeting with the approval of the Company's authorized engineering representative. Slight imperfections in appearance of the structure may be repaired ONLY when the customer has obtained the permission of the Company's authorized engineering representative.