Electric Service Requirements
2018

January 2018
Preface

The January 2018 edition of the *Electric Service Requirements* (ESR) book supersedes all previous publications. The purpose of this book is to help you obtain electric service from Portland General Electric.

All changes since the last publication are marked with a revision bar, as shown to the right.

The requirements in this book will be enforced on any request for service made after March 1, 2018.

It is strongly recommended that you consult Portland General Electric to resolve any questions concerning the requirements in this book. We will do our best to meet your needs for electric service in an economical and acceptable manner. This book may require different electrical equipment specifications than have been previously accepted in PGE service areas.

The information in this book is accurate at the time of publication, but is subject to change without notice. While PGE may provide updates to the printed version from time to time, the PDF version always contains the most up-to-date and definitive information. Instructions for downloading a PDF file of the entire ESR book (or PDF files of selected sections) are in Section 1.2.1, *Online Version of the ESR Book*.

The *ESR* book is meant to be read and interpreted in its entirety. Individual figures or pages do not represent the complete requirements for service and should not be cited as a stand-alone. In particular, *do not* use figures in this book as construction plans by themselves. The text that accompanies a figure often contains important information that is not contained in the drawing.

When referring to any code—such as the National Electrical Code, National Electrical Safety Code, or Oregon Electrical Specialty Code—always use the most recent publication.

Construction lead time varies with workload. Contact a PGE Service Coordinator as early in your design process as possible. See the *Preliminary Information* section for PGE contact information.

Electric Service Requirements Committee

January 2018
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</tbody>
</table>
Preliminary Information

**Revision Record for Electric Service Requirements 2018**

<table>
<thead>
<tr>
<th>Preliminary Information</th>
<th>In the “Terms and Definitions” section, updated the definition for Select Backfill. Otherwise, changes to Revision Record only.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Section 1</strong></td>
<td><strong>Basic Requirements</strong></td>
</tr>
<tr>
<td></td>
<td>No changes.</td>
</tr>
<tr>
<td><strong>Section 2</strong></td>
<td><strong>Permits and Applications</strong></td>
</tr>
<tr>
<td></td>
<td>No changes.</td>
</tr>
<tr>
<td><strong>Section 3</strong></td>
<td><strong>Services</strong></td>
</tr>
<tr>
<td></td>
<td>3.1.1 Added note about the need to consult with PGE about the loading capacity of this underground service: Three-phase, 240/120 volt, four-wire, grounded, delta.</td>
</tr>
<tr>
<td></td>
<td>3.4.7 Added requirement for Customer to install a disconnecting means on the load side of the medium voltage (primary) metering equipment. Added Figure 3-1, which shows the disconnecting means required by PGE.</td>
</tr>
<tr>
<td></td>
<td>3.4.7.1 Added requirement that the customer must provide the load side disconnect switch. Modified existing requirement for customer to provide a clear workspace to include space for load side disconnect switches. Added requirement for PGE to provide the primary disconnecting means.</td>
</tr>
<tr>
<td><strong>Section 4</strong></td>
<td><strong>Temporary Service</strong></td>
</tr>
<tr>
<td></td>
<td>4.4.1 Added the # sign before “…2-AWG-aluminum triplex conductor…” Added a new bullet point about the requirement to jacket up internal wire on an overhead service post. Replaced Figure 4-3 with new drawing that better reflects hardware and wires currently in use. Also added “24-inch tails” to label of Drip Loop.</td>
</tr>
<tr>
<td></td>
<td>4.4.2 In the second bullet point, added sentence about how braces must face the power source.</td>
</tr>
<tr>
<td><strong>Section 5</strong></td>
<td><strong>Clearances</strong></td>
</tr>
<tr>
<td></td>
<td>5.6.2 Removed all references to “mineral-oil-filled transformers” in section title and text, and replaced them with the word “transformers”. In Figure 5-10 and Table 5-2, replaced “Mineral-Oil-Filled Transformers” with “Standard Transformers.” Added requirement for how close transformers may be located to maintained drivable surfaces.</td>
</tr>
<tr>
<td>Section 6</td>
<td>Underground Requirements</td>
</tr>
<tr>
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<td>--------------------------</td>
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<tr>
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<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
|           |                          | 6.4.4 | In the fourth bullet point, changed “edge of the concrete pad” to “front edge of the concrete pad.”  
In the fifth bullet point, changed “the concrete pad” to “the sides or back of the concrete pad.” Also added the sentence about the need for PGE approval. |

| Section 7 | Single-Family Service | 7.2.2 | Added the bullet point: “The lid must be secured with a five-sided Penta-head bolt.”  
In the fifth bullet point, changed “6 inches of 3/4-inch minus crushed rock at the base” to “6 inches of 3/4-inch minus well-compacted crushed rock around and inside the base.”  
Added the bullet point: “The conduit stubs should be 2 inches minimum above the inside grade to prevent rocks and debris from falling into the conduit.”  
Added the bullet point: “Cover and mark conduits S for source, SVC for service, and ST for streetlight.”  
In the eighth bullet point, added “so that 6 feet of pull string extends beyond each end of the conduit” to the end of the sentence.  
In the tenth bullet point, changed “PVC elbows” to “Elbows.”  
Added a final bullet point about the requirement for the Customer to install a PGE-provided ground rod inside the handhole.  
Replaced Figure 7-12 with an updated version. |
7.2.3 In the first paragraph, added the sentence “This size may vary with the manufacturer.”
In the second bullet point, changed “6 feet of pull string” to “6 feet of additional pull string.”
Changed the third bullet point to read: “The trench depth at handhole location must be appropriate for the sweep being used. Cutting of sweeps is prohibited.”
Changed the fourth bullet point to read: “Use a minimum of 6-inches of well compacted 3/4-inch minus backfill under the splice box and 6-inches around the outside base.”
In the fifth bullet point, replaced the first sentence with these two sentences: “All secondary vaults (1730) must be installed on property lines within the utility easement, and the handhole must be set 2 inches above final grade or on the highside of the slope. Handholes set on a sidewalk must be set to grade.”
In the seventh bullet point, changed “Schedule 40, 90-degree elbows” to “Schedule 40 or fiberglass, 90-degree elbows.” Added the sentence: “Install to the proper depth for the sweep being used.”
In the eighth bullet point, changed the second sentence to read: “The ground rod must be buried 7 feet, 9 inches deep, be a minimum of 3 inches above grade inside the handhole, and located behind the feed conduit.”
Added the bullet point: “The lid must be installed with five-sided Penta-head bolts.”
Replacing Figure 7-13 with an updated version.

**Section 8**
Multiple-Family Service
No changes.

**Section 9**
Manufactured and Mobile Home Services
9.1.2 Added new headings, “9.1.2.1 Underground Pedestal Installation Service” and “9.2.2.2 Underground Post-Mounted Installation Service” to differentiate portions of existing text.

**Section 10**
Commercial, Industrial, and Large Residential Services, 800 Amps or Lower
10.2 In paragraph immediately following Figure 10-1, replaced “Single-phase, 480 volt service” with “All 480 volt service.”
10.3.1 Added “barns, and outbuildings” to the bullet beginning with the words “No safety socket is required…”
Added the following to the end of the section: “Contact PGE for clarification.”
10.7.1 In second bullet point, changed dimensions of the hinged doors to 24- x 48-inch.
## Preliminary Information

| 10.7.2 | In second bullet point, changed dimensions of the hinged doors to 24- x 48-inch. Added Figure 10-16: Current Transformer Metering, Line and Load Same Side, 600 Volts, 800 Amps Maximum, EUSERC 329B. |
| 10.7.3 | In Table 10-5, added row of cabinet dimensions for "Line/load on same side of cabinet" |
| 10.7.6 | Added new headings, “10.7.6.1 Single-Phase Installation” and “10.7.6.2 Three-Phase Installation” to differentiate portions of existing text. |

**Section 11**  
Commercial, Industrial, and Large Residential Services, 801 Amps or Higher  
No changes.

**Section 12**  
Agricultural and Other Pole-Mounted Services  
12.1 Added new bullet point referring to location of information about pole height, class, and depth requirements. Added blank page after Figure 12-1 to make it clear which text applies to that figure and which text applies to Figure 12-2.  
12.2 In sixth bullet point, added “or 60" deep with no concrete backfill.”

**Appendix A**  
No changes.

**Appendix B**  
No changes.

**Appendix C**  
No changes.
# Errors That May Cause Your Request for Electric Service to Be Turned Down

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<thead>
<tr>
<th>Error</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Overhead</strong></td>
<td></td>
</tr>
<tr>
<td>The weatherhead or point of attachment (POA) is too low.</td>
<td>See Table 5-1 for the minimum clearances for service drops.</td>
</tr>
<tr>
<td>No mast guy.</td>
<td>Guying is required for a mast that extends more than two feet above the roof. See Table 7-2 for guy requirements by mast size.</td>
</tr>
<tr>
<td>The service drop is attached to the fascia board.</td>
<td>A service drop is not allowed to be attached to a fascia board.</td>
</tr>
<tr>
<td>The meter socket or weatherhead is in the wrong location.</td>
<td>The meter socket and location must be approved by PGE prior to installation. See Section 5.2, Meter Clearances and Location Criteria.</td>
</tr>
<tr>
<td>The wrong style meter socket is installed.</td>
<td>PGE only accepts the ring-style meter socket. A ringless-style meter socket is not approved.</td>
</tr>
<tr>
<td><strong>Underground</strong></td>
<td></td>
</tr>
<tr>
<td>There is no pull string in the underground conduit.</td>
<td>Pull strings are required in all PGE conduits.</td>
</tr>
<tr>
<td>The trench is shallow.</td>
<td>PGE requires a minimum trench depth of 3 feet. See Section 6.2, Trenches Provided By the Customer.</td>
</tr>
<tr>
<td>The conduit connects to the wrong knockout on the meter socket.</td>
<td>Only the left knockout can be used on a 200-amp meter socket. However, any of the bottom knockouts can be used on a 320-amp meter socket.</td>
</tr>
<tr>
<td>The underground kick pipe must be straight and plumb.</td>
<td>No bends are allowed between the meter socket and the ground.</td>
</tr>
<tr>
<td>The meter location is unapproved.</td>
<td>The meter must be in an approved location. Call PGE for meter location before starting any work. See Section 5.2, Meter Clearances and Location Criteria.</td>
</tr>
<tr>
<td>The meter socket is too close to the gas meter.</td>
<td>The minimum distance between the meter socket and a gas meter is 3 feet.</td>
</tr>
<tr>
<td>The wrong style meter socket is installed.</td>
<td>PGE only accepts the ring-style meter socket. A ringless-style meter socket is not approved.</td>
</tr>
<tr>
<td><strong>Rewires of an Existing Structure</strong></td>
<td></td>
</tr>
<tr>
<td>Service is not brought up to current PGE requirements.</td>
<td>PGE requires that the meter socket, the weatherhead, and the meter and weatherhead locations be brought up to current requirements when being upgraded. Call PGE for meter location before starting any work.</td>
</tr>
<tr>
<td>Error</td>
<td>Requirement</td>
</tr>
<tr>
<td>---------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| The three-phase high-leg is not in the correct position or is not marked with orange tape. | PGE requires that the high-leg be on the right side of the meter socket.  
PGE also requires that the high-leg terminal be marked with orange tape in both the meter socket and in the panel, CT, or terminal cabinet. |
| Not using a safety-socket–type meter socket.                       | All nonresidential meter sockets, including required services, must be the safety-socket type (with a few exceptions). |
| No lockbox.                                                         | A lockbox must be installed near the electrical room.                        |
| A panic bar for the electrical room door is not on site.            | PGE requires that electrical room doors open outward and be equipped with a panic bar. |
| There are no permanent engraved labels on multiple-meter sockets.   | PGE requires that all multiple-meter installations have a permanently engraved metal or hard plastic label on each meter socket. Letters on each label must be at least 3/8-inch high. |
Terms and Definitions

ANSI  American National Standards Institute.
ASME  American Society of Mechanical Engineers.
Backfill  Materials such as sand, crushed rock, or soil that are used to fill a trench.
Bushings  Plastic or nylon rings that attach to the ends of conduit to protect the electrical cable from sharp edges.
Bypass  A method that allows for service continuity to the Customer while the meter is removed for test or inspection.
Chamfered  The smoothing of internal rough edges of factory- or field-cut conduits to prevent damage to PGE underground conductors when pulled into the conduit.
Current Transformer  A transformer that reduces the Customer's load current by a known ratio to a secondary metering current that is within the capacity of the meter.
Current Transformer Meter  A meter that requires current transformers because its current capacity is not as large as the Customer's current load.
Customer  The individual responsible for requesting electric service from PGE.
Direct-Burial Cable  Electrical cable that is suitable (approved by a recognized testing laboratory) for direct burial in the ground without using a conduit system.
Direct-Connect Meter  A meter that is energized to line voltage and carries all the load current. No current transformer or voltage interface is used.
Also called a self-contained meter.
Drip Loop  The loop formed by the Customer conductors that connects to the PGE service drop. The conductors are formed in a downward loop so water will not enter the Customer's service mast (weatherhead).
Elbow  A bend in a conduit having a small radius change in direction, also referred to as a standard radius. Small or standard radius bend elbows are not allowed for PGE conductors.
See Sweep.
EMT  Electrical Metallic Tubing.
EUSERC  Electric Utility Service Equipment Requirements Committee.
An association of utilities and manufacturers that creates standard designs for the interface between the electric utility’s service and the Customer’s facility. PGE is an active member of EUSERC.
Fault Current  Maximum available current under bolted short circuit conditions.
Field Heat Bend  Creating an on-site bend or sweep in a duct by heating the duct with a conduit heat blanket, propane torch, or other heating appliance.
NOTE: Field heat bends are not allowed.
Field Bend  A straight section of duct mechanically bent to achieve an angle in the duct.
NOTE: Field bends are not allowed.
<p>| <strong>Grounding</strong> | Grounding of Customer equipment must be in accordance with the latest issue of the NEC (Article 250 Grounding). Code enforcement agencies may require ground connection to be visible when an inspection is made. For safety reasons, the top of the ground rod should be flush with or below ground level in permanent application. |
| <strong>High Leg</strong> | On a four-wire, three-phase delta connection, the conductor having the phase-to-ground voltage of 208 V on a 120/240 volt service is called a high leg or wild leg. The high leg must be located on the right side and identified with an orange dot or tape. |
| <strong>IMC</strong> | Intermediate Metallic Conduit. |
| <strong>Lead</strong> | The horizontal distance from the surface of the pole to the point of entry of the anchor into the ground. |
| <strong>Manual Link Bypass</strong> | Bypass facilities requiring the physical act of placing links across line and load bypass studs provided in the meter socket. See Bypass. |
| <strong>Manufactured Home</strong> | A factory-assembled structure or structures, site specific, and transportable in one or more sections. These structures are designed to be used as a dwelling with a permanent foundation. See Section 9, Manufactured and Mobile Home Services. |
| <strong>Meter</strong> | A device that measures and records the summation of electrical energy over a period of time. |
| <strong>Meter Base</strong> | See Meter Socket. |
| <strong>Meter Base Ring</strong> | A metallic ring that secures the meter to the meter socket and can be sealed by PGE. |
| <strong>Meter Pedestal</strong> | A commercially built pedestal that contains a meter socket and Customer disconnect switches. |
| <strong>Meter Socket</strong> | The mounting device consisting of jaws, connectors, and enclosure for socket-type meters. Sometimes called a meter base. |
| <strong>Mobile Home</strong> | A factory-assembled structure or structures transportable in one or more sections that is built on a permanent chassis and designed to be used as a dwelling without a permanent foundation. |
| <strong>Modular Home</strong> | A factory-assembled structure or structures transportable in one or more sections that is built on a permanent chassis and designed to be used as a dwelling with permanent foundation. |
| <strong>NEC</strong> | National Electrical Code. |
| <strong>NESC</strong> | National Electrical Safety Code. |
| <strong>NFGC</strong> | National Fuel Gas Code. |
| <strong>NFPA</strong> | National Fire Protection Association. |
| <strong>OESC</strong> | Oregon Electrical Specialty Code. |
| <strong>Open Wire Secondary</strong> | Three conductors individually supported on insulators on a pole or crossarm. |</p>
<table>
<thead>
<tr>
<th><strong>Oregon Utility Notification Center (OUNC)</strong></th>
<th>Oregon state agency that administers Oregon’s excavation laws and handles statewide underground utility locate requests.</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSHA</td>
<td>Occupational Safety and Health Administration.</td>
</tr>
<tr>
<td>OUCC</td>
<td>Oregon Utility Coordinating Council.</td>
</tr>
<tr>
<td>OUNC</td>
<td>See <a href="#">Oregon Utility Notification Center</a>.</td>
</tr>
<tr>
<td><strong>Overhead Service</strong></td>
<td>Electric service supplied from PGE to the Customer utilizing overhead conductors.</td>
</tr>
<tr>
<td><strong>Plastic Conduit</strong></td>
<td>See <a href="#">PVC Conduit</a>.</td>
</tr>
<tr>
<td><strong>Plumb</strong></td>
<td>To have the sides and front of Customer-installed equipment and conduit perfectly vertical from both the front and side views.</td>
</tr>
<tr>
<td><strong>Point of Attachment</strong></td>
<td>The location where the PGE overhead service lateral attaches to the Customer’s structure.</td>
</tr>
<tr>
<td><strong>Point of Delivery</strong></td>
<td>The point where the power company’s circuit connects to the Customer’s system. Also referred to as a <em>service point</em>.</td>
</tr>
<tr>
<td><strong>Power Factor</strong></td>
<td>The cosine of the angle between voltage and current, expressed as a percentage. Also the ratio of the active power to the apparent power.</td>
</tr>
<tr>
<td><strong>Primary</strong></td>
<td>Over 600 volts.</td>
</tr>
<tr>
<td><strong>PVC Conduit</strong></td>
<td>A gray, schedule 40 PVC conduit approved for use in electrical installations. Commonly referred to as <em>plastic conduit</em>.</td>
</tr>
<tr>
<td><strong>Qualified</strong></td>
<td>Refers to a person who has been trained in and has demonstrated adequate knowledge of the installation, construction, or operation of lines and equipment and the hazards involved. This knowledge includes identification of and exposure to electric supply and communications lines and equipment in or near the workplace.</td>
</tr>
<tr>
<td><strong>Readily Accessible</strong></td>
<td>According to the NEC, a roof or other area is considered to be readily accessible if it can be casually accessed through a doorway, window, stairway, or permanently mounted ladder by a person on foot who neither exerts extraordinary physical effort nor employs special tools or devices to gain entry.</td>
</tr>
<tr>
<td><strong>Rewire</strong></td>
<td>A rewire occurs when a meter base, meter socket, or weatherhead is upgraded or the location of these parts is changed.</td>
</tr>
<tr>
<td><strong>Secondary</strong></td>
<td>600 volts and lower.</td>
</tr>
<tr>
<td><strong>Safety Socket</strong></td>
<td>Device consisting of manual link bypass facility and a circuit closing nut-and-bolt assembly which will de-energize the meter socket while the meter is removed for test or inspection.</td>
</tr>
<tr>
<td><strong>Self-Contained Meter</strong></td>
<td>See <a href="#">Direct-Connect Meter</a>.</td>
</tr>
<tr>
<td><strong>Select Backfill</strong></td>
<td>Material used to bed and cover conduit or direct-buried cable. It consists of material that passes through a 3/4-inch sieve, with no more than 15 percent of that material passing a No. 200 mesh sieve. In addition, the material must be reasonably free of organic and otherwise undesirable materials, and contain no sharp or foreign objects.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
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<tr>
<td>----------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Service Entrance Conductors</td>
<td>Customer-owned conductors that connect to the Customer’s service equipment from the service drop or service lateral.</td>
</tr>
<tr>
<td>Service Point</td>
<td>The point where the power company’s circuit connects to the Customer’s system. Also referred to as a the point of delivery.</td>
</tr>
<tr>
<td>Service Trench</td>
<td>Trench provided by the Customer for the service lateral.</td>
</tr>
<tr>
<td>Service Lateral</td>
<td>Conductors from the PGE system to the Customer’s house or Customer-owned service pole. These conductors can include a pole, pedestal, vault, or transformer.</td>
</tr>
<tr>
<td>Single-Family Service</td>
<td>Service furnished to Customers for domestic purposes in single-family dwellings.</td>
</tr>
<tr>
<td>Single-Phasing</td>
<td>Loss of single-phase on a three-phase service (running on two phases).</td>
</tr>
<tr>
<td>Socket</td>
<td>Mounting device consisting of jaws, connectors, and enclosure for socket-type meters.</td>
</tr>
<tr>
<td>Sweep</td>
<td>A bend in the conduit that has a factory-formed large radius change in direction.</td>
</tr>
<tr>
<td>Switchboard</td>
<td>See Switchgear.</td>
</tr>
<tr>
<td>Switchgear</td>
<td>A large panel or assembly of panels that contain buses, current transformers, meter switches, and protective devices.</td>
</tr>
<tr>
<td></td>
<td>Sometimes called a switchboard.</td>
</tr>
<tr>
<td>Test Block Facilities (TBF)</td>
<td>An assembly used to de-energize a self-contained meter socket without disconnecting electric service to the Customer.</td>
</tr>
<tr>
<td>Test Switch</td>
<td>A device used by PGE to isolate the meter from current transformers.</td>
</tr>
<tr>
<td>Temporary Service</td>
<td>Electrical service provided for residential and commercial construction, seasonal sales lots, rock crushers or paving plants, and other limited-duration applications. Normally limited to 12 months.</td>
</tr>
<tr>
<td>UL</td>
<td>Underwriters Laboratory.</td>
</tr>
<tr>
<td>Underground Service</td>
<td>See Service Lateral.</td>
</tr>
</tbody>
</table>
## PGE Contact Information

### Phone Numbers

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<tr>
<th>Contact</th>
<th>Toll-Free</th>
<th>Local</th>
<th>Fax</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Coordination</td>
<td>800-542-8818</td>
<td>503-323-6700</td>
<td>503-612-3501</td>
</tr>
<tr>
<td>Customer Service</td>
<td>800-542-8818</td>
<td>503-228-6322</td>
<td>—</td>
</tr>
<tr>
<td>Tree Trimming</td>
<td>800-544-1794</td>
<td>503-736-5460</td>
<td>—</td>
</tr>
<tr>
<td>Oregon Utility Notification Center (For locating underground utility cables)</td>
<td>8-1-1 or 800-332-2344</td>
<td>503-246-6699</td>
<td>—</td>
</tr>
<tr>
<td>Emergencies and outages, 24 hours</td>
<td>800-544-1795</td>
<td>503-464-7777</td>
<td>—</td>
</tr>
<tr>
<td>Light Out (streetlights)</td>
<td>800-544-1795</td>
<td>503-464-7777</td>
<td>—</td>
</tr>
</tbody>
</table>

### Email Addresses

<table>
<thead>
<tr>
<th>Contact</th>
<th>Email Address</th>
</tr>
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<tbody>
<tr>
<td>Service Coordination</td>
<td><a href="mailto:service.coordinators@pgn.com">service.coordinators@pgn.com</a></td>
</tr>
<tr>
<td>Tree Trimming</td>
<td><a href="mailto:trees@pgn.com">trees@pgn.com</a></td>
</tr>
<tr>
<td>Light Out (streetlight)</td>
<td><a href="mailto:LightOut@pgn.com">LightOut@pgn.com</a></td>
</tr>
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Section 1

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1 Basic Requirements
1 Basic Requirements

1.1 Definition of Customer

The Customer is the individual responsible for requesting electric service from Portland General Electric (PGE). The Customer may be the electrical contractor, developer, or homeowner installing the electric service.

IMPORTANT: When you see the words “Consult PGE” or “Consult with PGE” in this book, it means that the Customer must obtain PGE approval prior to installation. This applies to each and every installation. Failure to receive approval will result in denial of service until the installation meets PGE approval. For more information, see Errors That May Result in a Request for Electric Service Being Turned Down in the Preliminary Information section.

1.2 Purpose of This Book

This Electric Service Requirements (ESR) book was prepared to aid you in receiving service from PGE. The information in this book applies to relocated services, rewired services, house relocations, and new services. If additional information is required, contact a PGE Service Coordinator.

The ESR book is meant to be read and interpreted in its entirety. Individual figures or pages do not represent the complete requirements for service and should not be cited as a stand-alone.

Phone numbers for the Service Coordinators can be found in the PGE Contact Information by Phone Number table in the Preliminary Information section. You may contact a Service Coordinator at service.coordinators@pgn.com.

1.2.1 Online Version of the ESR Book

To access the ESR book online:
2. Scroll to the bottom of the page and click Construction.
3. In the box on the right side of the screen, click Electric Service Requirements.
4. Click Complete ESR book to open a PDF file of the entire book, or click the name of an individual section to open a PDF of that section only.

1.3 Changes or Conflicts in Requirements

The requirements in this ESR book are issued with the intent of complying with all applicable codes, ordinances, and tariffs. However, in case of conflict, the
appropriate tariff, code, or ordinance supersedes the interpretation offered in this book.

The requirements in this book may change if governing codes, ordinances, or tariffs change. PGE does not assume responsibility for keeping this book current and should be consulted when questions arise on the applicability of any item.

1.4 Additional Load for Existing Customers

The Customer must give PGE prior written notice before adding load or modifying existing electrical equipment to allow PGE an opportunity to determine if changes are needed to its distribution facilities. See PGE tariff, Rule C, Conditions Governing Consumer Attachment to Facilities.

PGE provides a service conductor(s) and a transformer(s) to accommodate existing or calculated demand load. New and existing Customer service equipment may have a larger load rating than the calculated or existing demand. PGE may provide and require that a placard (PGE part number 39558) be installed on the Customer’s service termination equipment that indicates the need to verify service source capacity prior to adding load.

1.5 Maximum Available Fault Current

The maximum available fault current will depend on the characteristics of the service being provided. It is the Customer’s responsibility to furnish service equipment capable of interrupting and withstanding the maximum available fault current. Upon request, PGE will provide the calculated maximum available fault current at the PGE point of delivery.

1.5.1 Single-Family Residential, 200 Amps or Lower

For single-family residences with services that are 200 amps or lower, the Customer is responsible for furnishing equipment that will withstand a minimum 10,000 amp fault current. Where the conditions exist, such as short-service lengths or larger service transformers, the maximum available fault current may exceed 10,000 amps. PGE will provide the calculated maximum available fault current to the Customer upon request.

1.5.2 Single-Family Residential, 201 Amps and Higher

For single-family residences with services that are 201 to 400 amps (320 amp continuous), the Customer is responsible for furnishing equipment that will withstand a maximum 22,000-amp fault current.

For services higher than 400 amps (320 amp continuous), PGE will provide the calculated maximum available fault current to the Customer upon request.
1.5.3 Commercial, Industrial, Agricultural, and Multifamily Services

The Customer is responsible for furnishing equipment that will withstand the maximum fault current available from PGE. PGE will provide the calculated maximum available fault current to the Customer upon request.

1.5.4 Network Services

Due to the electrical design of network services, Customers should expect fault current levels to be significantly higher than non-network services. (For more information, see the PGE and PacifiCorp Commercial Underground Network District Portland, Oregon map in the Preliminary Information section.) The Customer is responsible for furnishing equipment that will withstand the maximum fault current available from the PGE network service. PGE will provide the calculated maximum available fault current to the Customer upon request.

1.6 Customer’s Responsibilities

1.6.1 Safety

The Customer must comply with federal, state, and local laws and regulations concerning activities in the vicinity of PGE electrical lines and equipment. The Customer must comply with all laws and regulations to protect themselves, their family, their employees, PGE and its employees, contractors, and all third parties from injury, loss, or damage.

If PGE serves the Customer by means of primary voltage or transmission voltage circuits on the Customer’s premises, or if the Customer resells power and energy furnished by PGE, PGE requires the Customer to obtain and maintain insurance coverage that PGE deems adequate to satisfy the duty of indemnification. PGE requires a separate indemnification, hold harmless, and/or additional named insured agreement.

1.6.2 Switchgear Maintenance

The Customer is responsible for the proper installation and periodic maintenance of Customer-owned switchgear including overcurrent devices, cable and bus connections and terminations, and all other electrical equipment.

1.6.3 Grounding and Bonding

Grounding and bonding is critical for safety and electrical reliability. The Customer is responsible for ensuring that the electrical wiring and service equipment is grounded and bonded in accordance with applicable NEC requirements.
1.6.4 PGE Equipment Protection and Barrier Posts

The Customer is responsible for providing barrier posts for protection of PGE electrical equipment. When vehicles or other equipment can be near or around PGE facilities, barrier posts are required. For more information, see Section 6.4.6, *Barrier Post*.

1.6.5 Temporary Cover on All Openings

Where the Customer provides openings for PGE equipment, such as a pad-mounted transformer, the Customer must provide and install a temporary cover. The cover must be 3/4-inch marine- or exterior-grade plywood that is 6 inches larger than the opening and secured without damaging the concrete. PGE will remove the temporary cover during installation of the electrical equipment.

1.6.6 Landscaping

The Customer must install and maintain landscaping so that trees, shrubs, and other vegetation will not interfere with the access, proper operation, or maintenance of PGE facilities. For more information, see Section 5, *Clearances*.

Bark dust or other landscape materials must not cover a vault lid or other below-ground PGE facilities, nor must covers—such as fake rocks—be placed over electrical equipment. Consult PGE for clearance requirements of your specific installation. For easements and rights of way, see Section 2, *Permits and Applications*.

1.6.7 Monument Protection

Utility infrastructure, such as vaults, ducts, and road crossings owned and maintained by PGE must have a minimum separation of one foot from all monuments, or property markers, in accordance with ORS 92.004. It is the responsibility of the Customer to ensure that this requirement is met prior to the installation of PGE infrastructure.

1.7 Work Activity Near High-Voltage Overhead Power Lines Over 600 Volts

State statute and federal OSHA laws require that non-qualified persons must not enter, work, or otherwise move equipment such as ropes, booms, poles, stages, or scaffolding within 10 feet of a high-voltage overhead power line; some lines require even greater clearance. Two requirements include:

- The responsible party must notify PGE of the intended work activity a minimum of five working days prior to construction work. More lead time may be required depending on the work to be done.
- The responsible party and PGE must agree to a mutually satisfactory method to accomplish the activity safely.
1.8 **Temporary Shutdown**

A temporary shutdown of a Customer’s service may be required to safely maintain or upgrade PGE facilities. These shutdowns will normally be scheduled at a mutually convenient time for the Customer and PGE.

1.9 **Power Factor**

The current PGE tariff specifies a charge for low-power factor for certain commercial and industrial Customers. Low-power factor may cause inferior performance of the Customer’s electrical system. PGE recommends that the Customer install corrective devices to make the most effective use of the electrical system. PGE can provide a copy of the tariff if the Customer would like to determine potential savings during the design. A second meter socket is not required to meter power factor.

1.10 **Time-of-Use Metering**

The tariff may require time-of-use metering for certain commercial and industrial loads. Contact PGE for special requirements.

Time-of-use metering is available as an option for residential Customers. Contact PGE for further information.

1.11 **Call Before You Dig**

State laws require the Customer or excavator to call to determine the location of underground utilities two full working days (48 hours) prior to excavation. The excavation **must not** be started until locations have been marked or the utilities have informed the excavator that they have no facilities in the area.

**IMPORTANT**: Call 8-1-1 or 1-800-332-2344 before you dig. In the Portland metro area call 503-246-6699, or visit [www.digsafelyoregon.com](http://www.digsafelyoregon.com).

1.12 **Power Quality**

The characteristics of the Customer’s electrical equipment and devices must allow the PGE distribution system to operate efficiently without undue interference to PGE service or to other Customers. Whenever a Customer’s equipment has characteristics that cause undue interference with PGE service or to other Customers, the Customer must make changes in that equipment or provide—at Customer expense—additional equipment to eliminate the interference. Where practical, PGE will furnish additional equipment in accordance with the present tariff.

PGE reserves the right to inspect and test any equipment connected to its lines and to obtain any information necessary to determine the operational characteristics of the equipment. Prior to purchase, the Customer must submit...
information to PGE regarding any equipment that might cause interference with service to other Customers and/or require additional PGE facilities for its satisfactory operation.

Electric service supplied by PGE may be subjected to voltage disturbances that will not normally affect the performance of typical electrical equipment. These disturbances may result in the improper operation of voltage-sensitive equipment, such as computers or microprocessors. The Customer must provide any power conditioning devices needed to obtain the quality of power necessary for optimum performance of voltage-sensitive equipment.

The Customer may use additional facilities (such as a separate PGE transformer and a separate service) to minimize voltage fluctuations on secondary-voltage circuits for devices such as welders, induction heating equipment, and X-ray machines. Where the operation of these types of equipment causes undue voltage fluctuations on PGE primary voltage lines, the additional equipment required may include a separate primary voltage line. Where practical, PGE will furnish additional equipment in accordance with the present tariff.

The effects of the design and operation of high-frequency equipment—such as electronic heating systems, spark discharge devices, radio transmitting equipment, and equipment that generates harmonics, such as an induction furnace—must not create disturbances on the PGE electrical system that interfere with any other Customer’s proper operation of communication, radio, television, remote control, or other equipment.

Devices that can produce harmonic distortion—such as adjustable speed drives, electronic ballasts for fluorescent lighting, and switching power supplies for computers and electric vehicles—must be filtered so that the harmonic distortion that results from these devices is kept within the limits specified in IEEE 519-2014, Section 10. Compliance with this requirement is by PGE measurement at the point of change of ownership between PGE and the Customer, otherwise known as the point of delivery. PGE limits the maximum voltage distortion present on our distribution system to five percent for any one frequency and the total harmonic distortion (THD) to eight percent.

1.13 Motors

1.13.1 Protection

To assure adequate safety to personnel and to prevent damage to equipment, the Customer is responsible for providing and maintaining code-approved protective devices to protect all motors against overloading, short circuits, ground faults, and low voltage.

The Customer is responsible for protecting three-phase motors against single-phasing system events. Primary single phasing occurs when at least one of the primary sides of the transformer phases is open and no longer delivering electricity. Single phasing may occur for numerous reasons and cannot be fully eliminated, but risk to the Customer’s
equipment may be mitigated by protection schemes as determined by the
Customer.

1.13.2 Starting
Motors rated in excess of 10 horsepower that normally start more than four
times an hour, or motors rated in excess of 35 horsepower, may require
reduced-voltage starters or adjustable-speed drives.

PGE will furnish information regarding permitted starting currents. The
starting currents permitted depend on the frequency of motor starting, the
size and character of the Customer’s load, and the design of the PGE
distribution system in the area. Permitted starting currents will generally be
equivalent to the maximum starting current, which—in the opinion of
PGE—can be supplied without undue interference with service to other
Customers.

PGE will not normally invest in additional facilities to reduce voltage
fluctuations on an individual Customer’s service caused by the starting of
that Customer’s motors until after the Customer completes installation of
all approved reduced-voltage starters.

If the Customer still requires additional facilities, such facilities will be
installed at the Customer’s expense.

1.13.3 Adjustable-Speed Drive Controller
With prior permission, irrigation pumps or other equipment featuring an
adjustable-speed drive (ASD) controller that would normally require three-
phase service, may be served with single-phase service limited to a direct-
connect, safety-socket meter base rated 200 amps or lower, 120/240 volts
or 240/480 volts. An ASD controller must meet harmonic distortion
requirements described in Section 1.12, Power Quality. Contact PGE for
further information.

NOTE: When installing an ASD controller, contact PGE to determine if the
controller is affected by the pole-top reclosers.

1.14 Customer Generation
Contact PGE prior to installation of any generation equipment.

1.14.1 Emergency or Standby Generator
A permanently installed emergency or standby generator must be
connected to the Customer’s wiring system using a permanently installed,
open-transition (break-before-make) transfer switch intended for that
purpose. The transfer switch must be used to disconnect all ungrounded
conductors connected to the PGE system prior to connecting the
generator to the Customer’s electrical system. The transfer switch must be
designed and installed to prevent connection of the generator to the PGE system during any mode of operation.

For a closed transition (make-before-break) transfer switch, PGE will need to be notified prior to installation for review.

The Customer must comply with these provisions to prevent an accident:

• Never connect a portable generator to a permanent-wiring system unless the interconnection uses a permanently installed transfer switch. This can produce a hazardous situation for PGE or other service personnel.
• Government electrical inspectors must approve all transfer switches and/or transfer operating schemes.

1.14.2 Parallel Generation

Contact PGE prior to installation of any parallel generation equipment. For information on parallel generation equipment call PGE at 503-464-8100.

Parallel generation is defined as the parallel production of electrical energy where sources of generation outside of PGE connect with the PGE system for distribution. Such sources, when Customer owned, may provide all or a part of a Customer’s requirements, or the Customer may sell directly to PGE all or part of the output. Customer-owned sources include wind turbines, wheels, steam turbines, solar conversion, and geothermal devices. PGE will handle each proposal for parallel generation on an individual basis and will require a special contract between the Customer and PGE.

PGE must approve operation of the Customer’s parallel generation system. PGE will also designate the metering type and location, and determine the method of interconnection between the Customer system and the PGE system.

All parallel generation with production capabilities that will affect the service conductors by more than 30 amps requires a lockable ac disconnect switch located within 10 feet of the interconnection meter (unless another location has been approved by PGE). This disconnect switch must be accessible 24 hours a day.

1.14.3 Cogeneration

Cogeneration is defined as the joint production of electric energy and useful thermal energy in a combined process. It typically includes a gas turbine or diesel-driven generator with waste heat recovery and a steam or back-pressure turbine. PGE will handle each proposal for cogeneration on an individual basis by means of a special contract between the Customer and PGE.
PGE must approve the operation of the Customer’s cogeneration system. PGE will also designate the metering location, type of metering, and the method of interconnection between the Customer system and the PGE system.

1.14.4 Net Metering

Net metering power production is a type of parallel generation made available to PGE from a Customer that owns and operates a solar, wind, fuel cell, hydroelectric, landfill or digester gas, low-emission or renewable dedicated energy, or specific biomass fuel-powered facility with a generating-installed capacity of 25 kW or lower for residential Customers or 2 MW for commercial Customers.

Net metering facilities are intended to first offset the Customer’s load before exporting excess generation to the grid. Net metering measures the difference between the electricity supplied by PGE and the electricity generated by the Customer’s generator. Both PGE electricity and the excess generation pass through a bidirectional meter. The bidirectional meter is provided free of charge to the Customer to replace its existing single-direction meter. A Customer-owned generation meter may be required. See Figure 1-1 for a typical residential installation.

A warning label must be mounted on, or adjacent to, each meter base.

A written agreement with PGE is required prior to interconnection. See the PGE tariffs at www.portlandgeneral.com.

![Diagram of typical residential solar metering](Figure 1-1)

**1.14.5 Small Power Production**

Small power production is a parallel generation arrangement for Customer-owned facilities with generation capacities of 10 MW or lower.
and meeting the qualifying facility (QF) requirements outlined by the Federal Energy Regulatory Commission (FERC). Unlike net metering, small power production generation does not require generation to first offset a Customer’s load. The QF generation, in full or in part, is sold to PGE at avoided cost.

A written agreement with PGE is required prior to interconnection. (See PGE tariffs at www.portlandgeneral.com.) Some installations will require metering on the primary side. PGE will designate the metering location and type of metering. Consult with PGE prior to designing the power production system.

1.14.6 Solar Payment Option

The solar payment option (SPO)—also known as the Oregon feed-in tariff—power production is a parallel generation arrangement for Customer-owned solar electric facilities with a maximum dc nameplate of 100 kW (small- and medium-scale systems) or with 100 kW to a maximum of 500-kW dc nameplate (large-scale system).

For an SPO system—100-kW dc nameplate or lower—enrollment is on a biannual, first-come basis. (For program details, see PGE tariffs at www.portlandgeneral.com.) Like net metering, SPO generation first offsets the Customer’s load before exporting excess generation to the grid. Electricity generated in excess of the Customer’s load passes through a PGE-owned bidirectional meter provided free of charge. Unlike net metering, a second PGE-owned bidirectional generation meter is also installed. The second meter (solar production meter) measures all solar generation and is subject to a monthly service charge. The solar production meter socket must be wired the same as other PGE meter sockets, and the inverter conductors must be terminated in the lower section of the meter.

The solar production meter must be installed outside, within 10 feet of the other PGE-owned meter. Contact PGE for further information. See Figure 1-1 above for a typical residential installation. A warning label must be mounted on, or adjacent to, each meter base.

For a large-scale (over 100-kW and up to 500-kW dc nameplate) SPO system, enrollment is on an annual basis, which is determined through a bidding process. Like small power production, large-scale SPO system generation does not require generation to first offset a Customer’s load. Some installations will require metering on the primary side. PGE will designate the metering location and type of metering. Consult PGE prior to designing the SPO system.

A written agreement with PGE is required prior to interconnection. For more information, see the PGE tariffs at www.portlandgeneral.com.
1.14.7 Warning Label

A hard, plastic label must be mounted on, or adjacent to, each meter base. The label—with a red background and 3/8-inch-high white lettering—must be clearly legible and contain the following words:

WARNING: Customer-owned generation interconnected to PGE. Two sources may be present.

NOTE: PGE may require additional labels for parallel generation.

1.15 Six-Disconnect Rule

PGE requires a main disconnect in front of all meter banks that contain more than six meters. The main disconnect must be in the same location as the meter bank. For additional information, see Figure 8-2 in Section 8.1, Basic Requirements.
## Section 2

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2 Permits and Applications

2.1 Codes and Ordinances

The construction of new or remodeled installations must conform to applicable provisions of the National Electrical Code (NEC), National Electrical Safety Code (NESC), state rules and regulations, city and county ordinances and codes, rules on file with or issued by regulators, Occupational Safety and Health Administration (OSHA) rules during construction and maintenance, and PGE requirements.

2.2 Permits, Rights of Way, and Easements

The applicant is responsible—without cost to PGE—for all permits, rights of way, and easements required for the installation and maintenance of the electrical facilities that serve the applicant. A permit from the local jurisdiction is required before any work in the right of way may be performed.

Only PGE-approved excavation contractors and contractors who have made other special agreements with PGE will be allowed to work under a PGE street-operating permit. The contractor must notify the local jurisdiction before work is to begin per the terms of the permits required to complete the work. Jurisdictions within the PGE service territory have varied requirements regarding the amount of time needed to give notification. A copy of the permit must be on site.

2.3 Application for Service

It is important that the applicant provide PGE with the requested service date and accurate load information in a timely manner. Requests for service to commercial and industrial Customers normally require considerable advance planning by PGE in order to serve the load. All applicants should give a 60-day minimum lead time. Commercial and industrial Customers—and other installations requiring special transformers or other equipment not in stock—may require a six-month lead time or longer.

All applicants must include a site plan that shows the preferred service and meter location with requests for service. Commercial or industrial site plans must also show a single-line diagram of the electrical layout. Commercial or industrial applicants must provide all load information including lighting, water heating, cooking, space heating, air conditioning, and motor load. Sufficient information on equipment operations that estimate the kilowatt demand of the load should also be included. See the service request forms in Appendix B and Appendix C at the end of this book.

PGE will provide assistance upon request to Customers on service requirements and problems related to electric energy utilization for new, existing, and reconstructed installations. The Customer will be held liable for any personal injury or property damage if inadequate notice to and/or approval by PGE was not granted.
If changes in the service agreement are required, immediately contact PGE to set up alternative arrangements.

Local ordinances or state laws require that an applicant obtain appropriate permits before PGE establishes service. This may include approval of an electrical installation by the electrical inspection authority. Approval for service will be granted only after all service requirements have been met. This includes all the requirements referenced in this section of the ESR book, as well as the requirements in the rest of the book and in other PGE standards.

2.4 Emergency Connects or Reconnects

A request for an emergency connect or reconnect can be made by an electrical contractor, such as when a tree limb or storm takes down a service drop and damages Customer’s service entrance equipment, or a farmer’s irrigation equipment is damaged and water pumping service is needed immediately.

Under these emergency conditions an electrical contractor must fill out the Request to Energize an Electrical Installation form available on the State of Oregon Building Code Division website, http://www.cbs.state.or.us/external/bcd/pdf/0948.pdf. The request must be signed by a supervising electrician and submitted to PGE with a copy of the temporary electrical permit, if required. The electrician must also send a copy of this request to the Customer and inspecting authority. For PGE contact information, see the Preliminary Information section.

The Service Coordinator will determine the appropriate process for getting the service connected or reconnected. During normal working hours, a PGE Service Inspector may be requested to inspect the service, or PGE may send a crew to connect or reconnect the service.

PGE may refuse to connect the service if it is determined to be unsafe.
Section 3

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3 Services

3.1 Types of Service Furnished

Available electric service is 60 hertz, alternating current, single-phase or three-phase. (See Section 3.10, Load Requirements for more information.) The nominal secondary voltages are provided below.

3.1.1 Underground Service

The following underground service may be provided:

- Single-phase, 120/240 volt, three-wire, grounded
- Single-phase, 240/480 volt, three-wire, grounded
- Three-phase, 208Y/120 volt, four-wire, grounded, wye
- Three-phase, 480Y/277 volt, four-wire, grounded, wye
- Three-phase, 240/120 volt, four-wire, grounded, delta
  NOTE: Consult with PGE regarding the loading capacity for this service.
- Three-phase, 480/240 volt, four-wire, grounded, delta

3.1.2 Overhead Service

The following overhead service may be provided:

- Single-phase, 120/240 volt, three-wire, grounded
- Single-phase, 240/480 volt, three-wire, grounded
- Three-phase, 208Y/120 volt, four-wire, grounded, wye
- Three-phase, 240/120 volt, four-wire, grounded, delta
- Three-phase, 480Y/277 volt, four-wire, grounded, wye
- Three-phase, 480/240 volt, four-wire, grounded, open-delta

If other service voltages are required, the Customer must request—and PGE must approve—these voltages before services can be provided.

If primary voltage service is requested, refer to Section 3.4.7, Primary Voltage Service and contact PGE.

3.2 Permanent Service Connection

Only authorized PGE employees can make the permanent connection or disconnection of PGE electric service. Services must not be jumpered prior to local inspection and permanent connection by PGE. Services must not be energized without NEC-approved covers properly secured. For more information, see Section 2.4, Emergency Connects or Reconnects.
3 | Services

3.3 **Point of Delivery**

The point of delivery for commercial and industrial Customers refers to the location where the PGE circuit connects to the Customer’s system. The point of delivery must be on the outside of the building. Prior written approval by PGE is required before the point of delivery can be located in a dedicated electrical room.

PGE will only install service connections to the Customer’s meter equipment at the main-floor or entry-floor level.

The point of delivery for residential Customers must be no more than ten feet from the corner of the house closest to PGE lines. The Customer must contact PGE to determine an appropriate location of the Customer’s meter equipment.

For more information, see Section 5.3, *PGE Electrical Equipment Room* and the *Electrical Room Checklist*.

NOTE: For residential overhead services, the house siding must be installed before service will be provided.

3.4 **General Meter Installations**

The PGE tariff and rate schedules require the delivery of each class and type of electrical service through one meter to one Customer at one location.

NOTE: Meters must be accessible during normal work hours for meter reading and testing, except where a separate service is used to minimize voltage fluctuations on secondary voltage circuits. For more information, see Section 1.10, *Time-of-Use Metering*.

Meter location is subject to PGE approval. Metering equipment (such as a meter base or CT cabinet) must **not** be installed on the drive-through service entrance side of a commercial building. Existing drive-through locations where PGE equipment is installed on the drive-through service entrance side are subject to temporary closure of the drive-through lane(s) when necessary for PGE to access metering equipment.

Customers are not authorized to relocate any meter belonging to PGE or interfere in any way with the meter or its connection. The person responsible for the electrical work must contact PGE for any work that involves relocation, rewire, or new installation of a meter.

**WARNING**

Removing the meter from some types of meter sockets **does not** de-energize the service. Before performing any electrical work, test the service with a voltmeter or other appropriate instrument to verify that it is de-energized. **Death or serious injury may result** if anyone performs work on a service that is still energized.
The Customer must promptly notify PGE upon completion of repairs or modifications so PGE can inspect, install, and seal the meter. For more information, see Section 3.4.2, Sealing Provisions and Section 1.6.1, Safety.

### 3.4.1 Acceptable Meter Sockets

Acceptable meter sockets are manufactured in accordance with the current Electric Utility Service Equipment Requirement Committee (EUSERC) requirements, standards for safety meter sockets, ANSI C12, and UL 414. The Customer must provide and install the meter socket complete with terminal lugs; meter jaws; manual link bypasses or safety sockets (when required); and sealing means for all sections. Consult PGE for meter socket types.

NOTE: Ringless-style meter sockets are not approved.

When a meter socket is installed in a switchgear, it must be wired by the switchgear manufacturer per EUSERC Drawing 300, Meter Sockets, General. The load side of the meter must be wired to the breaker or disconnect position. Service to a switchgear that has been wired or altered by the Customer will be turned down.

### 3.4.2 Sealing Provisions

PGE uses seals placed on meter rings and associated service equipment to prevent injury and/or tampering. Sealing provisions for associated service equipment must use a stud/wing nut assembly or a clip suitable for use with a seal.

All cabinets and gutters containing unmetered conductors—other than mainline switches required by applicable codes—must have sealing provisions. Removable sections of conduit may only be installed when approved by PGE and must be sealed by PGE. Unmetered conductors passing through a service disconnect compartment for a mobile home service pedestal must be in conduit and arrangements must be made for sealing.

### 3.4.3 Mounting of Meter Sockets

Verify that clearances for meter sockets meet the requirements shown in Figure 5-2 and Figure 5-3 in Section 5.2, Meter Clearances and Location Criteria. Plumb sockets in all directions and securely mount them to a rigid surface. Securely fasten conductors to their respective terminals and arrange them in a manner that will not interfere with the installation of PGE conductors, the meter or cover, or with the operation of manual link bypasses.

If the meter cabinet is to be recessed in the wall, install a flush-type box or meter cabinet designed specifically for that purpose so that the face of the meter cabinet projects outward beyond the building surface as approved by PGE.
PGE requires 48 inches of clear working space in front of live parts and 78 inches of clear headroom. Do not install a barrier post that is within 48 inches of the front of the meter panel when a meter is removed and energized parts are exposed. For information on barrier posts, see Section 6.4.6, *Barrier Post* or contact a PGE Service Coordinator.

Locate meter sockets and other metering equipment at least 36 inches horizontally from a gas meter, gas valve, or nearest gas component (outlet elbow or flange) of the meter set. See Figure 5-4 in Section 5.2, *Meter Clearances and Location Criteria*, and Figure 5-11 and Figure 5-12 in Section 5.9, *Working Clearances Around Pad-Mounted Electrical Equipment*.

The unmetered service conductor and the metered service conductor will not be run in the same conduit, raceway, or gutter. This does not apply to minor repair jobs if coordinated with PGE before repair.

Be sure adequate protection exists for meters subject to physical damage. Barrier posts are required when metering equipment is exposed to vehicle traffic. See Figure 6-5 and Figure 6-6 in Section 6.4.6, *Barrier Post*.

### 3.4.4 Access to the Meter Socket

The meter socket must be mounted in a way that does not hinder removing the meter and/or cover from the base. The meter base panel, ring, and/or lid must not be sealed or obstructed in any way other than those methods allowed under the NEC and PGE Electric Service Requirements. Any hindrance—including but not limited to siding, caulking, enclosures, and landscaping—must be removed by the property owner in order to allow unrestricted access to the meter base.

### 3.4.5 Corrosive Areas

Meter sockets and other metering cabinets installed in highly corrosive areas (such as dairy farms, fertilizer or chemical plants) must be constructed of stainless steel.

### 3.4.6 Meter Socket Adapters

Customer-owned meter socket adapters and meter collars used for purposes such as providing a power source are not allowed on PGE services.

### 3.4.7 Primary Voltage Service

High-voltage instrument transformers and transformer-rated meters are required for Customers taking service at primary voltage under provisions of the PGE tariff. To establish a mutually satisfactory location for the service point and metering details, the Customer must consult PGE before construction begins.
PGE will not accept some transformer configurations because of disruptive operating characteristics. The Customer must submit specifications for protective devices and transformers, including core types and winding configurations with associated wiring, for written approval by PGE.

Contact PGE for details and limitations before installation.

PGE will provide primary voltage delivery to qualified Customers directly—without transformation—from the high-voltage or primary distribution system (standard for the location in which service is requested) if the following conditions apply:

- The service at primary voltage will not—in the judgment of PGE—adversely affect the operation of the PGE distribution system or service to other Customers.
- The service supplied is distributed in a safe and reliable manner.
- The Customer provides switching devices with appropriate overcurrent protection to isolate the utility system from disturbance on the Customer-owned primary facility.
- The Customer is responsible for the operation and maintenance of all Customer-owned equipment. PGE does not provide replacement parts for Customer-owned equipment.

PGE requires the Customer to install a disconnecting means on the load side of the medium voltage (primary) metering equipment. This equipment is in addition to any disconnecting means, overcurrent protective devices, or switches on Customer facilities for Customer use.

This disconnecting means separates the Customer’s system from the PGE system. It is intended for PGE use only and serves as a visible open as part of PGE line crew lockout/tagout procedures. The disconnecting means will not include overcurrent protection.

**Figure 3-1** shows the disconnecting means that are required by PGE.
3.4.7.1 **Switchgear Enclosure for Primary Metering**

Prior to construction, the Customer must consult with PGE regarding primary services greater than 600 volts. Customers must meet the requirements of EUSERC Section 400 when switchgear enclosures are required to meter medium-voltage delivery services. Ten feet of clear workspace is required in front of access doors.

The Customer must submit approval drawings of the metering equipment to PGE prior to fabrication. Such drawings must indicate the company name, the job address, the contact address, and the phone number of the manufacturer’s representative.

The Customer must provide and install:

- All necessary hardware per EUSERC Section 400
- The load side disconnect switch
- A clear working space 78 inches high, 48 inches deep, and as wide as the PGE metering equipment, including load side disconnect switches
- A concrete mounting vault (with a minimum 4-inch thick concrete pad) for the switchgear metering enclosure

PGE will provide:

- The meter
- A meter test switch
- Instrument current and voltage transformers and secondary metering wiring
- The primary disconnecting means

NOTE: The Customer must consult PGE for specifications on instrument transformers, the meter test switch, and secondary wiring of instrument transformers prior to ordering the meter enclosure. Enclosure drawings with a site plan and electrical room detail must be provided to PGE for approval prior to installation.

3.5 **Connection and Disconnection of Service**

Connection and disconnection of any service will be done by PGE. The Customer will be billed a charge according to the fee schedule in effect. A permit and inspection by the local code enforcing agency, and approval by PGE, is required before reconnection for the following:

- All services that have been disconnected longer than six months.
- Any service that has had Customer electrical equipment modified in any way.
All work must be scheduled with PGE for connection and disconnection of service.

No permit or inspection is required if an overhead drop is disconnected temporarily to allow felling of a tree or to provide safe working clearances for roofing, painting, or siding.

For information about emergency connects or reconnects, see Section 2.4, *Emergency Connects or Reconnects*.

### 3.6 Theft of Service or Unmetered Electric Service

Any unauthorized connections or wiring attached ahead of the meter that allow unmetered electric service—whether intentional or unintentional—should be immediately reported to the PGE Energy Recovery Unit. All calls will be treated in the strictest confidence and callers will remain anonymous.

The Energy Theft Hotline is 1-800-962-8184. The hotline is available 24 hours a day, 7 days a week.

### 3.7 Relocation of Services and Facilities

A fee may be charged if the Customer requests or requires relocation of existing PGE facilities.

### 3.8 Customer Equipment on PGE Poles

Customer-owned metering equipment, switching devices, conduits, conductors, or luminaires must **not** be mounted on a PGE pole.

### 3.9 Customer-Owned Poles and Guying

All Customer-owned and Customer-installed poles for overhead mobile home service, farmyard, or irrigation service must meet PGE requirements for height, depth of setting, pole class, and guying.

All poles must be 24-foot minimum length, set no less than 5 feet below the ground level, with gravel backfill. The size of the pole is to be Class 6 (6-inch minimum top diameter, 7-inch diameter 6 feet from the butt) or better, full-length, commercially treated. A 6- x 6-inch treated post can be used if the post is located within 25 feet of an unobstructed drivable surface.

For pole lengths longer than 24 feet, consult PGE for proper setting depth.

All Customer-owned poles must be guyed and anchored unless prior permission is obtained from PGE. Guys are to be a minimum 5/16-inch galvanized steel cable, having a lead-to-height ratio of 1:2.
3.10 Load Requirements

3.10.1 Single-Phase Service

Equipment having a capacity of two kilowatts or more must be operated at 208 volts or higher.

Customers connecting any individual motor larger than five horsepower must obtain prior approval from PGE. In addition, air conditioners and heat pumps larger than five tons require prior PGE approval. Single-phase motors larger than three horsepower may cause voltage dips that are objectionable to some Customers.

Space or water heating must be designed and controlled so that no more than 48 amperes of load at 240 volts switches on or off at any one time.

PGE limits the maximum single-phase, 120/240 volt load served through one point of termination to the capacity of a 167-kVA, single-phase transformer.

PGE requires the Customer to use three-phase service instead of single-phase service if—in the judgment of PGE—the Customer’s connected load is excessive for single-phase service.

Single-phase service over 320 amps requires current transformer metering as described in Section 10.7, Current Transformer Metering, 800 Amps Maximum.

3.10.2 Three-Phase Service

Three-phase service will be provided upon request to residential and nonresidential Customers in accordance with the current PGE tariff.

Three-phase service over 200 amps requires current transformer metering as described in Section 10.7, Current Transformer Metering, 800 Amps Maximum or Section 10.5, Customer’s Responsibility for Maintaining Switchgear.

The Customer’s connection of single-phase loads to three-phase services must follow these guidelines in order to reduce the likelihood—or eliminate a common cause—of overloading or single-phasing condition that could damage the Customer’s three-phase equipment:

- On a 208Y/120 volt or 480Y/277 volt, three-phase service, all single-phase loads should be split evenly among the three phases.
- On a 240/120 volt, delta, three-phase service, single-phase loads (both 120 and 240 volt) must not utilize the high-leg (wild), except for resistance heating equipment, which should be balanced across all three phases.
The high-leg (wild), four-wire deltas must be identified with the color orange and be on the right side of the meter base or CT cabinet.

PGE will choose the voltage supplied to the Customer depending on the characteristics of the PGE distribution system in the area and the Customer’s electrical needs. PGE limits service at 208Y/120 volts to a maximum demand of 500 kVA and 480Y/277 volts to 2000 kVA. The Customer must obtain a prior agreement from PGE for service to three-phase loads larger than 500 kVA at 208Y/120 volts and 2000 kVA at 480Y/277 volts.

Three-phase, 480 volt service may not be supplied where the total load to be served is less than 50 kilowatts except where the load consists of a single motor (such as irrigation pumping) with nameplate rating of at least 20 horsepower, or an existing 480-volt transformer bank that has capacity for the additional load.

Typically, three-phase, four-wire, closed-delta service will not be supplied from underground primary systems.

New three-phase, three-wire service is not available from PGE. Conversion of an existing three-phase, three-wire service is required when:

- The Customer adds load.
- Electric work or repair is required in the meter base or meter socket.
- The meter base or meter socket is replaced.
- The service entrance conductors and/or the weatherhead is replaced.

### 3.11 Customer-Owned Transformers Beyond the Point of Delivery

Transformers furnished and owned by the Customer beyond the point of delivery (POD) normally used for step-up or step-down of delivery voltages (such as 208 volts stepped up to 480 volts) must conform to the transformer types acceptable to PGE. In particular, use of grounded wye-delta transformers installed with the grounded wye towards the POD is not allowed without protection and relaying acceptable to PGE. A fault on the grounded wye side of the Customer’s transformer may result in damage to the transformer and/or electrical equipment and improper operation of PGE protection equipment; and pose a safety hazard for Customer employees, PGE personnel, and the public.

### 3.12 Service to Mixed-Use Facilities, Residential and Commercial

Services to mixed-use facilities with both residential and commercial Customers are usually complex. These services require that the Customer consult PGE for availability of service voltages, overhead or underground service options,
transformer locations, and service entrance requirements before plans are completed or electrical equipment purchased.

Where underground service is requested, the Customer will be required to provide the necessary space on their premises for the installation of PGE transformers and associated electrical equipment. This type of service may require a transformer pad and/or vault, or a Class-A vault.
## Section 4

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4 **Temporary Service**

Upon request, PGE will supply temporary service at a location adjacent to PGE facilities as provided in the appropriate electric service schedules. Consult PGE for information regarding temporary construction service programs.

### 4.1 Basic Requirements

Always locate a temporary service for construction work so that the meter is protected from accidental damage. Where practical, place the temporary service in a location that is usable throughout the construction period. When PGE must relocate a temporary service, the Customer must pay the relocation cost in accordance with the PGE schedule of charges.

The service pole and service post must be sound and in good condition for the duration of its use. PGE will not energize a temporary service if the Customer-provided service pole is not safe, or if the service post is not suitable for supporting the tension of the service conductor.

**NOTE:** A service pole is round; a service post is square.

Overhead temporary services must meet the clearance requirements provided in this section and in Section 5, *Clearances*. Underground temporary cables must be placed in a trench meeting the requirements of Section 6, *Underground Requirements*. Temporary service cables laid on the ground, even with mechanical protection, are not permitted.

### 4.2 Temporary Service for Construction Work

Temporary service for construction work can be set up in one of four typical structures.

- A 6- x 6-inch overhead service post in a nonroad crossing
- A 6- x 6-inch overhead service post in a road or traffic crossing
- Overhead service pole
- Underground service, 4- x 4-inch post-mounted

### 4.3 Construction Criteria for Temporary Service

Temporary structures must meet all of the following construction criteria before PGE can provide service. PGE has the right to refuse connection if height, strength, bracing, or other requirements are not met.

- The pole, post, and stakes must be pressure- or thermally treated by the manufacturer with an approved American Wood Preservatives Association standardized preservative. A steel stake may be used in place of a wood stake.
• All posts, poles, and stakes must be one continuous piece.
• To ensure strength, all lumber must be free of sucker knobs and have spike knots no larger than one third of any face. Checks greater than 0.5-inch wide are not permitted. No visible wood decay is allowed.
• Set the stakes in undisturbed soil. Each stake must be attached to the brace using three 16d or greater (penny) nails; the brace must be attached to the post with a minimum of three 16d or greater nails. If a steel stake is used, a U-bolt may be substituted for the three 16d nails.
• To provide stability, use tamped, 3/4-inch minus crushed rock at a depth that equals the required depth of the pole or post.
• Installation of a service post for temporary construction power requirements cannot exceed 180 days of use. If temporary construction power service is needed beyond 180 days, an overhead service pole must be provided.
• A service conductor that crosses a road or traffic area is required by the National Electrical Code (NEC) and the National Electrical Safety Code (NESC 232-1) to have a higher aboveground clearance than required in other situations. These crossings require the installation of an overhead service pole or an overhead service post as specified in Section 4.4.1.2.
• The distance between the electric utility point of attachment and the temporary service pole or 6- x 6-inch post must be 60 feet or less. If this distance is greater than 60 feet, a 4- x 4-inch overhead clearance post must also be used to ensure adequate clearance. For more information, see Section 4.4.2.
• An electrical permit and inspection by the local code enforcement agency is required for all temporary services.
• The code-enforcing agency may require that the grounding connection be visible when the electrical inspection is made. For safety reasons, however, the top of the ground rod should be flush with or below the ground level.

4.4 Construction Requirements for Temporary Service

Follow these construction requirements for all types of overhead and underground temporary service.

• The meter socket must be National Electrical Manufacturers Association (NEMA) type 3R (rainproof) and in good condition with no holes, bends, or damage. The meter socket must be plumb in all directions.
• Service equipment must be NEMA type 3R (rainproof) and in good condition with no holes, bends, or damage. NEC-approved covers must be properly secured.
• The center of the meter socket must be a minimum of 42 inches and a maximum of 72 inches from the ground level.
• Attach the electrical label or permit to the meter base.
• See Section 5, Clearances, for service drop and (where applicable) drip loop clearances.
4.4.1 Overhead Service Post, 6- x 6-Inch

Use the following requirements for an overhead service post. These requirements are in addition to the construction criteria in Section 4.3 and the construction requirements at the beginning of Section 4.4.

- A #2-AWG-aluminum triplex conductor suitable for tensioned overhead service is required, and must be long enough to reach the ground. Use an eyebolt and a wedge grip to attach the triplex conductor to the top of the post.
  - See Figure 4-1 for an overhead service in a nonroad crossing.
  - See Figure 4-2 for an overhead service in a road or traffic crossing.
  - See Figure 4-3 for a detail of the attachment point and connection point.
- All internal wire must be jacketed up to the end of the 24-inch tails where it will be connected to the triplex conductors.
- Make sure that the braces do not block the working space around the meter or service equipment.
- The Customer is responsible for the conductor from the meter base to where it reaches the ground.
Figure 4-1: 6- x 6-inch Overhead Service Post in a Nonroad Crossing
Figure 4-2: 6- x 6-inch Overhead Service Post in a Road or Traffic Crossing
Figure 4-3: Detail of Attachment Point and Connection Point
4.4.1.1 Overhead Service Post (6- x 6-inch) In a Nonroad Crossing

Use the following requirements for a service post in a nonroad or traffic-free crossing. These requirements are in addition to the construction criteria in Section 4.3 and the construction requirements in Section 4.4.

An overhead service post in a nonroad crossing is shown Figure 4-1. See Figure 4-3 for a detail of the attachment point and connection point.

- The post must be 6- x 6-inch square, a minimum of 16 feet in length, and set in the ground a minimum of 36 inches.
  
  NOTE: When a temporary service post is within 25 feet of the PGE service drop, a 4- x 4-inch post can be substituted for the 6- x 6-inch post.

- The braces must be 2- x 4-inches and a minimum of 12 feet in length.

- The stakes must be 2- x 4-inches and set in the ground a minimum of 24 inches. If ground conditions prohibit driving a wood stake, it is acceptable to substitute a 0.75-inch round steel stake set in the ground to the same depth. See Figure 4-4 for a steel stake and U-bolt.
4.4.1.2 Overhead Service Post (6- x 6-inch) In a Road Crossing or Traffic Crossing

Use the following requirements for an overhead service post when the service drop crosses a road or traffic crossing. These requirements are in addition to the construction criteria in Section 4.3 and construction requirements in Section 4.4.

An overhead post in a road or traffic crossing is shown in Figure 4-2. Figure 4-3 shows a detail of the attachment point and connection point.

- The post must be 6- x 6-inch square, a minimum of 24 feet in length, and set in the ground a minimum of 48 inches.
- The braces must be 2- x 4-inches and a minimum of 18 feet in length.
- The stakes must be 2- x 4-inches and set in the ground a minimum of 36 inches. If ground conditions prohibit driving a wood stake, it is acceptable to substitute a 0.75-inch round steel stake set in the ground to the same depth. See Figure 4-4 for a steel stake and U-bolt.

4.4.2 Overhead Clearance Post (4- x 4-inch)

A 4- x 4-inch overhead clearance post (shown in Figure 4-5) is required when the distance between the electric utility point of attachment and the temporary service pole or post is greater than 60 feet.
The following requirements are in addition to the construction criteria in Section 4.3 and the construction requirements in Section 4.4.

- The post must be a minimum 4- x 4-inch square and set in the ground a minimum of 24 inches.
- The braces must be 2- x 4-inches and a minimum of 12 feet in length. They must also be facing the power source.
- The stakes must be 2- x 4-inches and set in the ground a minimum of 24 inches. If ground conditions prohibit driving a wood stake, it is acceptable to substitute a 0.75-inch round steel stake set in the ground to the same depth. See Figure 4-4 for a steel stake and U-bolt.
- Maintain a maximum of 60 feet between the posts.
- Maintain a minimum of 8 feet between the post and the stake.

![Figure 4-5: 4- x 4-inch Overhead Clearance Post](ESR0004)
4.4.3 Underground Service, 4- x 4-inch Post-Mounted

A temporary underground service (shown in Figure 4-6) is available only in areas where the permanent service is from an underground facility.

The following requirements are in addition to the construction criteria in Section 4.3. See Section 6, Underground Requirements, for underground and conduit requirements.

- Firmly tamp the 3/4-inch minus crushed rock around the post. Dome the earth to allow for settling.
- The conduit must be rigidly fastened to the wood post.
- Use a wood post that is a minimum 4- x 4-inch square and owned by the Customer.
- Maintain a 36-inch minimum straight section of conduit between sweeps.

![Figure 4-6: Underground Service, 4- x 4-inch Post Mounted]
4.5 **PGE Gold Temporary Service for Residential Applications**

PGE Gold Temporary Service is an enhanced service that provides an unmetered, flat-rate, temporary service for residential construction.

Gold Temporary Service may only be used for lights and tools, and for any equipment less than or equal to 5 horsepower (hp) that is necessary for the construction and final inspection of the associated residential dwelling(s), including testing of a domestic well pump and septic pump.

Gold Temporary Service may not be used for operation of permanently installed appliances, equipment, or construction trailers; or to heat or dry structures under construction.

When using a PGE Gold Temporary Service, the Customer must use electrical extension cord sets (or other devices) that incorporate ground fault interrupters (GFIs) to comply with local codes.

PGE installs the Gold Temporary Service and no permits are required. The cost and installation of the temporary service will be provided per all current PGE and tariff regulations. Contact PGE for availability and further information.

If a request for a Gold Temporary Service involves installation at an existing PGE pad-mounted transformer, it may be necessary for a PGE crew to provide excavation. The Customer will be responsible for the additional costs associated with that excavation.

If no transformer is present, a PGE construction drawing will be required.
# Section 5

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5 Clearances

5.1 Basic Requirements

The Customer must provide suitable space and provisions for mounting a meter socket at a location acceptable to PGE. It is in the mutual interest of the Customer and PGE to provide a location that is convenient to both parties for reading, testing, and replacing meters.

If, in the opinion of PGE, a Customer makes a meter inaccessible, such as by installing a fence or enclosure, the Customer must—at his or her own expense—provide access acceptable to PGE or move the meter socket to a location acceptable to PGE. If a meter is located behind a fence, see the requirements in Section 5.2.3.

Where the point of delivery is located inside the Customer’s building, PGE will only install service connections to Customer’s metering equipment at the main or entry floor level.

The Customer is responsible for obtaining base flood plain elevation requirements from the local jurisdiction, and ensuring that all Customer-owned switchgear and metering equipment is installed in accordance with these requirements.

PGE will not install a meter on a mobile structure, such as a trailer, barge, crane, dredge, dragline, or any mobile pumping equipment; or on a floating dwelling unit, such as a houseboat.

5.2 Meter Clearances and Location Criteria

Meter clearances and locations must meet all of the following criteria.

• PGE requires the minimum unobstructed workspace in front of a meter to be 78 inches high, 48 inches wide, and 48 inches deep. See Figure 5-1.
• A meter installed in a cabinet requires a minimum space of 48 inches deep to allow the cabinet door to open.
• Locate all meters and metering equipment at least 36 inches horizontally from a gas meter.
• In a single-meter socket installation, the center of the meter socket cannot be more than 72 inches from the finished grade or floor immediately in front of the meter, or lower than 42 inches from that grade or floor.
• In a gang meter base installation or switchgear installation, the center of the uppermost meter socket must be no higher than 78 inches and the lowermost meter socket must be no lower than 36 inches. No more than five meters are allowed in a single vertical gang meter stack. See Figure 8-2, in Section 8, Multiple-Family Service.
• The Customer is responsible for providing a minimum 4- by 4-foot level workspace in front of all metering equipment.
5.2.1 Single-Meter Installation

Follow these additional clearance requirements for a single-meter installations, both flush-mount and surface-mount.

- The minimum horizontal clearance from the center of the meter to a wall or obstruction is 10 inches. See Figure 5-2.
- The minimum vertical clearance from the center of the meter to a ceiling or obstruction is 9 inches.

5.2.1.1 Single-Meter, Flush-Mount Installation

Follow these additional clearance requirements for a single-meter, flush-mount installation.

- A minimum 3/4-inch plywood backing is required.
- The building face must not extend beyond the face of the meter box. See Figure 5-2.
5.2.1.2 *Single-Meter, Surface-Mount Installation*

Follow this additional clearance requirement for a single-meter, surface-mount installation.

- A surface-mount meter must have a minimum of two 2- x 4-inch back supports. See Figure 5-2.

![Figure 5-2: Meter Clearances for Single-Meter Installations](ESR0006)
5.2.2 Multiple-Meter Installation

Follow these additional clearance requirements for a multiple-meter installation in a room or on adjacent walls. All of these requirements refer to the drawings shown in Figure 5-3.

- All doors to a room that contains PGE metering and termination equipment of 120 volts or higher must open out. These doors must be equipped with a panic bar before service will be provided.

- When the cabinet door on a piece of utility equipment is open, that door must not block the egress.

- The minimum horizontal clearance from the center of the meter to a wall or obstruction is 10 inches.

- The minimum horizontal clearance from the side of a current transformer (CT) cabinet to a wall or obstructions is 30 inches.

- The minimum horizontal clearance from the front of a CT cabinet to a wall or obstruction is 48 inches.

- A minimum 90-degree clear open space is required when the CT cabinet door is open.

- When there are multiple meters on adjacent walls, a 16-inch minimum horizontal clearance is required from the side of the meter box to a wall or obstruction.

- The minimum horizontal clearance from the open door of a CT cabinet to a wall or obstruction is 4 inches.

- No more than five meters are allowed in a single vertical gang meter stack.
Figure 5-3: Meter Clearances for Multiple-Meter Installations
5.2.3 Residential Meter

Install a residential meter and current transformer (CT) cabinet outdoors at a location acceptable to PGE. As a general guideline, locate the meter on the side of the structure closest to the PGE line or within 10 feet of the front (or street) side to prevent the meter from being located behind a fence. Avoid installing a meter on an exterior bedroom or bathroom wall or patio, as well as exterior walls that are likely to be fenced in.

If a meter is located behind a fence, a gate must be installed on the same side of the house that the meter is on, or on whichever side of the house will result in the shortest distance from the street to the meter.

Never install a meter over a window well, over steps in a stairway, or in another unsafe or inconvenient location. Keep shrubs and plants from obstructing access to metering equipment. See Figure 5-4.

Follow these clearance requirements for overhead service.

- See Table 5-1 for clearances for service drops and drip loops.
- The meter socket and location must be approved by PGE prior to installation.
- Buildings should not be constructed under or adjacent to lines.
- The cable and drip loop must be at least 18 inches above an inaccessible roof as defined by NESC.
- Locate the weatherhead a minimum of 24 inches above the roof and within 48 inches of the roof edge. See Section 7.3.2, Service Mast Guy and Anchor Requirements for guying requirements.
- The maximum length of a service cable over the roof surface is 6 feet.
- The maximum distance between the meter base and the corner of the house closest to a PGE line is 10 feet (120 inches). See Figure 5-5.
- The minimum distance between a gas meter and the PGE meter is 36 inches. See Figure 5-5.
- To maintain customer privacy, avoid locating a meter within 36 inches of a window or door with a view of living spaces. See Figure 5-5.
- A minimum of 30 inches of clear workspace is required from the edge of a window well. See Figure 5-5.
- The point of attachment for the cable must be a 3/8-inch eyebolt that is within 24 inches of the weatherhead. See Figure 5-4 and Figure 5-5.

NOTE: A service drop installed on the gable side of a residence requires prior PGE approval. See Figure 5-4.
Figure 5-4: Metering Equipment for Overhead Service
Figure 5-5: Residential Meter Clearances for Overhead Service
### Table 5-1: Minimum Clearances for Service Drops, 750 Volts and Lower, Based on NESC C2-2012

<table>
<thead>
<tr>
<th>Type of Clearance</th>
<th>Type of Structure or Feature</th>
<th>Clearance (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum service drop clearance.¹ (NESC Table 232-1)</td>
<td>Over roads, streets, and other areas subject to truck traffic</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Over alleys, parking lots, and driveways</td>
<td>16²</td>
</tr>
<tr>
<td></td>
<td>Over land traveled by vehicles</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Over state highways (ODOT may require greater clearances)</td>
<td>19</td>
</tr>
<tr>
<td>Minimum clearances over spaces and ways subject to pedestrians/restricted traffic only. (NESC Table 232-1)</td>
<td>At height of attachment</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Drip loops of service drops for 120/240, 208Y/120 volts, and 480Y/277 volts</td>
<td>12</td>
</tr>
<tr>
<td>Minimum clearances from buildings for service drops not attached to the building. (NESC Table 234-1)</td>
<td>Vertical clearance over or under balconies and roofs accessible to pedestrians</td>
<td>11³</td>
</tr>
<tr>
<td></td>
<td>Vertical clearance over or under balconies and roofs not accessible to pedestrians</td>
<td>3.5³</td>
</tr>
<tr>
<td></td>
<td>Horizontal clearance to walls, projections, windows, balconies, and areas accessible to pedestrians</td>
<td>5³</td>
</tr>
<tr>
<td></td>
<td>Radio and television antennas not accessible to pedestrians</td>
<td>3³</td>
</tr>
<tr>
<td>Minimum clearances from service drops (including drip loops) attached to a building or other installation over or along the installation to which they are attached. (NESC rule 234C-3 and Figure 234-2)</td>
<td>Vertical clearance from the highest point of readily accessible roofs, balconies, decks, fire escapes, or other attached structures over which they pass or to which they are attached. See NESC 234C-3d for exceptions and additional information.</td>
<td>10³</td>
</tr>
<tr>
<td></td>
<td>From the highest point of roofs, decks, or balconies over which they pass above a not-readily-accessible roof and terminating at a (through-the-roof) service conduit or approved support, the service and its drip loops set not less than 18 inches above the roof; not more than 6 feet of the service cable over the roof located not more than 4 feet from the edge of the roof</td>
<td>1.5³</td>
</tr>
<tr>
<td></td>
<td>From the highest point of roofs, decks, or balconies over which they pass in any direction from doors, windows that are designed to open (except from above), porches, or fire escapes</td>
<td>3</td>
</tr>
</tbody>
</table>

---

1. Service drop is defined as a multiplex insulated conductor cabled on and supported by a bare neutral messenger (TX/QX).
2. The PGE recommended clearance is based on meeting clearances over the life of the installation.
3. NESC considers a roof, balcony, or area to be readily accessible to pedestrians if it can be casually accessed using a doorway, ramp, window, stairway, or permanently mounted ladder by a person on foot who neither exerts extraordinary physical effort nor uses special tools or devices to gain entry. NESC does not consider a permanently mounted ladder to be a means of access if the bottom rung is eight feet or more above the ground or other permanently installed accessible surface.
5.2.4 Nonresidential Meter

Locate a nonresidential meter and current transformer (CT) cabinet outdoors unless PGE confirms—prior to installation—that no acceptable outdoor location exists. Any indoor location must have prior written approval by PGE. PGE requires access to all meter locations during the hours of 8:00 a.m. to 4:30 p.m.

Do not locate an indoor meter in a show window, closet, bathroom, over a sink or laundry tub, or in any location that is not safe, convenient, or readily accessible.

5.3 PGE Electrical Equipment Room

The electrical equipment room must be located on an outside wall with a door leading directly to the outside.

A room is not considered accessible unless the access door is keyed for a PGE lock, a key pad is installed, or equipped with a PGE-provided lockbox that contains a key to the door of each meter room. Doors to a meter or electrical equipment room must open outward and be equipped with a panic bar before service will be provided. The door must be a minimum of 36 inches wide and 78 inches high.

A room that contains PGE electrical equipment must be illuminated and accessible to PGE personnel. A meter or electrical equipment room must contain only PGE equipment, telecommunications equipment, and security and fire alarm systems. At a minimum, the room must have drywalls that are taped.

Whenever a service equipment change—such as a new service or rewire—is made to an existing electrical or meter room, the room must be retrofitted and/or brought up to the requirements specified in the Electrical Room Checklist and in this section.

IMPORTANT: An electrical equipment room must not be used for storage.
5.3.1 Workspace Requirements

Follow these workspace requirements for a PGE electrical equipment room when there is one enclosure in a room, or two enclosures in a room.

NOTE: When there are two enclosures in a room, it is assumed that live parts are exposed on both sides of the workspace.

5.3.1.1 General Requirements

These workspace requirements apply to all PGE electrical equipment rooms.

- The width of the workspace in front of electrical equipment must be 48 inches.
- No obstructions are permitted in the workspace.
- In all cases, the workspace must permit at least a 90-degree opening of equipment doors or hinged panels.
- When normally enclosed live parts are exposed for inspection or servicing, the workspace—if in a passageway or general open space—must be suitably guarded.

5.3.1.2 Workspace When There Is One Enclosure

When a PGE electrical equipment room has one enclosure, a minimum of 48 inches is required between the front of the enclosure and a wall or obstruction when equipment in the enclosure is 600 volts or less to ground. See Figure 5-6.

Figure 5-6: Workspace When There Is One Enclosure
5.3.1.3 Workspace When There is One Enclosure and One Doorway

These workspace requirements apply to PGE electrical equipment rooms that have one enclosure and one doorway.

- A minimum of 48 inches is required between the front of the enclosure and the closest doorway opening when the equipment in the enclosure is 600 volts or less to ground. See Figure 5-7.
- A minimum of 96 inches is required between the front of the enclosure and a wall or obstruction when the equipment in the enclosure is 600 volts or less to ground. See Figure 5-7.

Figure 5-7: Workspace When There Is One Enclosure and One Doorway
5.3.1.4 Workspace When There Are Two Enclosures

When a PGE electrical equipment room has two enclosures, a minimum of 48 inches is required between enclosures when the equipment in the enclosures is 600 volts or less to ground. See Figure 5-8.

Figure 5-8: Workspace When There Are Two Enclosures
5.3.1.5 Workspace When There Are Two Enclosures and Two Doorways

These workspace requirements apply to PGE electrical equipment rooms that have two enclosures and two doorways.

- A minimum of 48 inches is required between enclosures when the equipment in the enclosures is 600 volts or less to ground.
- A minimum of 48 inches is required between the front of the enclosure and the closest doorway opening when the equipment in the enclosure is 600 volts or less to ground. See Figure 5-9.
- A minimum of 36 inches is required for the doorway width.

![Figure 5-9: Workspace When There Are Two Enclosures and Two Doorways](image-url)
5.3.2 Workspace Entrance Requirements

These workspace entrance requirements apply to all PGE electrical equipment rooms.

- At least one entrance of sufficient size—and with a continuous and unobstructed exit—is required to provide access to workspace around the electrical equipment.

- For equipment rated 1200 amps or more that contains overcurrent devices, switching devices, or control devices, there must be one entrance to the required workspace not less than 36 inches wide and 78 inches high at each end of the workspace. Where the entrance has a personnel door (or doors), the door(s) must open in the direction of egress and be equipped with panic bars, pressure plates, or other devices that are normally latched but open under simple pressure.

- A single entrance is permitted where the depth of the workspace is twice that required by NEC Table 110.26(A)(1) or PGE specifications—whichever is greater. It must be located so that the distance from the nearest edge of the entrance is not less than the minimum clear distance specified in Table 110.26(A)(1) or PGE specifications—whichever is greater—for equipment operating at that voltage and in that condition.
Electrical Room Checklist

Room Location and Access Door
- The electrical room must be on an outside wall.
- The door must open to the outside of the building.
- The door must have a key pad installed or be keyed for a PGE lock, or a door key must be provided and stored in a PGE-provided lockbox. Refer to Section 5.3.
- The door must be installed, open outward, and be equipped with a panic bar prior to receiving electric service. See Section 5.3.
- The door must be a minimum 36 inches wide by 78 inches high. Refer to Section 5.3.
- 36 inches of clear space in front, back, and to the sides of the access door.

Workspace
- 48 inches of clear space in front of electrical cabinets with door. Doors must not block egress.
- Minimum workspace of 78 inches high by 48 inches wide by 48 inches deep in front of meter equipment per PGE. Refer to Section 5.3.1.

Storage
- The electrical room must not be used for storage.

Electrical Panels, Switchgear, and CT Cabinets
- Review by PGE engineer, Service and Design Project Manager, and/or Meter Services.

Miscellaneous
- The electrical room must be illuminated. Refer to Section 5.3.
- At a minimum, the walls must be finished with dry wall and taped. See Section 5.3.
- Ensure that the switchgear and metering equipment are installed per the floodplain requirements of the local jurisdictions, if applicable. Refer to Section 5.1.
5.4 **Clearances from Pools and Spas**

5.4.1 **Overhead Clearances to a Pool and Diving Structure**

The clearance in any direction from the water level, edge of pool, base of diving platform, or anchored raft must not be less than 23 feet from TX, QX, or open supply lines. The clearance in any direction to a diving platform must not be less than 15 feet from TX, QX, or open supply lines.

5.4.2 **Underground Clearances**

Underground conductors must not be under or horizontally within 5 feet of the inside wall of an in-ground pool. See Section 6, *Underground Requirements* for trench depth, cover, and conduit requirements.

5.5 **Clearance from an Underground Fuel Storage Tank**

Underground service conduits must have a minimum of 10 feet of separation between the conduit run and the nearest point to a buried fuel storage of any construction (including metal or fiberglass).

5.6 **Oil-Filled Transformer Separation from a Structure**

Oil-filled electrical equipment must be located a certain distance from a combustible structure in order to comply with local requirements and national codes. The amount of separation depends on the flammability of both the insulating fluid and the nearby structure. Reductions in the minimum separation distance can be achieved by using a less-flammable dielectric fluid and/or fire barrier.

5.6.1 **Combustibility of Building Material**

The combustibility of a building is evaluated by looking at the building structure, or at the finish surface material applied to the inside or outside in combination with the structure.

*NFPA 1: Fire Code* defines two types of noncombustible material:

- One in which no part will ignite and burn when subjected to fire.
- One that has a structural base of noncombustible material as defined above, with a surfacing material not over 1/8 inch thick that has a flame-spread rating of 50 or less.

The only building that can be considered noncombustible are those whose structural members are steel (with fire coatings approved by local fire authorities), brick, or concrete with an outside surface having a flame-spread rating of 50 or less. All other designs require increased clearances between the structure and the oil-filled unit.
NOTE: The installation of metal, brick, or stone siding on a wall constructed of wood studs does not meet the definition of a noncombustible structure.

5.6.2 Location of a Transformer Next to a Building

Locate a transformer away from a building wherever possible. When it is not possible to locate a transformer away from a building, the minimum separation distances shown in Figure 5-10 and listed in Table 5-2 must be applied. The separation values provided in the table apply to both pad-mounted and submersible transformers.

![Figure 5-10: Minimum Separation of a Standard Transformer from a Building](image)

NOTE: Locate transformers a minimum of 5 feet and a maximum of 15 feet from a maintained drivable surface.

Table 5-2: Minimum Separation of a Standard Transformer from a Building

<table>
<thead>
<tr>
<th>Oil Capacity (gallons)</th>
<th>Noncombustible Structure $^1$ (S)</th>
<th>Combustible Structure $^2$ (Y)</th>
<th>To Any Opening in Structure $^3$ (W)</th>
<th>Vertical Distance $^4$ (Z)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–499</td>
<td>3</td>
<td>8</td>
<td>8</td>
<td>25</td>
</tr>
<tr>
<td>500–5000</td>
<td>25</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>5001 or more</td>
<td>50</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

1. Separation to the nearest component if the structure is noncombustible and there are no openings closer than 8 feet.
2. Separation to the nearest component (wall or overhang) if the structure is combustible.
3. Opening in structure does not include windows that are not designed to be opened.
4. Separation measured from the top of the pad to any barrier that is not a living space or workspace.
5.7 Separation of PGE Equipment from Other Oil-Filled Equipment

Wherever possible, locate a transformer away from other oil-filled equipment, such as electrical equipment and fuel storage tanks. Where it is not possible to locate a transformer away from oil-filled equipment, the minimum separation distances listed in Table 5-3 must be applied. The separation values in the table apply to both pad-mounted and submersible transformers.

### Table 5-3: Minimum Separation of a Standard Transformer from Other Oil-Filled Equipment

<table>
<thead>
<tr>
<th>Fluid Capacity of Either Container (gallons)</th>
<th>Horizontal Distance (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0–499</td>
<td>5</td>
</tr>
<tr>
<td>500–5000</td>
<td>25</td>
</tr>
<tr>
<td>5001 or more</td>
<td>50</td>
</tr>
</tbody>
</table>

1. Source: FM Global Property Loss Prevention Data Sheet 5-4

5.8 Location of a Less-Flammable Oil-Filled Transformer Next to a Building and Other Oil-Filled Equipment

Where it is not possible to attain adequate separation between a standard transformer and a combustible structure or other oil-filled equipment (as defined in Table 5-2 and Table 5-3), a transformer filled with high flash-point fluid may be installed. High flash-point fluid is an integral component of a less flammable-rated transformer according to FM Global. A less flammable-rated transformer may be installed with reduced separations to structures or other oil-filled equipment.

- Use the values shown in Table 5-4 for a less flammable-rated transformer located near a building.
- Use the values shown in Table 5-5 for a less flammable-rated transformer located near other oil-filled equipment.

### Table 5-4: Minimum Separation of a Less-Flammable-Rated Transformer from a Building

<table>
<thead>
<tr>
<th>Oil Capacity (gallons)</th>
<th>Minimum Separation (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Noncombustible Structure² (S)</td>
</tr>
<tr>
<td>All sizes</td>
<td>3</td>
</tr>
</tbody>
</table>

1. Source: FM Global Property Loss Prevention Data Sheet 5-4
2. Separation to the nearest component if the structure is noncombustible and there are no openings closer than 8 feet
3. Separation to the nearest component (wall or overhang) if the structure is combustible
5 Clearances

4. Opening in structure does not include windows that are not designed to be opened.
5. Separation measured from the top of the cabinet to any barrier that is not a living space or workspace. This separation is for working clearances only.

### Table 5-5: Minimum Separation of a Less-Flammable-Rated Transformer from Other Oil-Filled Equipment

<table>
<thead>
<tr>
<th>Fluid Capacity of Either Container</th>
<th>Horizontal Distance (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All sizes</td>
<td>3</td>
</tr>
</tbody>
</table>

1. Source: FM Global Property Loss Prevention Data Sheet 5-4. Other oil-filled equipment must contain similarly rated less-flammable fluids for the reduction in separation to apply; otherwise the distances in Table 5-3 must apply.

### 5.9 Working Clearances Around Pad-Mounted Electrical Equipment

The work performed by PGE line crews requires that a working clearance be maintained around electrical equipment. The minimum amount of clear space may vary on any side of pad-mounted or submersible electrical equipment. For example, the clear space required in front of doors or access panels is greater than the clear space on a non-opening side of an enclosure.

The working clearance requirements impose a clearance to any structure, such as a wall or a fire barrier, constructed close to the oil-filled equipment to reduce the separation distance from a combustible building. The clearance also applies to shrubs and trees.

The following working clearance requirements apply to all pad-mounted electrical equipment:

- Ten feet of horizontal separation is required in front of, and extending parallel to, the front of the enclosure, and any electrical equipment side that has a door or access panel.
- Three feet of horizontal separation is required on any non-opening side of electrical equipment.
- Twenty feet of vertical separation is required above the electrical equipment.

**Figure 5-11** shows the required separation for pad-mounted electrical equipment adjacent to a noncombustible structure. See **Figure 5-12** for the required separation for pad-mounted electrical equipment adjacent to a combustible structure.
Figure 5-11: Working Clearances Around Pad-Mounted Electrical Equipment Adjacent to a Noncombustible Structure
5.10 Working Clearances Around PGE Submersible Equipment

The following working clearance requirements apply to all submersible electrical equipment:

- Eight feet of horizontal separation is required in front of and on the sides of the enclosure lid.

  **NOTE:** The front of an enclosure lid is the side opposite the lid hinges.

- Three feet of horizontal separation is required behind the enclosure lid.

- Twenty feet of vertical separation is required above the electrical equipment.
Figure 5-13 shows the separation requirements for submersible electrical equipment.

**Figure 5-13: Working Clearances Around PGE Submersible Equipment**

5.11 Separation of Electrical Equipment and Meter from a Gas Meter Set

Figure 5-14 and Figure 5-15 show the separation requirements between electrical equipment and a meter and a gas meter set.

- The minimum distance between a gas meter, gas meter regulator, or gas meter flange and a meter is 3 feet.

The design of the gas meter set varies. Differences include:

- The regulator will not always be the farthest component in the gas meter set.
- The customer gas line may extend beyond the last component.
- The nearest gas component could be an outlet elbow or flange.
- The length of the gas meter set—dimension X in Figure 5-14—varies with the number of meters and associated equipment.
Figure 5-14: Separation of Electrical Equipment and a Meter from a Gas Meter Set

Figure 5-15: Separation of a Meter from a Gas Meter Regulator and Gas Meter Flange
5.12 **PGE Secondary Voltage Pedestal and Handhole**

A PGE pedestal and handhole must have three feet of horizontal separation from the gas meter set. Since these installations do not have switches inside the pedestal or handhole—and therefore are not a concern of the gas company—this separation is a PGE requirement for workspace only.

5.13 **Separation of PGE Electrical Equipment from a Liquefied Petroleum Gas Container**

Electrical equipment (such as a transformer, switch, vault, and pedestal) is considered to be a source of ignition and must be separated from a liquefied petroleum (LP) gas container. LP gas is also known as propane or butane.

The separation distance for an LP gas container is defined as the distance from the electrical equipment to either the pressure-relief valve on a portable container, or the filling connection(s) or vent valve(s) for a container filled on site from a bulk truck. See Figure 5-16.

The separation distances listed in Table 5-6 must be applied to installation of electrical equipment on customer property with an LP container.

![Figure 5-16: Minimum Distances from an Aboveground LP Storage Tank](image)
Table 5-6: Minimum Separation of a Less-Flammable-Rated Transformer from Other Oil-Filled Equipment

<table>
<thead>
<tr>
<th>Container Type</th>
<th>Tank Location</th>
<th>Container Size</th>
<th>Minimum Separation from Electrical Equipment in Any Direction (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>From Relief Valve of Container Not Filled On Site</td>
</tr>
<tr>
<td>DOT Aboveground</td>
<td></td>
<td>All sizes</td>
<td>5</td>
</tr>
<tr>
<td>ASME Belowground</td>
<td></td>
<td>0 to 2000</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2001 to 120,000</td>
<td>—</td>
</tr>
</tbody>
</table>

1. Source: FM Global Property Loss Prevention Data Sheet 5-4. Other oil-filled equipment must contain similarly rated less-flammable fluids for the reduction in separation to apply; otherwise the distances in Table 5-3 must apply.

2. U.S. Department of Transportation (DOT) rating.

3. Container sizes are rated in gallons-of- capacity (WC) in the U.S. Customary System.
Section 6

<table>
<thead>
<tr>
<th>Heading</th>
<th>Page</th>
</tr>
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<td>• Trenches Provided by the Customer</td>
<td>6-1</td>
</tr>
<tr>
<td>• Conduit</td>
<td>6-5</td>
</tr>
<tr>
<td>• Concrete Pads and Vaults for a Pad-Mounted Transformer</td>
<td>6-8</td>
</tr>
</tbody>
</table>
6 Underground Requirements

6.1 Basic Requirements

The Customer is responsible for the trenching, backfilling, compaction, conduit, transformer pads or vaults, and any other requirements to complete the construction for underground service. For a transformer installation, the Customer must provide space for the transformer on private property. For all trenching and transformer installations, the Customer must meet any requirements of governmental authorities—including excavation permits—and PGE.

All secondary services must be in conduit. To avoid damage to underground conductors and service equipment from soil settling, all service conduit riser elbows must be backfilled at least 4 inches deep with tamped, 3/4-inch minus crushed rock. Where a Customer’s service conduit riser extends vertically through a paved or concrete surface adjacent to the service entrance, a sleeve is required around the conduit to prevent direct contact of the conduit with the pavement.

Where exposed to motor vehicles, the Customer must install and maintain a PGE-approved barrier to protect a pad-mounted transformer and other equipment. For more information, see Section 6.4.6, Barrier Post.

In most cases PGE will install, maintain, and own the underground service lateral from the PGE distribution line or transformer in the Customer’s conduit to the point of delivery. For more information, see Section 6.3, Conduit.

6.2 Trenches Provided by the Customer

The Customer must be in compliance with the Occupational Safety and Health Administration (OSHA) rules and the Oregon Utility Coordinating Council (OUCC) standards. The location of the service entrance on the Customer’s premises is an important consideration to both the Customer and PGE.

Customer responsibilities include:

- Consulting PGE to determine the route and the point of attachment for underground service laterals, meter locations, service outlet locations, current transformers, and terminal cabinet enclosures. Routing conduit under buildings or other permanent obstructions is not permitted; exceptions may be allowed with approval from PGE if alternative routes are not available.

- Locating the service entrance to make the meter and service easily accessible from PGE distribution lines and convenient for the installation, operation, and maintenance of PGE meters and equipment.

- Obtaining a permit from the local jurisdiction before any work in the right of way is performed. Only PGE-approved excavation contractors and contractors who have made special arrangements with PGE will be allowed to work under a PGE permit. The contractor must notify the local jurisdiction 48 hours before the work is to begin. A copy of the permit must be on site.
• Placing spoil (excavated material) a minimum of 24 inches back from the edge of the trench as shown in Figure 6-1 and Figure 6-2. If this is not possible, shoring may be required to comply with OSHA standards. Spoil may be placed in the street upon approval from the local jurisdiction.

Figure 6-1: Service Cable Trench for Joint Use With Gas

1. Minimum cover may be more if the city has specific requirements.
2. Install a sufficient amount of red danger tape over the top of service conduits.
6.2.1 Call Before You Dig

State laws require that the Customer or excavator call for the locations of underground utility cables at least two full working days, or 48 hours, prior to excavation. The excavation must not be started until locations have been marked, or the utilities have informed the excavator that they have no facilities in the area.

**IMPORTANT**: Call 8-1-1 or 1-800-332-2344 before you dig. In the Portland metro area call 503-246-6699 or visit www.digsafelyoregon.com.

6.2.2 Trench Dimensions and Cable Separation

Trench designs must provide suitable protective earth cover and separation between PGE-energized cables and other joint trench utilities along the entire trench length. See Figure 6-1 and Figure 6-2 for trench depth and cable separation minimum requirements. Greater depths may be required by local jurisdictions.

Customer-owned water lines on private property are allowed in trenches adjacent to PGE-approved conduit. If PGE service is not directly buried, the customer’s water line must have a minimum one-foot vertical and two-foot horizontal clearance from PGE conductors.

**Figure 6-2: Service Cable Trench for Joint Use Without Gas**

1. Minimum cover may be more if the city has specific requirements.
2. Install a sufficient amount of red danger tape over the top of service conduits.
NOTE: For single-family and duplex residential subdivision, industrial, and commercial projects, finished grade must be established prior to trench excavation to ensure that minimum cover requirements for cables and conduits are attained. Minimum cover requirements for cables are measured from the trench surface to the top of the cable or conduit.

6.2.3 Select Backfill

When on-site backfill contains rocks larger than 4 inches or rocks with sharp corners, select backfill must be used. Select backfill must be placed a minimum of 4 inches below and 6 inches above the conduit or cable configuration.

Select backfill material is granular material that meets these standards:

- 100 percent of the material passes a 3/4-inch sieve.
- No more than 15 percent of the material passes a No. 200 mesh sieve.
- The material is reasonably free of organic and otherwise undesirable materials.

Backfill in the remainder of the trench must be free of rocks larger than 4 inches in diameter.

6.2.4 Mechanical Protection

For extreme, adverse ground conditions—such as solid rock formations or conflicts with other utilities—conduit may be installed at a minimum depth of 12 inches provided one of the following mechanical protection methods is used:

- Rigid steel.
- A layer of concrete directly above the conduit. This layer must be at least 2 inches thick and have a horizontal coverage of at least 6 inches beyond the end of the duct, high-density polyethylene (HDPE) duct, or PVC Schedule 40 duct.

6.2.5 Controlled Density Fill

Use a controlled density fill (CDF) where physical protection of the conduit system is necessary. CDF may be necessary for critical feeders or where the conduit system may be exposed to future excavation. CDF may also be used where the heat of the cable must be dispersed at a greater rate than the native soil backfill will allow. Install CDF 6 inches on all sides of the conduit.

CDF must have a maximum compressive strength between 200 and 500 psi in 28 days, have an allowable slump of 4 inches at the time of batching, and be dyed red.
6.2.6 Mitigating Potential Surface and Subgrade Water Flows

The Customer is responsible for recognizing and mitigating potential surface and subgrade water flows that may allow water to enter into the Customer’s electrical equipment. Measures taken may include a second junction box for water mitigation.

6.3 Conduit

All conduit routes must be approved by PGE prior to installation by the Customer; Customer-installed conduit must be inspected by PGE before backfill.

PGE will not install a conductor if the conduit system is improperly constructed. The Customer is responsible for repairing—or for the costs associated with repairing—any conduit problems prior to installation of a PGE conductor. PGE will own and maintain the conduit system once a PGE conductor has been installed.

The Customer must install either rigid steel or electrical-grade Schedule 40 gray PVC conduit. Sweeps of PVC, rigid steel, and fiberglass are acceptable. All PVC joints must be glued. All factory- or field-cut conduits must be chamfered to prevent damage to PGE cables.

If rock or other obstructions are encountered, consult PGE. When the conduit terminates at a PGE pole, consult PGE for exact conduit location. See Table 6-1 for conduit requirements for secondary voltage conductors.

Additional conduit requirements for secondary voltage conductors include:

- Four-inch conduit may be substituted for 3-inch conduit.
- Large conduit size, additional conduits, or a larger bend radius may be required for longer runs, four-wire full neutral, or direct connection to utility conduit. The Customer must consult PGE for specific requirements.
- Conduit spacers are required for any multiple-conduit installations where a horizontal configuration in the trench cannot be obtained. Contact PGE for approved conduit spacers.

HDPE duct may be used for horizontal directional boring applications. The duct must meet the requirements of PGE specification L22501 (available upon request of your PGE project manager).

For safety reasons, the duct must be black with three equally spaced extruded red stripes, which is a specification requirement. Aluminum couplings with barbed threads on both ends must be used to join HDPE duct sections, and straight couplings with barbed threads on one end and NPT on the other end must be used for connecting to PVC duct.
NOTE: The conduit requirements listed in Table 6-1 are for reference only. Requirements for a specific situation depend on the design and requirements of the service.

Table 6-1: Conduit Requirements for Secondary Voltage Conductors

<table>
<thead>
<tr>
<th>Service Entrance Ampacity</th>
<th>Single-Phase, Three Wire</th>
<th>Three-Phase, Four Wire&lt;sup&gt;1&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Conduit Size</td>
<td># of Conduits</td>
</tr>
<tr>
<td>200 A or lower</td>
<td>3-inch</td>
<td>1</td>
</tr>
<tr>
<td>320 A continuous</td>
<td>3-inch</td>
<td>1</td>
</tr>
<tr>
<td>400 to 600 A</td>
<td>3-inch</td>
<td>2</td>
</tr>
<tr>
<td>800 A</td>
<td>3-inch</td>
<td>3</td>
</tr>
<tr>
<td>1000 A</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>1200 A</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>1201 to 1300 A</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>1301 to 1500 A</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>1501 to 1600 A</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>1601 to 1800 A</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>1801 to 2000 A</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>2001 to 2100 A</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>2101 to 2300 A</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>2301 to 2500 A</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>2501 to 2700 A</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>2701 to 3000 A</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

1. Consult PGE for conduit sizes for all three-phase services. These values are provided for reference only and may not align with the actual requirements for a specific situation.
6.3.1 Customer-Owned Conductors

The Customer’s service conductors must be in a separate conduit system from PGE conductors.

6.3.2 Conduit Sweeps and Pull Lines

Bends must have a minimum 36-inch formed sweep radius for a 2- to 4-inch conduit, and a minimum 60-inch formed sweep radius for a 5- to 6-inch conduit.

IMPORTANT: All bends must be factory made. Field bends or field heat bends are not acceptable.

Rigid steel or PGE-approved fiberglass bends are required for runs of 151 feet or longer, or for any length run with more than 180 degrees in bends. PVC Schedule 40 bends are acceptable for runs of 150 feet or shorter. The maximum total number of bends in any conduit is 270 degrees.

Sweeps must be separated by a minimum 5-foot straight section. There must be a 3-foot minimum straight section from a vault. See Table 6-2 for fiberglass sweep specifications.

Where a Customer’s conduit extends to a PGE pole, the Customer must provide the sweep. Consult PGE for the exact location on the pole.

Cap all conduits at both ends during installation to keep them free of dirt and debris.

IMPORTANT: All conduits must have a 500 pound-rated nonconductive pull line with 6 feet of line extending from each end of the conduit.

A pull line must be installed after the conduit is joined and the glue is dry. When a new conduit and/or pull line will be entering an existing PGE secondary vault or transformer, the installer is required to contact PGE prior to installation. A PGE crew will be scheduled to meet the installer at the site to assist with the installation.

Additional sweep requirements include:

- Each sweep must have two extra-deep, fabricated PVC couplings.
- The sweep must meet NEMA TC14, *Reinforced Thermosetting Resin Conduit and Fittings*, for iron pipe size (IPS) design.

**Table 6-2: Fiberglass Sweep Specifications**

<table>
<thead>
<tr>
<th>Diameter (inches)</th>
<th>Sweep Radius (inches)</th>
<th>Minimum Wall Thickness (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2–4</td>
<td>36</td>
<td>0.095</td>
</tr>
<tr>
<td>5–6</td>
<td>60</td>
<td>0.110</td>
</tr>
</tbody>
</table>
6.3.3 Duct Proofing

*Duct proofing* is a process used to ensure that the duct is clear of obstructions and grit; it also ensures that no portion of the duct is collapsed or out of round. The Customer is responsible for duct proofing all ducts installed for PGE jobs before the job is completed and before the installation of PGE conductors.

To test for obstructions and out-of-round ducts, a wood test mandrel (or equivalent plastic and/or hard rubber mandrel) configured for the duct ID installed must be pulled through the ducts.

The Customer is responsible for furnishing the appropriate duct-proofing tool, such as a duct brush or steel or polyurethane duct checker.

6.3.4 Conduit Locations

During construction, the Customer must mark conduit locations with white paint or other marker, such as a plastic strip, per Oregon Administrative Rules (OAR) 952-001-0070.

6.4 Concrete Pads and Vaults for a Pad-Mounted Transformer

6.4.1 Pad

A precast concrete pad is required for a pad-mounted transformer. Consult PGE for transformer dimensions and installation requirements. Pads must be flush with the finished grade within 12 inches of a sidewalk or other paved area.

The Customer must install a 5/8-inch OD x 8-foot ground rod inside the transformer. (PGE will provide this ground rod.) The ground rod must be a maximum of 4 inches above final grade and a minimum of 4 inches on the field side of the primary source.

6.4.2 Vault

PGE requires a vault under a cable compartment. Consult PGE for transformer vault dimensions. The vault lid must be installed 2 inches above the finished grade in landscaped areas and flush with the finished grade within 12 inches of a sidewalk or other paved area.

6.4.3 Clearances

See Figure 5-13 in Section 5.10, *Working Clearances Around PGE Submersible Equipment* for the required clearances from a pad-mounted transformer.
6.4.4 Excavation and Backfill

Excavate the entire area beneath the pad or vault to a depth of 18 inches below final grade. All soil beneath the pad site must be compacted and level prior to setting or pouring the pad or vault to prevent settling. Backfill with compacted 3/4-inch minus gravel within 5 feet of the pad or vault.

6.4.5 Temporary Cover on All Openings

Where the Customer provides openings for PGE equipment, such as a pad-mounted transformer, the Customer must provide and install a temporary cover. The cover must be 3/4-inch marine grade or exterior grade plywood that is 6 inches larger than the opening and secured without damaging the concrete. PGE will remove the temporary cover during installation of the electrical equipment.

6.4.6 Barrier Post

Install a barrier post, or posts, around all electrical equipment (such as a transformer, switchgear, or sectionalizing cabinet) in areas where the equipment is exposed to vehicle traffic. The barrier post design and location must be approved by PGE.

Follow these requirements when installing a barrier post.

- Install a 6-inch diameter, Schedule 40 galvanized steel post filled with concrete on all sides of the equipment that are exposed to vehicles.
- The barrier posts must be no more than six feet apart. See Figure 6-3 for a top view of the barrier post locations around electrical equipment.
- Install the barrier post off-center of the equipment to allow the door to open.
- Do not install a barrier post closer than 4 feet to the front edge of the concrete pad or vault where the equipment door is located or will be located. See Figure 6-3 for barrier post locations, and see Table 6-3 for barrier post dimensions.
- Do not install a barrier post closer than 3 feet to the sides or back of the concrete pad or vault when the side or back of the equipment does not have a door. (See Figure 6-3.) If a smaller clearance is required, PGE approval is necessary.
- All concrete must have a minimum compressive strength of 3000 psi after 28 days, and be domed at the top of the steel post. The concrete must have a 2-inch dome above the final grade to prevent water pooling.
- Install the barrier post in undisturbed earth. However, the area between the vault wall and the barrier hole may be filled with 3/4-inch minus compacted gravel if three feet of undisturbed area is not available after the vault is set.
• Provide 3 inches of concrete below the bottom of the post.
• Use steel reinforcement when the barrier post is at a loading dock. Steel reinforcement must be 6 x 6 W2.9/2.9 welded wire fabric (WWF) placed around the outside of the galvanized steel post. Steel reinforcement is not required in an area that has only car traffic. See Figure 6-4.
• Overlap the welded wire fabric 6 inches and use a wire tie to secure the fabric.
• Paint all barrier posts safety yellow and apply two 3-inch-wide reflective bands near the top of all barrier posts. See Figure 6-4.
• Where a barrier post interferes with opening the equipment door or inhibits the workspace, a removable barrier post must be installed with prior approval of PGE.
• A barrier post must be installed prior to energizing the service.

Figure 6-3: Top View of Barrier Post Locations at a Pad-Mounted Installation
Underground Requirements

The dimensions shown for A and B in the table below refer to the drawing in Figure 6-4.

Table 6-3: Barrier Post Dimensions For Specific Locations

<table>
<thead>
<tr>
<th>Location</th>
<th>Location</th>
<th>Dimension (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Length of Galvanized Steel Post</td>
</tr>
<tr>
<td>Loading dock</td>
<td></td>
<td>108</td>
</tr>
<tr>
<td>Car traffic area</td>
<td></td>
<td>96</td>
</tr>
</tbody>
</table>

Figure 6-4: Barrier Post Dimensions
# Section 7

<table>
<thead>
<tr>
<th>Heading</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Requirements</td>
<td>7-1</td>
</tr>
<tr>
<td>Underground Service</td>
<td>7-2</td>
</tr>
<tr>
<td>Overhead Service</td>
<td>7-20</td>
</tr>
</tbody>
</table>
7 Single-Family Service

7.1 Basic Requirements

The location of the service entrance on the Customer’s premises is an important consideration. For clearance and location criteria, see Section 5.2, Meter Clearances and Location Criteria.

- Consult PGE to determine the point of attachment for overhead service drops, underground service laterals, and meter locations.
- Locate the service entrance and meter to make them more accessible from the PGE distribution line and convenient for the installation and maintenance of PGE meters.

The Customer will provide, install, and maintain all service equipment—including service entrance conductors for overhead service, conduit, enclosures, and meter sockets—to include rights of way and space for the installation and maintenance of PGE facilities. Follow these requirements:

- The Customer must not terminate the principal grounding conductor in the PGE sealed termination compartment.
- Customer wires installed in the meter socket must allow working space for the installation of PGE wires. Panel covers must be secured prior to inspection and energizing.
- See Section 6, Underground Requirements for underground and conduit requirements. For conduit requirements, see Table 6-1, Conduit Requirements for Secondary Voltage Conductors.
- The meter socket must not be used as a junction box.

7.1.1 Residential Sockets

A single-phase, direct-connect residential socket that has a maximum current capacity of 125, 200, or 400 (320 continuous) amperes and is approved by ANSI, UL, EUSERC, and PGE may be used.

NOTE: All single-phase, 400 amp (320 amp continuous) sockets must have an approved manual link bypass.

Code-calculated loads greater than 320 amperes require current transformer metering. Contact PGE for information and requirements. See Section 10, Commercial, Industrial, and Large Residential Services, 800 Amps or Lower.

NOTE: For a 200 amp service, a bypass meter socket is approved—but not required—for single-family residential services. Consider a bypass meter socket if interruption of power during routine meter service would be a problem in the residence.
7.2 Underground Service

For preparation of underground service, the Customer must obtain approval and specifications from PGE for the proposed installation.

The Customer is responsible for recognizing potential surface and subgrade water flow that may allow water to enter into the Customer’s electrical equipment. PGE will coordinate with the Customer to assist in preventing this water entry.

Customers who are adequately served by existing overhead distribution facilities, but want underground service, should contact PGE for details of its policy regarding a conversion. Special rules may apply in areas where local ordinances specify underground service.

PGE underground conductors will be installed as specified in Section 6.2, Trenches Provided by the Customer and Section 6.3, Conduit for underground service to residential premises. The Customer must furnish and install PGE-approved conduit.

The Customer is responsible for the cost of all trenches, conduits, vaults, excavation, backfill, and site restoration on the premises or within the confines of the subdivision to be served. This also includes costs for work outside the project to permit connection to PGE facilities.

PGE will install, own, and maintain the underground service lateral from its distribution line to the Customer’s point of delivery.

7.2.1 Underground Service Extension

Figure 7-1 shows a residential underground-approved combination meter socket for 100 and 200 amp maximum, single-phase service (EUSERC 301). The variable dimensions indicated in this figure are listed in Table 7-1.

Figure 7-2 shows a residential underground-approved meter socket for 200 amp maximum, single-phase service (EUSERC 301A). The variable dimensions indicated in this figure are listed in Table 7-1.

Figure 7-3 shows a residential underground approved meter socket for 400 amp maximum (320 amp continuous), single-phase service (EUSERC 302B).

Figure 7-4 shows a typical installation of an underground service extension to the house.

Figure 7-5 shows a PGE-installed standoff bracket on the pole.

Follow these basic construction requirements for all underground service extensions.

• The Customer is responsible for the trench, backfill, compaction, surface restoration, and conduit as required for service extensions.
• Hubs are not approved for use on the concentric knockout of underground socket enclosures. Approved bushings, box adapters, or other conductor protection are required for these enclosures.

• The service entrance riser must be in line with the left side of the entrance knockout. (See Figure 7-4.) For detailed clearance requirements, see Section 5, Clearances.

• Customer-owned conductors cannot enter or pass through the PGE compartment in the meter socket except in a 320-amp meter socket.

• A ringless meter socket is not approved.

• The Customer will provide and install a PGE-approved meter socket. The point of delivery for residential customers must be located on the front of the building or no more than 10 feet back from the front corner. The Customer must contact PGE to determine the exact location of the meter socket.

• For 320 amp service or lower, 3-inch PVC Schedule 40 electrical conduit, with up to 270 degrees of bends can be used. All bends must have a 36-inch long sweep radius (factory-made only). Field heat bends are not acceptable.

• When the conduit extends to a PGE pole or handhole, consult PGE for the exact conduit location. PGE will install a bracket on the pole or mark the location on the pole for the conduit. There must be a minimum 8 inches between the pole and the backside of the conduit. See Figure 7-5.

• Attach the electrical label or permit to the meter base.

• The meter socket and conduit must be rigidly attached to the structure; 2- x 4-inch back supports are required. The meter socket and conduit must be plumb when inspected. PGE will determine the exact location of the meter. See Figure 7-6.

• Sleeves around conduit are required when passing through a paved area adjacent to a building foundation. These will prevent ground settling from pulling the conduit down.

• The riser elbow must be backfilled with a minimum 4-inch depth of 3/4-inch minus crushed rock that is tamped to avoid soil settling.

• Use factory bends with no more than 90 degrees of total bend to obtain a minimum depth of 36 inches while keeping the conduit flush against the house.

• No bends are allowed in the conduit riser between the meter socket and the underground sweep. If local codes do not allow conduit in the foundation or footing, a surface-mounted meter must be installed. See Figure 7-6.

• See Figure 7-7 for the optional seismic footing design.
Figure 7-1: Residential Underground Approved Combination Meter Socket for 100 and 200 Amp Maximum Single-Phase Service (EUSERC 301)

The variable dimensions shown in the table below refer to the drawing in Figure 7-2.

Table 7-1: Dimensions for Residential Underground Approved Meter Sockets for 100 and 200 Amp Maximum Single-Phase Service

<table>
<thead>
<tr>
<th>Amps</th>
<th>Dimension (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td>125</td>
<td>6</td>
</tr>
<tr>
<td>225</td>
<td>8.5</td>
</tr>
</tbody>
</table>
Figure 7-2: Residential Underground Approved Meter Socket for 200 Amp Maximum Single-Phase Service (EUSERC 301A)
Figure 7-3: Residential Underground Approved Meter Socket for 400 Amp Maximum (320 Amp Continuous) Single-Phase Service (EUSERC 302B)
Figure 7-4: Underground Service Extension
7 Single-Family Service

7.2.1.1 Surface-Mount Installation

The Customer will furnish and install the following for a surface-mount installation:

- An underground-type meter socket enclosure
- Conduit
- Utility easement (when required)
- Long radius sweep

The following requirements apply to a surface-mount installation such as that shown in Figure 7-6. They are in addition to the basic requirements described in Section 7.1.

- No bends are allowed in the conduit riser between the meter socket and the underground sweep. If local codes do not allow conduit in the foundation or footing, a surface-mounted meter must be installed.
- On a brick or concrete block siding, use a 1/4–20 x 3.25 lead sleeve expansion bolt in joint in place of a lag screw on an anchor strap.
- The conduit riser must be in line with the left side of the entrance knockout.
- A 3 inch-to-2.5 inch smooth-wall swedge reducer installed as close as possible to the meter socket may be used for 2 x 4 framing.
- See Figure 7-7 for the optional seismic footing design.
Figure 7-6: Surface-Mount Installation

- Meter
- Back Support
- Strap
- Final Grade
- Sleeve
- Conduit

42 in. Min.
72 in. Max.
Figure 7-7: Seismic Footing Design
7.2.1.2 Flush-Mount Installation

The following requirements apply to a flush-mount installation such as that shown in Figure 7-8. They are in addition to the basic requirements described in Section 7.1.

- No bends are allowed in the conduit riser between the meter socket and the underground sweep. See Figure 7-8 for an installation with conduit in the foundation and footing.
- The conduit riser must be in line with the left side of the entrance knockout.

Figure 7-8: Flush-Mount Installation
7.2.1.3 Underground Conduit System for Long-Side Service

The following requirements apply to an underground conduit system for long-side service, such as that shown in Figure 7-9. They are in addition to the basic requirements described in Section 7.1.

- The customer is responsible for providing a continuous electrical conduit with pull string from the meter socket to the pedestal or handhole.
- Use a 500 pound-rated service pull string in the conduit.
- If the pedestal is energized, consult PGE before installing the conduit.

![Figure 7-9: Top View of an Underground Conduit System for Long-Side Service](image-url)
7.2.1.4 Swedge Reducer for Meter Base Applications

A 3 inch-to-2.5 inch smooth-wall swedge reducer—installed as close as possible to the meter socket—may be used for 2 x 4 framing. See Figure 7-10.

When a conduit extends to a PGE pole or handhole, consult PGE for the exact conduit location. PGE will install a bracket on the pole or mark the location on the pole for the conduit. AS shown in Figure 7-11, there must be a minimum 8 inches between the pole and the backside of the conduit.

Figure 7-10: Swedge Reducer

Figure 7-11: PGE-Installed Standoff Bracket
7.2.2 Secondary Splice Pedestal

These requirements apply when installing a secondary splice pedestal, such as the PF300 secondary splice pedestal shown in Figure 7-12. They are in addition to the basic requirements described in Section 7.1.

- Install the pedestal so that the ground level marker on the case is at the final grade.
- The pedestal must be installed level with the horizon.
- The latch on the lid must face toward the street.
- The lid must be secured with a five-sided Penta-head bolt.
- Use a minimum of 6 inches of 3/4-inch minus well-compacted crushed rock around and inside the base of the pedestal.
- The conduit stubs should be 2 inches minimum above the inside grade to prevent rocks and debris from falling into the conduit.
- Cover and mark conduits as follows:
  - S for source.
  - SVC for service.
  - ST for streetlight.
- Install 500-pound-rated pull string in the source conduit so that 6 feet of pull string extends beyond each end of the conduit.
- The source conduit must be on the field side of the pedestal.
- Elbows to be 36-inch radius.
- The Customer must install a 5/8-inch OD x 8-foot-long ground rod inside the secondary splice pedestal. (PGE will provide this ground rod.)

Install the ground rod as follows:
- Bury it a minimum of 7 feet, 9 inches deep.
- Make sure that the rod extends a minimum of 9 inches below the neutral bus behind the source conduit.
- Locate it as close to the back of the pedestal as possible.
Figure 7-12: PF300 Secondary Splice Pedestal
7.2.3 Secondary Handhole

The following requirements apply when installing a secondary handhole, such as the 17 x 30 x 18-inch deep secondary handhole shown in Figure 7-13. (This particular handhole has a 21.75- x 34.75-inch polymer cover marked ELECTRIC. This size may vary with the manufacturer.) These requirements are in addition to the basic requirements described in Section 7.1.

- Contact PGE for approved manufacturers of secondary handholes.
- Mark, cap, and install 500-pound-rated pull string so that 6 feet of additional pull string extends beyond each end of the conduit.
- The trench depth at the handhole location must be appropriate for the sweep being used. Cutting of sweeps is prohibited.
- Use a minimum of 6 inches of well-compacted 3/4-inch minus backfill under the splice box, and 6 inches around the outside base.
- All secondary vaults (1730) must be installed on property lines within the utility easement, and the handhole must be set 2 inches above final grade or on the highside of the slope. Handholes set on a sidewalk must be set to grade. Alternate locations must be approved by PGE and noted on the drawing.
- The cost for relocation or adjustment of a 1730 vault will be the responsibility of the builder or developer requesting the move. PGE approval of installation will be based on final grade and location criteria set by the developer and his or her agent.
- For permanent service, use 3-inch Schedule 40 or fiberglass, 90-degree elbows with a 36-inch radius. Install to the proper depth for the sweep being used.
- The Customer must install a 5/8-inch OD x 8-foot-long ground rod inside the handhole. (PGE will provide this ground rod.) Install the ground rod as follows:
  - Bury it a minimum of 7 feet, 9 inches deep.
  - Ensure that the rod extends a minimum of 3 inches above grade inside the handhole.
  - Locate it behind the feed conduit.
  - The lid must be installed with five-sided Penta-head bolts.
Figure 7-13: Secondary Handhole

- Penta-Head Bolts
- Final Grade
- Conduit Marker
- Property Line
- Elbow
- Ground Rod
- 3-inch Transformer Conduit
- Duct to Streetlight (as required)
- 5-foot Section of Straight Duct to Streetlight (as required)
- 3 in.
- 2 in. Max.
7.2.4 Post-Mounted, Freestanding Residential Meter Pedestal

The following requirements apply when installing a post-mounted, freestanding residential meter pedestal such as the one shown in Figure 7-14. They are in addition to the basic requirements described in Section 7.1.

- A minimum 6- x 6-inch pressure-treated wood post owned by the Customer must be installed. Firmly tamp the earth around the post; dome the earth to allow for settling. A railroad tie is **not** an acceptable alternative to the 6- x 6-inch pressure-treated wood post.

- Use a strap to secure the conduit to the post.

- PGE will determine the exact location of the meter.

- The post must be installed a minimum of 7 feet from the service post.

- An electrical label or permit must be displayed on the meter base.

- The Customer will furnish and install the following:
  - An underground-type meter socket
  - Hardware for the 6- x 6-inch post
  - Conduit with pull string
  - Utility easement
  - A trench
  - A 5/8-inch OD x 8-foot-long galvanized ground rod (PGE can provide this ground rod)
Figure 7-14: Post-Mounted, Freestanding Residential Meter Pedestal

- Meter
- Post
- 42 in. Min.
- 72 in. Max.
- 24 in. Min.
- Strap
- Final Grade
- Conduit to PGE
- Conduit to Customer
7 | Single-Family Service

7.3 Overhead Service

For Customers in an overhead service area, PGE will install an overhead service drop from the PGE distribution lines to the service entrance on the Customer’s residence, building, or structure. PGE will also install underground service in an overhead area. (See Section 7.2, Underground Service, for requirements.)

Consult PGE for location of the meter socket before rewiring the service. See Figure 5-2 in Section 5.2, Meter Clearances and Location Criteria for meter clearances for single-meter installations.

The Customer must provide a single attachment point within 2 feet of the weatherhead that can be reached with a single span of service drop cable from an adjacent PGE line. For service mounted on a customer-owned pole, locate the weatherhead within 2 feet of the top of the pole. The point of attachment must be high enough above the finished grade and in a proper position to provide minimum clearances as specified in Table 5-1, Minimum Clearances for Service Drops, 750 Volts and Lower Based on NESC C2-2012.

It is important to avoid overhang of a service drop above adjacent property, and to provide a service drop route without obstruction by buildings, trees, or other objects. Locate the point of attachment on the building wall that faces the nearest PGE line, or on a service mast capable of withstanding the tension of the service drop.

Extend and tie supports for service drops from and into the main structural members of the building. Extend the service mast through the roof on a typical single-story building unless adequate clearance exists at the gable end of the building. (See Figure 5-4 in Section 5.2.5, Residential Meter.) The service entrance riser conduit for overhead installations must be a minimum Schedule 40 PVC.

Use a rigid metal pipe clamp for the point of attachment for a service mast. For attachment to a building, use a 3/8-inch eyebolt connected to a significant structural member, such as a rafter or roof plate. For a single-story building, the attachment must not be below the downhill slope of the roof or the rain gutters. Attachment to a fascia board is not permitted.

If a Customer encounters a problem in meeting these clearances, PGE will provide assistance in determining specific requirements that will comply with the codes.

NOTE: For residential overhead services, the house siding must be installed prior to energizing the service.

Figure 7-15 shows a residential overhead approved meter socket for 100 amp, 200 amp (EUSERC 301 or 301A), and 400 amp (320 amp continuous) maximum, single-phase service (EUSERC 302B).

Figure 7-16 shows a residential overhead approved meter socket for 100 and 200 amp maximum, single-phase service.
**Figure 7-17** shows overhead service for surface- and flush-mounted metering.

![Diagram of overhead service with labeled sections: Cable Terminating Section, Distribution Section (optional locations)](ESR0027)

**Figure 7-15:** Residential Overhead Approved Meter Socket, 100, 200, and 400 Amps

![Diagram of overhead service with labeled sections: Cable Terminating Section, Distribution Section (optional locations)](ESR0028)

**Figure 7-16:** Residential Overhead Approved Meter Socket, 100 and 200 Amps
7.3.1 Surface- and Flush-Mount Installations

These requirements apply to surface- and flush-mount installations, such as the ones shown in Figure 7-17. They are in addition to the basic requirements described in Section 7.3.

• Allow 24-inch conductor leads for connection to the service drop.
• The guy must be 1/8-inch galvanized steel strand or larger.
• The service mast must be continuous rigid steel conduit and securely attached. See Table 7-2 for guy requirements by mast size and for maximum height without guys.
• Mount the service mast on the side nearest the distribution pole. See Section 5, Clearances, for clearance requirements between the roof and the service line.
• On a brick or concrete block siding use a 1/4–20 x 3.25 lead sleeve expansion bolt in the joint in place of a lag screw on an anchor strap.
• PGE will determine the exact location of the meter socket for new and rewire installations.
• The Customer is responsible for providing a minimum 4- by 4-foot level workspace in front of all metering equipment. PGE will assist in determining the location of metering equipment.
• An electrical label or permit must be displayed on the meter base.
• Conduit coupling must not be installed above the roof line.
• The maximum distance between the center of the service mast and the edge of the roof or outer edge of the gutter is 4 feet.
• On a flush-mount installation the building face must not extend beyond the face of the meter box.

Table 7-2: Guy Requirements by Mast Size

<table>
<thead>
<tr>
<th>Service Mast Rigid Steel Conduit Size</th>
<th>Service Size</th>
<th>Utility Service Length</th>
<th>Length of Unsupported Mast</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-inch</td>
<td>200 amps or less</td>
<td>Less than 100 feet</td>
<td>24 inches</td>
</tr>
<tr>
<td>3-inch</td>
<td>201 to 400 amps</td>
<td>Less than 80 feet</td>
<td></td>
</tr>
</tbody>
</table>
Figure 7-17: Overhead Service for Surface- and Flush-Mount Metering
7.3.2 Service Mast Guy and Anchor Requirements

These requirements apply to mast guys and anchors (see Figure 7-17 and Figure 7-18). They are in addition to the basic requirements described in Section 7.3.

- Use 1/4–20 bolts to secure the roof plate, which is fitted between the shingles, to the rafters.
- The roof plate must be installed so that the service alignment extension falls between the guys.
- When using anchor strap 1, a 3/8-inch eyebolt and washer with a header block between the rafters is acceptable. An eye lag is not acceptable.
- Anchor strap 1 and anchor strap 2 must accommodate a 2-3/8-inch diameter service mast.
- Anchor strap 1 is made from 3/16- x 1-inch galvanized steel.
- Anchor strap 2 is made from two 2 x 4 studs, 3/16- x 1-inch galvanized steel, and two 1/4–20 x 3 lag screws or 1/4–20 bolts.
- Anchor strap 1 and anchor strap 2 each has a set screw.
- The maximum distance between the push brace and the weatherhead is 18 inches.
- When using a push brace, two braces are required.
Figure 7-18: Service Mast Guys and Anchors
## Section 8

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<tr>
<th>Heading</th>
<th>Page</th>
</tr>
</thead>
<tbody>
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<td>Underground Service</td>
<td>8-4</td>
</tr>
<tr>
<td>Service Terminating Arrangements</td>
<td>8-4</td>
</tr>
<tr>
<td>Overhead Service</td>
<td>8-7</td>
</tr>
</tbody>
</table>
8 Multiple-Family Service

8.1 Basic Requirements

These requirements apply to a multiple-family service.

• An electrical label or permit must be displayed on the meter socket.
• The Customer must provide a conduit with pull string.
• The conduit must be rigidly attached to the building and be straight and vertical to the sweep in the trench.
• The Customer is responsible for providing a minimum 4-x-4-foot level workspace in front of all PGE electrical equipment.
• The Customer is responsible for recognizing potential surface and subgrade water flows that may create an entry of water into the Customer’s electrical equipment. PGE will work with the Customer to assist in preventing this entry of water.
• The service conduit riser must be backfilled at least four inches deep with 3/4-inch minus crushed rock that is tamped to avoid soil settling.
• Before power is connected, each meter on a structure with multiple service must have a permanently engraved metal or hard plastic label with letters at least 3/8-inch high to identify each customer service address. Consult PGE for further label requirements. See Figure 8-1.

![Figure 8-1: Meter Label With Service Address](image)

NOTE: It is the Customer’s responsibility to ensure that each meter socket is correctly labeled. PGE may check the meter installations to verify that they are correctly labeled, and charge the Customer a fee when a meter socket is incorrectly labeled. See PGE Schedule 300 and Tariff Rule M, Section 1.D.

• The house meter must be the safety-socket type. Where the meter serves lighting only, a bypass or safety socket is not required. See Figure 8-2.
Figure 8-2: Meter Socket Installation for Underground and Overhead Multiple-Family Services
8.2 Grouping Service Entrances

PGE requires grouping of service entrances at a common point for multiple-family units such as duplexes, apartments, or accessory dwelling units (ADUs). See Figure 8-3.

8.2.1 Six-Disconnect Rule

PGE requires a main disconnect in front of all meter banks that contain more than six meters. The main disconnect must be in the same location as the meter bank. See Figure 8-2.
8.3 *Underground Service*

Follow the basic, locational, Electric Utility Service Equipment Requirement Committee (EUSERC), and National Electrical Code (NEC) requirements for underground multiple-family service.

For additional information, see Section 5, *Clearances*, and Section 6, *Underground Requirements*.

8.3.1 *Locational Requirements*

The following requirements apply to underground service:

- PGE will determine the exact location of the meters.
- The center of the lowest meter in a bank of meters must be a minimum of 36 inches from final grade. The highest meter in a bank of meters must be a maximum of 78 inches from the final grade. See Figure 8-3.
- A minimum 3-inch spacer is required between the disconnect or pull section and the meter socket panel. See Figure 8-2.

8.3.2 *EUSERC Requirements*

The following EUSERC requirements apply to underground service:

- The cable pulling section must be sized for PGE service termination ampacity per EUSERC 343 and must have bus extension drilled for landing lugs.
- When cross-busing is installed below or behind a termination position, EUSERC 347 requires that cross-busing be fully insulated or a barrier must be installed.
- Refer to EUSERC 353 for minimum and maximum dimensions to meet spacing and stacking requirements.

8.4 *Service Terminating Arrangements*

Figure 8-4 shows typical service terminating arrangements when there is a two-meter socket module that is rated 0 to 200 amps.

Figure 8-5 shows typical service terminating arrangements when there is a three- to six-meter socket module that is rated 201 to 600 amps.

Refer to Table 8-1 for the dimensions of the terminating section for meter socket modules rated 0 to 600 amps per EUSERC 342.
Figure 8-4: Service Terminating Arrangements for Two Meters Rated 0 to 200 Amps
(EUSERC 342)
Figure 8-5: Service Terminating Arrangements for Three to Six Meters Rated 201 to 600 Amps

Table 8-1: Dimensions of Terminating Section for Meter Socket Modules (EUSERC 342)

<table>
<thead>
<tr>
<th>Equipment Rating (amps)</th>
<th>Minimum Dimension (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>W</td>
</tr>
<tr>
<td>0 to 200</td>
<td>6.5</td>
</tr>
<tr>
<td>201 to 600</td>
<td>10.5</td>
</tr>
<tr>
<td>601 to 800</td>
<td></td>
</tr>
</tbody>
</table>
8.5 *Overhead Service*

The Customer is responsible for bringing service entrance conductors from the service head to the PGE point of attachment. PGE will not extend conductors from the point of attachment to individual service heads. It is the Customer’s responsibility to obtain the necessary permits from the electrical code enforcing authority that has jurisdiction.
# Section 9

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<thead>
<tr>
<th>Heading</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underground Service</td>
<td>9-1</td>
</tr>
<tr>
<td>Overhead Service</td>
<td>9-5</td>
</tr>
</tbody>
</table>
9 Manufactured and Mobile Home Services

9.1 Underground Service

Refer to Section 6, Underground Requirements and Section 7, Single-Family Service for requirements that pertain to installation of underground secondary service.

9.1.1 Manufactured Home

Underground service to a manufactured home will be provided under the same requirements as single-family service if the home is site-specific, occupies a private lot, and has a permanent foundation as determined by the local jurisdiction. For more information, see the meter height and position requirements in Section 5.2, Meter Clearances and Location Criteria.

The location of a factory-installed meter socket must be approved by PGE before manufacture of the home. When the meter socket is improperly located, the Customer is responsible for all modifications to relocate or locate the meter to PGE requirements.

9.1.2 Mobile Home

For underground service to a mobile home, locate the Customer’s service entrance on an approved pedestal or mounted on a wood post.

9.1.2.1 Underground Pedestal Installation Service

The location of the pedestal is specified by PGE. Other applications for the pedestal must be approved by PGE.

The wood post must measure at least 6- x 6 inches and be pressure- or thermally treated by the manufacturer with an approved American Wood Preservative Association standardized preservative. The use of railroad ties is not acceptable.

The Customer must furnish, install, and maintain the pedestal or wood post. The Customer must also furnish and install an underground-type meter socket enclosure, a 6- x 6-inch pressure- or thermally treated post and hardware, a conduit with pull string, a utility easement, and a trench. See Figure 9-1 and Figure 9-2.

Keep the bottom of the enclosure containing the service equipment a minimum of 24 inches above the finished grade. For a meter that is subject to physical damage, the Customer must install and maintain a barrier post or other suitable protection approved by PGE. See Section 6.4.6, Barrier Post for requirements.
A permanent label on the meter socket enclosure with the space number is required in a mobile home park.

After approval, PGE will provide service to the meter pedestal compartment for a permanent mobile home. Each mobile home must have a separate pedestal compartment approved by PGE for termination of the PGE service lateral.

 Locate PGE conductor trenches and conduits in mobile home parks away from—never underneath—the pad, foundation, or area provided for the manufactured home.

Follow these requirements for underground pedestal installation service to a mobile home. See Figure 9-1.

- Provide additional corrosion-resistant protection to the bottom of the pedestal that contacts the soil. Use electroplate galvanizing under the paint or use a paint with coal tar coating.
- Install the pedestal a minimum of 7 feet from the service pole.
- Locate the bottom of the pedestal 18 to 24 inches below final grade.
- Locate the pedestal so that the front door to PGE connections remains accessible.
- Locate the center of the meter a minimum 42 inches above final grade and a maximum 72 inches above final grade.
- Display the electrical label or permit on the meter socket.
- Locate the bottom of the access door a minimum of 6 inches above final grade.
- Ensure that the metal seal that PGE uses to secure the access door to PGE connections remains accessible.
- Maintain a clearance of at least 6 inches between the final grade and the bottom of the access door to PGE connections. The access door must have a sealable provision for PGE.
- Drive two 0.125- x 1- x 1-inch steel angles into the ground on each side of the pedestal. Attach the steel angles to the side of the pedestal using 1/4-inch or larger bolts.
- Do not install the Customer’s conduit across the front of the PGE access door on a pedestal.
- Use a corrosion inhibitor on all aluminum connections.
Figure 9-1: Underground Pedestal Installation Service for a Mobile Home (EUSERC 307)
9.1.2.2 Underground Post-Mounted Installation Service

Follow these requirements for underground post-mounted installation service to a mobile home. See Figure 9-2.

- Install a minimum 6- x 6-inch pressure-treated wood post that is owned by the Customer. Firmly tamp the earth around the post; mound the earth around the post to accommodate settling.
- An electrical label or permit must be displayed on the meter socket.
- Use a strap to secure the conduit to the post.
- PGE will determine the exact location of the meter.
- The post is to be installed a minimum of 7 feet from the service pole.
- Maintain a 24-inch minimum between the bottom of the meter enclosure and the final grade.
- See Section 6.2, Trenches Provided by the Customer for trench requirement details.

---

Figure 9-2: Underground Post-Mounted Service for a Mobile Home
9.2 Overhead Service

PGE will supply new overhead service to any building or premises that is not in an area designated by the local governmental jurisdiction and/or PGE as an underground district restricted to underground service.

9.2.1 Manufactured Home

PGE will provide overhead service to a manufactured home using the same requirements as a residential occupancy provided in Section 7, Single-Family Service. The Customer must make provisions for meter height and placement as described in Section 5.2, Meter Clearances and Location Criteria.

The location of the factory-installed meter socket must be approved by PGE before manufacture of the home. When the meter socket is improperly located, the Customer is responsible for all modifications to relocate or locate the meter to PGE requirements.

9.2.2 Mobile Home

The Customer must install the meter socket and service equipment on a wood pole. The pole must be pressure-treated or thermally treated by the manufacturer with an American Wood Preservative Association standardized preservative. PGE will not energize the service if the Customer-provided service pole is not safe to climb.

The pole height must provide all required clearances for the PGE service drop and any telephone, cable, or other attachments. For more information, see Section 5, Clearances.

Follow these requirements for overhead service to a mobile home with a Customer underground service lateral, and for overhead service to a mobile home with a Customer overhead service drop. See Figure 9-3 and Figure 9-4.

- The Customer is to provide and install a new PGE-approved pole that has a minimum length of 20 feet and a minimum diameter of 5.5 inches at the top. The pole must be pressure-treated or thermally treated by the manufacturer, and set a minimum of 5 feet below the level of the ground with gravel backfill. A 6- x 6-inch treated square post is an option.
- If the service drop crosses a road or traffic area, the pole must have a minimum length of 24 feet, a minimum diameter of 5.5 inches at the top, and set a minimum of 5 feet below the level of the ground with gravel backfill.
- A pole longer than 24 feet must be set more than 5 feet below the level of the ground. Consult PGE for proper depth.
- An electrical label or permit must be displayed on the meter socket.
• The Customer must provide a 3/8-inch eyebolt where the service attaches to the pole.

• The Customer is to provide the drip loop and a minimum 5/16-inch galvanized steel cable down guy and anchor. The guy attachment is to be at the height of the weatherhead.

• Allow 24 inches of cable to create the drip loop.

• A longer pole may be required to accommodate overhead communication lines. Contact the telephone utility and the cable company for their required clearances.

• PGE will determine the exact location of the meter.

Follow this additional requirement for overhead service to a mobile home with a Customer overhead service drop.

• Install the pole a minimum of 7 feet from the service pole.
Figure 9-3: Overhead Service to a Mobile Home With a Customer Underground Service Lateral

See Section 5 for Clearances

See Table 5-1 for Service Drop Clearances

PGE Responsibility → Customer Responsibility

Galvanized Steel Cable

Eyebolt

Conduit With Strap

Meter Socket

Conduit

Down Guy Attachment

Anchor

42 in. Min.
72 in. Max.

60 in. Min.
12 in. Max.

2
1

ESR0033
Figure 9-4: Overhead Service to a Mobile Home With a Customer Overhead Service Drop
Section 10

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<td>Termination Compartment Requirements</td>
<td>10-6</td>
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<td>Customer’s Responsibility for Maintaining Switchgear</td>
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<tr>
<td>Commercial Service 0 to 800 Amps</td>
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<tr>
<td>Current Transformer Metering, 800 Amps Maximum</td>
<td>10-18</td>
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</tbody>
</table>
Commercial, Industrial, and Large Residential Services,
800 Amps or Lower
10 Commercial, Industrial, and Large Residential Services, 800 Amps or Lower

This section provides the PGE requirements for commercial, industrial, and large residential services up to 800 amps and lower than 600 volts, including single-phase and three-phase services for self-contained and current transformer (CT) meters. Consult PGE Meter Services for requirements and equipment for services higher than 600 volts.

10.1 Basic Requirements

All commercial, industrial, and large residential Customers must coordinate their service requirements with PGE. They must provide factory-produced submittal drawings of switchgear before purchase and installation of equipment.

Single-residential services over 320 amp continuous and all three-phase residential services are considered large residential services. Residential meters must meet the meter clearances and location criteria covered in Section 5.2, Meter Clearances and Location Criteria.

Single-phase services over 320 amps continuous, and three-phase services over 200 amps, require CT metering except as referenced in Section 10.3.

10.2 Meter Location

Meters must comply with accessibility and location requirements in Section 5, Clearances. For commercial and residential meters located outdoors, the ground in front of the meter(s) must be a minimum 4- x 4-foot level area.

Where the permanent final grade (or the final platform landing) cannot be provided in front of the meter(s) or service termination equipment at the time of connection, the Customer must supply and install a temporary minimum 4- x 4-foot platform of sufficient strength to support PGE personnel. Steps to the platform must be provided as needed.

Where meter equipment is installed in a location subject to vehicle traffic, the Customer is required to install and maintain a PGE-approved barrier post. (See Figure 6-4, Barrier Post Dimensions.) Meter sockets, terminal cabinets, current transformer cabinets, and transformers should be located away from landscape irrigation sprinklers.

Doors to a meter or termination equipment room must open outward and be equipped with a panic bar. A PGE lockbox must be installed near the door. For more information, see Section 5.3, PGE Electrical Equipment Room.

Before power is connected, each meter on a structure with multiple service must have a permanently engraved metal or hard plastic label that identifies the Customer service address in letters at least 3/8-inch high (as shown in Figure 10-1).
All 480 volt service must be permanently and visibly labeled as such. PGE requires a red label with white lettering that reads: SINGLE-PHASE 480V. Place the label in an easy-to-see location for safety. Consult PGE for further label requirements.

NOTE: It is the Customer’s responsibility to ensure that each meter socket is correctly labeled. PGE may check the meter installations to verify that they are correctly labeled, and charge the Customer a fee when a meter socket is incorrectly labeled. See PGE Schedule 300 and Tariff Rule M, Section 1.D.

### 10.3 Direct-Connect Meter

PGE requires a direct-connect (self-contained), socket-type meter when the ampacity of a single-phase service entrance is 400 amps maximum (320 amps continuous) or lower, or when the ampacity of a three-phase service is 200 amps continuous or lower. See Table 10-1 for direct-connect meter socket requirements.

**Figure 10-2** shows direct-connect meter sockets for single-phase service. See **Figure 10-3** for direct-connect meter sockets for three-phase service.

NOTE: With prior permission from PGE, an adjustable-speed drive (ASD) controller may be served with single-phase service using a direct-connect, safety-socket meter socket rated 200 amps or lower, 120/240 volt or 240/480 volt. Contact PGE for further information.

NOTE: A three-phase main breaker is required for a 120/208 volt, single-phase service.
### Table 10-1: Direct-Connect Meter Socket Requirements

<table>
<thead>
<tr>
<th>Type of Service</th>
<th>Socket Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>120/240 volt, single-phase, three-wire</td>
<td>4-jaw</td>
</tr>
<tr>
<td>120/208 volt, single-phase, three-wire (Contact PGE for info)</td>
<td>5-jaw</td>
</tr>
<tr>
<td>208/120 volt, three-phase, 4-wire</td>
<td>7-jaw</td>
</tr>
<tr>
<td>480/277 volt, three-phase, 4-wire</td>
<td></td>
</tr>
<tr>
<td>240/120 volt, three-phase, 4-wire or 480/240 volt, three-phase, 4-wire</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 10-2: Direct-Connect Meter Sockets, Single-Phase, Three-Wire Service**
10.3.1 Direct-Connect Meter Safety Socket

Prior to installing a direct-connect meter safety socket, contact PGE. PGE accepts a 320-amp, 120/240-volt manual link bypass meter base for nonresidential use. See Figure 10-4.

NOTE: 120 volt service is no longer offered.

Follow these requirements when installing a direct-connect meter safety socket.

- Wires installed in the meter base by the Customer must have clear space for PGE to install conductors.
- The EUSERC safety socket with a test link bypass is required for all 120/240 volt services rated 100 and 200 amps, and for 480 volt services rated up to and including 200 amps.
- A manual link bypass is required for all 120/240 volt, single-phase services with a nominal rating of 400 amps (320 amps continuous).
- No safety socket is required for service equipment rated 200 amps or lower for the following uses:
  - Temporary construction
  - Residential pumps, gates, outdoor lighting, barns, and outbuildings.

Contact PGE for clarification.
Figure 10-4: Commercial and Large Residential Single-Phase, Direct-Connect Meter Safety Sockets

- 100 A, 120/240 V Single-Phase (EUSERC 304)
- 200 A, 120/240V Single-Phase (EUSERC 305)
- All 480 V, 100 A, and 200 A
- 5-terminal Safety Socket
- 120/208 V Single-Phase
- 320 A 120/240 V Manual Link Bypass
- Manual Bypass Stud
- Reserved for PGE Conductors
10.4 Termination Compartment Requirements

Locate and make accessible all compartments for termination of PGE service laterals as close as possible to where the conductors enter the building on an entry level or main floor. When connecting two or more sets of service equipment to a single-service lateral, the Customer must provide a sealable terminal box complete with terminating positions.

The Customer must also provide an approved method in which to make multiple taps. Do not install Customer-owned devices such as limiters or fuses in terminal boxes.

The Customer must not terminate the principal grounding conductor in the PGE sealed termination compartment.

The termination compartment for PGE conductors must meet EUSERC 342 requirements. Refer to Table 8-1, Dimensions of Terminating Section for Meter Socket Modules, EUSERC 342 or see EUSERC 343 in Figure 10-5.

Follow these requirements when installing a pull box with terminating facilities.

- Refer to Table 10-2 for the minimum dimensions for pull boxes with terminating facilities (EUSERC 343). This applies only to the PGE portion of the pull box.
- The cable-pulling section must be sized for PGE service termination in EUSERC 342 and 343 and must have bus extension drilled for landing lugs. NEC requires a main disconnect when more than six services are connected. (See Section 1.15, Six-Disconnect Rule.) When the sum of distribution section ampacities exceeds the pulling section ampacities, the Customer will be responsible for providing NEC-approved load calculations.
- The termination compartment for a large residential (0 to 800 amps) modular metering section must meet size requirements shown in Table 8-1.
  NOTE: PGE will not terminate directly on the customer breaker.
- See Figure 5-3 for meter clearances for multiple-meter installations.
- If a cross bus is installed below or behind a terminating position, the cross bus must be fully insulated and barricaded.
- Bus stubs shall be anchored to prevent turning.
- Customer service entrance conductors must exit above the lugs.
- Cable entry through the back of the cabinet generally does not meet PGE requirements due to minimum cable bend radius.
Figure 10-5: Pull Box With Terminating Facilities, 0 to 600 Volts, 0 to 1200 Amps (EUSERC 343 and 347)
10.5 Customer’s Responsibility for Maintaining Switchgear

The Customer is responsible for the proper installation and periodic maintenance of Customer-owned switchgear including overcurrent devices, cable and bus connections and terminations, and all other electrical equipment.

Ensuring that bolted connections have a long service life requires that there be a clean contact surface and proper clamping pressure between the terminal lug and the terminal pad. Use of a torque wrench will result in more consistent clamping forces on bolted connections. PGE recommends that bolted connections be torqued to the values in Table 10-3.

Table 10-3: Maximum Torque Values for Bolted Connections

<table>
<thead>
<tr>
<th>Bolt Size</th>
<th>Aluminum (ft·lb)</th>
<th>Everdur (ft·lb)</th>
<th>Stainless Steel (ft·lb)</th>
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<tbody>
<tr>
<td>3/8–16</td>
<td>12</td>
<td>18</td>
<td>20</td>
</tr>
<tr>
<td>1/2–13</td>
<td>25</td>
<td>40</td>
<td>45</td>
</tr>
</tbody>
</table>

Note: For set screw connections torque to manufacturer recommendations.
10.6 Commercial Service, 0 to 800 Amps

Follow these basic requirements for commercial services of 0 to 800 amps.

- NEC requires a main disconnect when more than six services are connected. (See Section 1.15, Six-Disconnect Rule for more information.) When the sum of distribution section ampacity ratings exceeds the pulling section ampacity ratings, the Customer will be responsible for providing NEC-approved load calculations.

- Meters and equipment must be accessible during normal working hours for meter reading and testing. When a lockbox is needed, it must be installed outside the meter room.

- Each multiple-meter service must have a permanently engraved metal or hard plastic label with letters at least 3/8-inch high to identify the customer’s service address before power is connected. See Figure 10-1.

- If a cross bus is installed below or behind a terminating position, the cross bus must be fully insulated and barricaded (EUSERC 347).

10.6.1 Commercial Pedestal, 0 to 200 Amps

See Figure 10-6 for a commercial pedestal, 0 to 200 amps. For minimum pedestal dimensions, see Table 10-4.

Follow these additional requirements when installing a commercial pedestal, 0 to 200 amps.

- Consult PGE for pad requirements.
- The barrier between the meter section and the pull section shall extend to the edge of the test block barrier.
- See EUSERC 308 for additional requirements.

Table 10-4: Minimum Dimensions for Pedestals

<table>
<thead>
<tr>
<th>Service</th>
<th>A (inch)</th>
<th>W (inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-phase</td>
<td>10</td>
<td>10.5</td>
</tr>
<tr>
<td>Three-phase</td>
<td>10</td>
<td>12.5</td>
</tr>
</tbody>
</table>
Figure 10-6: Commercial Pedestal, 0 to 200 Amps (EUSERC 308)
10.6.2 Commercial Three-Phase, Direct-Connect Meter Safety Socket

Figure 10-7 shows a 100-amp commercial, three-phase pedestal (EUSERC 304). See Figure 10-8 for a 200-amp commercial, three-phase pedestal (EUSERC 305).

Follow these additional requirements when installing a commercial three-phase, direct-connect meter safety socket.

• The socket must be a EUSERC-approved safety socket with test blocks that maintain service to the customer while the meter is removed for testing or inspection.
• A three-phase, 320-amp, direct-connect meter socket is not approved for commercial use.
• For a four-wire delta service, the high-leg (wild) terminal must be located on the right side of the test blocks, and identified by an orange mark. The test block must be factory marked and readily identified.
Figure 10-8: 200-Amp Commercial, Three-Phase, Direct-Connect Meter Safety Socket (EUSERC 305)
10.6.3 Commercial Ganged Meter Sockets

Follow this additional requirement when installing commercial ganged meter sockets, such as the one shown in Figure 10-9.

- PGE terminates service conductors in the cable pulling section on bus extensions only, not on the Customer’s disconnect. Cable entry through the back of the pulling section is not allowed. The cable pulling section must be sized for PGE service termination (EUSERC 343) and must have bus extension drilled for landing lugs.

![Figure 10-9: Commercial Ganged Meter Sockets](ESR0042)
10.6.4 Commercial Module Meter Sockets

Figure 10-10 shows a commercial module meter socket installation (EUSERC 304, 305, and 347). See Figure 10-11 for a typical double-stacked module meter socket installation.

Follow this additional requirement when installing commercial ganged meter sockets.

- A minimum 3-inch spacer is required between the pull section and the meter socket panel.

Figure 10-10: Commercial Module Meter Sockets (EUSERC 304, 305, and 347)
Figure 10-11: Typical Double-Stacked Module Meter Sockets
10.6.5 Combination Current Transformer/Direct-Connect, Wall-Mount Metering

Figure 10-12 shows a combination current transformer (CT)/direct-connect, wall-mount metering, 0 to 800 amps. See Figure 10-13 for the EUSERC identification for this equipment.

Follow these requirements when installing a combination CT/direct-connect, wall-mount metering.

- Bonding jumpers must be used around knockouts.
- The pull section must be rated at the sum of the service maximum ampacity.
- For services larger than 800 amps, see Section 11, Commercial, Industrial, and Large Residential Services, 801 Amps or Higher.

Figure 10-12: Combination Current Transformer/Direct-Connect, Wall-Mount Metering, 0 to 800 Amps
Figure 10-13: EUSERC Identifications for Combination Current Transformer/Direct-Connect, Wall-Mount Metering, 0 to 800 Amps
10.7 Current Transformer Metering, 800 Amps Maximum

Current transformer (CT) metering is required when a three-phase service exceeds 200 amps, or when a single-phase 120/240 volt service exceeds 400 amps (320 amps continuous). For services over 800 amps, see Section 11, Commercial, Industrial, and Large Residential Services, 801 Amps or Higher. PGE prefers switchgear metering, but it is not required for services of 800 amps or lower.

The CT cabinet and meter must be mounted outside the building as described in Section 5.2, Meter Clearances and Location Criteria.

The Customer will provide and install:

- The weathertight NEMA 3R-rated metallic CT cabinet securely mounted on a rigid surface. The doors are to be hinged and capable of being sealed. (See Section 10.7.4.) For installations where both the line and load sides are coming in and going out underground or overhead, the cabinet shall be a minimum 48-inches wide x 48-inches high x 11-inches deep.
- EUSERC-approved CT mounting bases rated 50,000 amperes fault duty. Fault currents over 50,000 amperes must have switchgear metering. Contact PGE for maximum available fault current.
- The conduit between the socket enclosure and the CT mounting base.
- The remote socket enclosure, drilled and tapped for a PGE test switch.
- A 6-inch diameter barrier post, which is required where metering equipment is installed in vehicle traffic area. For more information, see Figure 6-5, Figure 6-6, and Table 6-3 in Section 6.4.6, Barrier Post.
- The CT cabinet and meter socket, which must be mounted plumb in both directions.

PGE will own, provide, and install:

- The meter and test switch, with their associated wiring.
- Line-side service conductors on the CT mounting base and connectors for PGE-owned conductors (for underground services only).

Consult PGE for current transformer installation specifications.

NOTE: To prevent water drainage into the customer’s equipment, PGE equipment, transformers, and vaults must not be located higher than the CT cabinet.
10.7.1 Current Transformer Metering, Post-Mounted

Figure 10-14 shows current transformer metering, post-mounted, 600 volts, 800 amps maximum.

Follow these requirements when installing post-mounted current transformer metering.

- The Customer must consult PGE before construction and follow the guidelines in Section 10.7.
- The current transformer cabinet must have two factory-installed, 24- x 48-inch hinged doors with handles in the center.
- The cabinet must be a minimum 12 inches above the final grade.
- The meter must be mounted so that it does not interfere with the opening of the cabinet doors.
- For a four-wire delta service, the high-leg (wild) terminal must be located on the right side and identified by an orange mark.
- The configuration shown in Figure 10-14 can be used as a wall mount if clearance allows.
- The Customer must provide 3-inch galvanized, rigid steel pipe supports with caps or 6- x 6-inch pressure-treated wood posts.
- The Customer must provide the conduit and the sweep with a 36-inch minimum radius.
- Mount the meter socket on the side of the compartment.
- Provide a 1- to 3-inch space between the cabinet and the meter enclosure.
- The Customer must provide 24 inches of concrete backfill.
Figure 10-14: Current Transformer Metering, Post Mounted, 600 Volts, 800 Amps Maximum
10.7.2 Current Transformer Metering, Wall-Mounted

*Figure 10-15 and Figure 10-16* show wall-mounted current transformer metering, 600 volts, 800 amps maximum (EUSERC 329B).

Follow these requirements when installing wall-mounted current transformer (CT) metering.

- The Customer service entrance conduits must exit the enclosure on the load side of the CT. PGE will not allow customer conductors or conduit in PGE terminating and pull space.
- The current transformer cabinet must have two factory-installed, 24- x 48-inch hinged doors with handles in the center.
- For a four-wire delta service, the high-leg (wild) terminal must be located on the right side and identified by an orange mark.
- The meter socket must not be located above the CT enclosure without PGE approval.
- The cabinet must be a minimum of 12 inches above the final grade.
- See Section 5.2, *Meter Clearances and Location Criteria* for clearances.
Commercial, Industrial, and Large Residential Services,
800 Amps or Lower

Figure 10-15: Current Transformer Metering, Wall Mounted, 600 Volts,
800 Amps Maximum (EUSERC 329B)
Reserved for PGE Conductors

48 in. Min.

75 in. Max.

12 in. Min.

13.25 in. Min.

1.25-inch Conduit

CT Mounting Base

To Customer

To PGE

Final Grade

10 in. Min.

20 in. Min.

36 in. Min.

78 in. Max.

Figure 10-16: Current Transformer Metering, Line and Load Same Side, 600 Volts, 800 Amps Maximum (EUSERC 329B)
10.7.3 Current Transformer Cabinet

Figure 10-17 shows a current transformer (CT) cabinet, 800 amp maximum and 0 to 600 volts (EUSERC 316, 317, and 318). See Table 10-5 for the minimum dimensions of a CT cabinet.

Follow these requirements when installing a CT cabinet.

- Only conductors associated with a single meter will be permitted in the CT cabinet. For other underground services, a separate terminating pull box will be provided for a PGE service lateral. See Table 10-2 for minimum dimensions for pull boxes with terminating facilities.
  NOTE: No connections, including the installation of monitoring equipment, will be made in any CT enclosure to supply any other meter.
- Customer conductors must exit the enclosure on the load side of the current transformers.
  NOTE: The Customer’s conductors will not be permitted in the PGE terminating and pull space.
- The cabinet must be mounted in a readily accessible location acceptable to PGE. The cabinet must be a minimum of 12 inches above the final grade.
- The top of the CT mounting bracket must not be more than 78 inches above floor level. The cover must have factory-installed hinges for side opening with sealing provisions, and be able to hold the cover in the open position at 90 degrees or more.
- A clear workspace is required in front of this cabinet. (See Figure 5-3, Meter Clearances for Multiple-Meter Installations.) The hinged door must open in the direction opposite to the room door so that room ingress or egress is not blocked. The location of the cabinets must be on the main or entry level floor.
- For overhead service, the Customer will provide connectors, terminate line, and load-side service conductors in all CT compartments. The Customer will connect conductors to the line and load sides of the EUSERC-approved mounting base. Line- and load-side terminations on CT landing pads require two bolts per connector.
- For underground service, the Customer will provide a EUSERC-approved CT mounting base for installation in a CT cabinet.
- A label that states, “Do Not Break Seal, No Fuses Inside” is required on the front of the CT cabinet.
Figure 10-17: Current Transformer Cabinet, 800 Amp Maximum, 0 to 600 Volts (EUSERC 316, 317, and 318)

Table 10-5: Current Transformer Cabinet Minimum Dimensions

<table>
<thead>
<tr>
<th>Type of Service</th>
<th>EUSERC</th>
<th>Minimum Exterior Cabinet Dimensions (inches)</th>
<th>CT Mounting Base</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Width</td>
<td>Height</td>
</tr>
<tr>
<td>Single-phase, three-wire 401 to 800 amps</td>
<td>Dwg No. 317</td>
<td>24</td>
<td>48</td>
</tr>
<tr>
<td>Three-phase, four-wire 201 to 800 amps</td>
<td>Dwg No. 318</td>
<td>36</td>
<td>48</td>
</tr>
<tr>
<td>Above 800 amps</td>
<td>See Section 11, Commercial, Industrial, and Large Residential Services, 801 Amps or Higher</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Line/load on same side of cabinet</td>
<td>N/A</td>
<td>48</td>
<td>48</td>
</tr>
</tbody>
</table>
10.7.4 Current Transformer Metering Conduit

The Customer must provide conduit between the meter socket and the CT cabinet. Follow these requirements when installing conduit.

- Use rigid steel or IMC conduit. A minimum of 1.25 inches is required with proper fittings and bushings to protect metering conductors and ensure bonding of metal parts.

- Schedule 40 PVC may be allowed when a bonding lug is provided in both the CT cabinet and meter socket. EMT conduit will be allowed for runs of less than 10 feet.

- For standard installation, conduit must be of sufficient length to ensure a minimum distance of 10 inches between the center of the meter socket and the CT cabinet.

- If the standard location is not suitable or workable, an alternate location may be approved. Any alternate location must have prior written PGE approval and must adhere to the following guidelines.
  - Conduit runs must be 50 feet or less, with no more than three bends totaling 270 degrees. No one bend greater than 90 degrees will be allowed.
  - Pull lines are required in all conduit as specified in Section 6.3.3, *Duct Proofing*.
  - When CT metering conduit dead ends on the back of a CT cabinet, use PVC flexible nonmetallic conduit to extend from the back wall to the front of the cabinet.
  - Secure all removable conduit fittings with 1/4–20 screws with sealing provisions. LBs (90-degree ells) may be allowed outside the enclosure for rewrites only. LBs may not be used for new construction.
10.7.5 Current Transformer Meter Socket Enclosure

Use a meter socket enclosure for CT metering with a space reserved below the socket for a PGE test switch 9.5 inches in length. See Figure 10-18 and Table 10-6.

Follow these requirements when installing a CT meter socket enclosure.

- Verify that the enclosure contains a mounting perch that is tapped for a test switch. PGE will install the test switch.
- **Do not** use a meter socket with circuit closers or bypass clips. They will not be approved.
- All unused openings must be covered and secured by the Customer.

![Figure 10-18: Current Transformer Meter Socket Enclosure](ESR0048)
Table 10-6: Current Transformer Meter Socket Requirements

<table>
<thead>
<tr>
<th>Type of Service</th>
<th>Socket Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>120/240 volt, single-phase, three-wire</td>
<td>6-jaw</td>
</tr>
<tr>
<td>120/208 volt network, single-phase, three-wire</td>
<td>8-jaw</td>
</tr>
<tr>
<td>208/120 volt, three-phase, four-wire</td>
<td></td>
</tr>
<tr>
<td>480/277 volt, three-phase, four-wire</td>
<td>13-jaw</td>
</tr>
<tr>
<td>240/120 volt, three-phase, four-wire</td>
<td></td>
</tr>
</tbody>
</table>

10.7.6 Transformer Mounting Base, Single-Phase and Three-Phase

Figure 10-19 shows a transformer mounting base for installation in a current transformer (CT) cabinet, single-phase, three-wire, 800 amp maximum (EUSERC 328B). See Figure 10-20 for a typical single-phase CT installation.

Figure 10-21 shows a transformer mounting base for installation in a CT cabinet, three-phase, four-wire, 800 amp maximum (EUSERC 329B). See Figure 10-22 for a typical three-phase CT installation.

Follow these requirements when installing a transformer mounting base—single-phase or three-phase—in a CT cabinet.

- On an overhead service the Customer must furnish all lugs and connect conductors to the line and load terminals of the CT mounting base. On an underground service, the Customer only needs to connect to the load side.
- The mounting base accepts bar-type current transformers only.
- Verify that the mounting base for the CT meets ratings for available fault current (50,000 amp maximum).
- Line- and load-side terminations on CT landing pads require two bolts for each mounting position.
- Termination of service conductors must be aluminum-bodied mechanical lugs. Use a one-position lug for 0 to 400 amps and a three-position lug for 401 to 800 amps.

10.7.6.1 Single-Phase Installation

Follow this additional requirement when installing a transformer mounting base, single-phase, in a CT cabinet.

- See Section 5.2, Meter Clearances and Location Criteria.
10.7.6.2 Three-Phase Installation

Follow this additional requirement when installing a transformer mounting base, three-phase, in a CT cabinet.

- For a four-wire delta service, the high-leg (wild) terminal must be located on the right side and identified by an orange mark.

Figure 10-19: Transformer Mounting Base for Installation in a CT Cabinet, Single-Phase, Three-Wire, 800 Amp Maximum (EUSERC 328B)
Figure 10-20: Typical Single-Phase CT Installation
Figure 10-21: Transformer Mounting Base for Installation in a CT Cabinet, Three-Phase, Four-Wire, 800 Amp Maximum (EUSERC 329B)
Figure 10-22: Typical Three-Phase CT Installation
Section 11

<table>
<thead>
<tr>
<th>Heading</th>
<th>Page</th>
</tr>
</thead>
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<td>11-1</td>
</tr>
<tr>
<td>Switchgear Metering</td>
<td>11-1</td>
</tr>
<tr>
<td>Current Transformer Compartment for Switchgear</td>
<td>11-19</td>
</tr>
</tbody>
</table>
11 Commercial, Industrial, and Large Residential Services, 801 Amps or Higher

This section provides the PGE requirements for commercial, industrial, and large residential services higher than 800 amps and lower than 600 volts. Consult PGE Meter Services for requirements and equipment for services higher than 600 volts.

11.1 Basic Requirements

All commercial, industrial, and large residential Customers must coordinate their service requirements with PGE before purchase and installation of equipment.

Large residential services are single-residential services over 320 amp continuous and all three-phase residential services. Residential meters must meet the meter clearances and location criteria covered in Section 5.2, Meter Clearances and Location Criteria.

11.2 Switchgear Metering

An Electric Utility Service Equipment Requirement Committee (EUSERC)-approved switchgear metering section is required when the service entrance rating is greater than 800 amperes. The switchgear metering section may be used for three-phase services over 200 amperes and single-phase service over 320 amperes.

The metering current transformer will be located in the current transformer (CT) compartment. The meter and test switch may be mounted on the cover of the hinged compartment or located remotely. The area below the barrier in this compartment may be used as a main switch (or breaker) compartment, a load distribution compartment, or a bottom-fed terminating pull section. The metering compartment shall be on the supply side of the main switch.

The mounting pad for all switchgear metering enclosures will be a concrete pad that is at least 4 inches thick for the width of the switchgear.

Follow these requirements when installing indoor or outdoor switchgear metering.

• Meter panels must not be hinged to a filler panel.
• The neutral terminal must be permanently identified in clearly visible block lettering with neutral or N.
• For 240/120 volt, three-phase, four-wire services, the high-leg (wild) terminal must be located on the right side, and permanently marked in orange by the manufacturer.
• Cable entry through the back of the cabinet generally does not meet PGE requirements due to minimum cable bend radius.
11.2.1 Indoor Switchgear Metering

Follow these additional requirements when indoor switchgear metering (EUSERC 325 and 326), such as that shown in Figure 11-1.

- Prior approval must be obtained from PGE if the metering switchgear is to be installed indoors. Indoor switchgear must be accessible for maintenance and meter reading. For more information, see Section 5.2, *Meter Clearances and Location Criteria*.
- The load section of an indoor switchgear may be used by PGE as the terminating section for underground service (EUSERC 327). See Figure 11-2.

![Figure 11-1: Indoor Switchgear Metering (EUSERC 325 and 326)](ESR0054)
Figure 11-2: Load Section of an Indoor Switchgear (EUSERC 327)
11.2.2 Outdoor Switchgear Metering

Follow these additional requirements when installing outdoor switchgear metering (EUSERC 354), such as that shown in Figure 11-3.

- Exterior doors on outdoor switchgear must be sealable and must hold securely at a minimum of 90 degrees when open.
- PGE will only approve the outdoor switchgear with a single enclosure door that is constructed with a 4-inch spacer as shown in EUSERC 354.
- When installing outdoor switchgear metering, the Customer must install a concrete pad with 48 inches of concrete in front of any cabinet that contains PGE equipment. Drainage must slope away from the cabinet. See Figure 11-4.
- Barrier posts are required if the switchgear is exposed to vehicular traffic. For more information, see Section 6.4.6, Barrier Post.

Figure 11-3: Outdoor Switchgear Metering (EUSERC 354)
Figure 11-4: Concrete Pad in Front of Cabinet
11.2.3 Switchgear Service Termination

Follow these basic requirements for switchgear service termination.

- The Customer will provide the switchgear service section, instrument transformer mounting base, panels, meter socket, and provisions for a test switch.

- The meter and test switch are to be owned, provided, and installed by PGE in the Customer-owned metering compartment. Window or doughnut-type current transformers for switchgear are provided by PGE and installed and secured by the Customer.

- For four-wire delta services, the high-leg (wild) terminal must be located on the right side and identified by an orange mark. This identification must be consistent on the equipment for all metering and PGE termination points.

- For underground service, PGE will terminate the line-side service conductors using PGE-provided connectors on lug landings in the pull section.

- The locking method used by the Customer on the metering enclosure must provide for independent access by PGE.

- Customer-owned conductors and devices, such as limiters and fuses, are not permitted in PGE sealed pull sections or metering compartments.

11.2.4 EUSERC Requirements

These EUSERC requirements apply to switchgear service termination.

- Terminating bolts must be secured in place and must be provided with nuts, flat washer, and a spring washer; all parts must be plated to prevent corrosion. Bus bars are required from the pull section into the service section.

- PGE requires a clear workspace in front of a switchgear of 78 inches high, a minimum of 48 inches wide, and 48 inches deep.

- Bonding must meet Oregon Electrical Specialty Code (OESC) requirements. Lugs for terminating the Customer’s bonding wire (or other bonding conductors) must be located outside the sealable section and must be designed to readily permit the Customer’s neutral system to be isolated from the PGE neutral when necessary.

- All removable panels and covers to the compartments used for terminating or routing conductors must have sealing provisions.

- All pull and termination sections must have full-front access. Cover panels must be removable, sealable, provided with two lifting handles, and limited to a maximum size of 9 square feet in area.

- When self-contained meter sockets are installed in switchgear, they are to be wired by the switchgear manufacturer.
11.2.5 Pull Box With Terminating Facilities 0 to 600 Volts, 0 to 1200 Amps

**Figure 11-5** shows a pull box with terminating facilities 0 to 600 volts, 0 to 1200 amps (EUSERC 343A and 347). See **Figure 5-3** for meter clearances for multiple-meter installations.

See **Table 11-1** for minimum dimensions for pull boxes with terminating facilities (EUSERC 343A).
11.2.6 Commercial Multiple Metering, Direct-Connect, Floor-Mounted Switchgear, 1201 Amps and Higher

Follow these requirements when installing commercial multiple metering, direct-connect, floor mounted switchgear, 1201 amps and higher (EUSERC 306 and 345), such as that shown in Figure 11-6.

- All removable panels and covers to compartments used for metering must be sealable.
- Metering conductors must not pass through adjacent metering compartments except in enclosed wireways.
- For four-wire delta services, the high-leg (wild) terminal must be located on the right side and identified by an orange mark. This identification must be consistent on the equipment for all metering and PGE termination points.
- Test blocks with rigid insulating barriers must be furnished, installed, and wired or bused to the meter sockets. Test block cover panels must be sealable and fitted with a lifting handle.
- Meter panels must be removable, but must be nonremovable when the meter is in place.
- Each metered service must have a permanently engraved metal or hard plastic label with letters at least 3/8-inch high to identify the customer’s service address before power is connected. See Figure 10-1, Meter Label With Service Address.
- Single-phase, 480 volt service must be permanently and visibly labeled as such. PGE requires a red label with white lettering that reads: SINGLE-PHASE 480V. Place the label in an easy-to-see location for safety. Consult PGE for further label requirements. NOTE: Each meter socket and associated disconnect must be correctly labeled as to the unit, suite, or space number.
- For pull section details when used on underground services, see Figure 11-7 or EUSERC 345, and Table 11-2.
• The Customer must provide an acceptable concrete pad for all switchgear metering service sections and pull boxes.
• If a freestanding unit can be expanded beyond six meter sockets (due to load growth), then a main disconnect will be required in the initial installation.

Figure 11-6: Commercial Multiple Metering, Direct-Connect, Floor-Mounted Switchgear, 1201 Amps and Higher (EUSERC 306 and 345)
Figure 11-7: Underground Service Termination Switchgear Service Section, 400 to 3000 Amps, 0 to 600 Volts (EUSERC 345)

Table 11-2: Minimum Pull Section Dimensions (Applies to Figure 11-7 Only)

<table>
<thead>
<tr>
<th>Switchgear Rating (amps)</th>
<th>Minimum Width W (inches)</th>
<th>X Minimum Dimension (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3-Wire</td>
<td>4-Wire</td>
</tr>
<tr>
<td>200 to 800</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>801 to 1200</td>
<td>24</td>
<td>30</td>
</tr>
<tr>
<td>1201 to 2000</td>
<td>30</td>
<td>35</td>
</tr>
<tr>
<td>2001 to 3000¹</td>
<td>—</td>
<td>42</td>
</tr>
</tbody>
</table>

1. Consult PGE for services higher than 2000 amps.
11.2.7 Underground Service Termination Switchgear Service Section, 400 to 3000 Amps, 0 to 600 Volts

Follow these requirements when installing an underground service termination switchgear service section, 400 to 3000 amps and 0 to 600 volts (EUSERC 345), such as that shown in Figure 11-7.

- A switchgear pull section, a separate termination enclosure, or a bottom-feed service section must be provided for all switchgear underground services.
- Bus bars—with provisions for termination lugs per EUSERC 347—are required from the pull section into the service section when the main switch is rated higher than 800 amperes, or when multiple metering is to be supplied.
- The minimum dimensions in Figure 11-7 are for vertical entry at the top or bottom only. Side or rear entry of the service cable into the pull section may require a greater dimension than that shown in Table 11-2.
- The Customer must provide a drawing with dimensions of proposed service equipment.
- Consult PGE for services higher than 2000 amps.
- Refer to EUSERC 347 for bus/cable termination.
- Refer to EUSERC 343 for sealable termination enclosure.
11.2.8 Underground Service Termination in a Pull Section Below the Ground Level

Figure 11-8 and Figure 11-9 show underground service termination in a pull section below the ground level, 400 to 3000 amps, 0 to 600 volts based on EUSERC 345 note 6.

- Figure 11-8 shows a pull section with back-entry conduits at the top or bottom.
- Figure 11-9 shows a pull section with side-entry conduits at the lower end of the section.

See Table 11-3 for the variable dimensions shown in the two figures.

Follow these requirements when installing an underground service termination in a pull section below the ground level:

- The cover panels on the pull and wireway sections must be a two-piece design of equal size with two lifting handles. The cover panels shall be removable and sealable.
- The minimum access dimensions—W1 and W2—are measured between the inside edges of the left- and right-side return flanges.
- The pull section and termination section shown in Figure 11-8 and Figure 11-9 are reserved for PGE supply conductors. No conduits or Customer wiring shall be installed in, or routed through, this area.
- The minimum clearance from any energized part to a removable cover panel must be 4 inches.
- The Customer shall provide a Unistrut® cable support bracket. Consult PGE.
- A minimum 10-foot clear workspace is required in front of the pull section and in the opposite direction from the entry direction of the cable.
- Potential water intrusion into service conduits, the pull section, and termination section can occur when the source side of PGE facilities, (such as a transformer vault) are at a higher elevation than the pull and termination sections. When the intrusion of water can reasonably be expected, the following actions are required.
  - The Customer is responsible for providing a means to prevent the accumulation of water in the pull and termination sections. This can be accomplished by providing a water collection system—a concrete well, for example—under the pull and termination sections with a gravity drain or sump pump to remove any standing water.
  - PGE must review and approve of any water accumulation and drainage systems prior to installation. See Figure 11-10 for a pad drain for freestanding switchgear.
Figure 11-8: Underground Service Termination in a Pull Section Below the Ground Level, Showing Pull Section With Back-Entry Conduits at the Top or Bottom
Figure 11-9: Underground Service Termination in a Pull Section Below the Ground Level, Showing Pull Section With Side-Entry Conduits at the Bottom
Figure 11-10: Pad Drain for Freestanding Switchgear

Table 11-3: Minimum Pull Section Dimensions

<table>
<thead>
<tr>
<th>Switchgear Rating (amps)</th>
<th>Pull Section Width W1 (inches)</th>
<th>Wireway Width W2 (inches)</th>
<th>Wireway Depth D1 (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>401 to 800</td>
<td>24</td>
<td>24</td>
<td>24 (single-phase only) 30</td>
</tr>
<tr>
<td>801 to 1200</td>
<td>—</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>1201 to 3000</td>
<td>—</td>
<td>42</td>
<td>48</td>
</tr>
</tbody>
</table>
11.2.9 Overhead Service Termination Switchgear Service Section

Follow these requirements when installing an overhead service termination switchgear service section, 0 to 600 volts (EUSERC 348), such as that shown in Figure 11-11.

- The service entrance conductors, cable, or bus bar are furnished and installed by the Customer as follows:
  - When the switchgear is served with bus or bar conductors, the conductors shall enter through the top, or at the side or back in the upper 10-inch section.
  - When the switchgear is served with cable conductors, the conductors shall only enter the top of the switchgear.
- An extension may be required when conduits enter from the side or rear.
- The direction of feed is from the top to bottom in the switchgear service section. Load conductors shall exit below the metering compartment and may not be routed back through the current transformer compartment in order to exit the service section.
- Refer to EUSERC 325 and 326 for the requirements for the 90-inch service section.

![Figure 11-11: Overhead Service Termination Switchgear Service Section, 0 to 600 Volts (EUSERC 348)](image)
11.2.10 Remote Switchgear Metering Enclosure

Follow these requirements when installing a remote switchgear metering enclosure (EUSERC 325 and 339), such as that shown in Figure 11-12.

- The service termination and metering equipment should be located outside, near the transformer. If PGE allows the service termination to be located inside the building, the metering enclosure must be located outside the building.

- The conduit in the switchgear section must be nonmetallic tubing and must be terminated in the current transformer compartment in front of the current transformers. Ninety-degree sweeps (LBs or similar devices) are not permitted inside the enclosure.

- The neutral terminal must be permanently identified in clearly visible block lettering with neutral or N.

- For 240/120 volt, three-phase, four-wire service the high-leg (wild) terminal must be located on the right side, and permanently marked in orange by the manufacturer.

- If—in the opinion of PGE—the switchgear service section is inaccessible for meter testing and maintenance, the Customer must provide direct access between the remote meter and the current transformer.

- The Customer must provide and install the remote meter socket enclosure, the metering switchgear section, and 1.25-inch conduit for the metering secondary conductors. For more information, see Section 10.7.4, Current Transformer Metering Conduit.
Commercial, Industrial, and Large Residential Services, 801 Amps or Higher

Figure 11-12: Remote Switchgear Metering Enclosure
(EUSERC 325 and 339)
11.3 Current Transformer Compartment for Switchgear

Follow these basic requirements when installing a current transformer (CT) compartment for switchgear.

- Set the direction of feed from the top or bottom. No other conductors shall pass through this compartment.
- The dimensions are measured to the inside edge of the compartment access opening.

11.3.1 Current Transformer Compartment for Switchgear
0 to 1000 Amps, 0 to 600 Volts

Follow these additional requirements when installing a CT compartment for switchgear 0 to 1000 amps, 0 to 600 volts, three-phase, four-wire service (EUSERC 320), such as that shown in Figure 11-13.

- Bus arrangements and supports shall be provided as shown in Figure 11-13. The neutral bus may be located at either side.
- A clear, unobstructed workspace shall be provided around the CT bus units from the barrier to the upper support bar.
- The barrier shall be constructed of rigid insulating material that is resistant to electrical arc tracking.
Figure 11-13: Current Transformer Compartment for Switchgear 0 to 1000 Amps, 0 to 600 Volts, Three-Phase, Four-Wire Service (EUSERC 320)
11.3.2 Current Transformer Compartment for Switchgear 1001 to 3000 Amps, 0 to 600 Volts

Follow these additional requirements when installing a CT compartment for switchgear 1001 to 3000 amps, 0 to 600 volts, three-phase, four-wire service (EUSERC 322), such as that shown in Figure 11-14.

- Busways must remain in position when the removable section B is out.
- When horizontal-cross busways supply the service section phase buses, a neutral bus bar extension shall be provided in the instrument transformer compartment above the lower CT bus support.
- The Customer shall install a doughnut-style CT.
Figure 11-14: Current Transformer Compartment for Switchgear 1001 to 3000 Amps, 0 to 600 Volts, Three-Phase, Four-Wire Service (EUSERC 322)
Section 12

<table>
<thead>
<tr>
<th>Heading</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Irrigation Pumping Overhead Metering, Direct Connect</td>
<td>12-1</td>
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<td>• Underground Irrigation Pumping Service Backstop Options</td>
<td>12-4</td>
</tr>
<tr>
<td>• Meter Access Platform in a Flooded Area</td>
<td>12-6</td>
</tr>
</tbody>
</table>
12 Agricultural and Other Pole-Mounted Services

12.1 Irrigation Pumping Overhead Metering, Direct Connect

Follow these requirements when installing an irrigation pumping overhead metering, direct-connect service such as that shown in Figure 12-1.

- The Customer must install the service conductors from the pump switchgear to the meter socket, and from the meter socket to the weatherhead.
- Consult PGE for platform requirements.
- For clearance information, see Table 5-1, Minimum Clearances for Service Drops, 750 Volts and Lower Based on NESC C2-2012.
- The pole provided by the Customer must be pressure-treated or thermally treated by the manufacturer with an approved American Wood Preservatives Association standardized preservative.
- For pole height, class, and depth requirements, see Section 3.9, Customer-Owned Poles and Guying.
- PGE will bond the down guy to the service neutral and pole ground conductor.
- The down guy is to be attached at the weatherhead height.
- The Customer must provide and install a minimum 5/16-inch down guy to support the PGE overhead conductor.
- The Customer is to provide and install an anchor.
- A 96-inch minimum must be maintained between the mounting studs.
Figure 12-1: Irrigation Pumping Overhead Metering, Direct Connect

Refer to Section 3.9
12.2 Underground Irrigation Pumping Service Backstop Options

Follow these requirements when installing an underground irrigation pumping service backstop, such as the four examples shown in Figure 12-2.

- All hardware must be galvanized or stainless steel.
- All wood posts and poles must be pressure treated or thermally treated by the manufacturer with an approved American Wood Preservatives Association standardized preservative.
- All steel sheets must be 1/8- to 3/8-inch thick galvanized steel.
- All metal pieces must be bonded to the ground conductor.
- 2- x 2-inch galvanized steel posts may be used.
- All posts and poles must be set 36 inches deep with concrete backfill or 60 inches deep with no concrete backfill.
- The wood posts must be a minimum 4 inches x 6 inches.
- The wood support must be 2 inches x 6 inches.
- Wood poles must be 6 inches in diameter.
- All posts and poles must be capped.
- Install a Unistrut® between the posts or poles to support conduit.
- Bolt the meter and the disconnect switch to the Unistrut.
Figure 12-2: Underground Irrigation Pumping Service Backstop Options

- Pole
- Steel Sheet
- Post
- Concrete Backfill (Use if post or pole is set to 36 in.)
- Unistrut
- Conduit Support
- Wooden Support
- Unistrut Conduit Support
12.3 *Meter Access Platform in a Flooded Area*

Follow these requirements when installing a meter access platform in a flood area, such as the typical Customer-installed platform shown in Figure 12-3.

- PGE requires a clear workspace in front of a switchgear of 78 inches high, a minimum of 48 inches wide, and 48 inches deep.
- PGE and the Customer will determine when a platform is required and where it will be located. Contact PGE for variations in platform requirements. The platform must be approved by PGE before installation.
- All lumber used to make a platform must be pressure-treated. The cost of construction will be the responsibility of the Customer. The Customer must maintain the platform for future access and structural strength.
- The Customer is responsible for permits or use of land associated with a meter access platform.
- The pole will be furnished and installed by the Customer.
- The stair run will vary with the height of the platform, and the handrail stanchions will be equally spaced.
- The Customer is responsible for ensuring that the minimum electrical clearances are maintained from the platform to the service attachment. See Table 5-1, *Minimum Clearances for Service Drops, 750 Volts and Lower Based on NESC C2-2012.*

**IMPORTANT**: PGE will notify the Customer if a hazardous situation exists with a meter access platform. The Customer will have 60 days to repair the safety or maintenance issue. If repairs are not made by the end of this time, the Customer's service will be subject to disconnection.
Figure 12-3: Typical Meter Access Platform
Appendix A: Required Files for Service

The information in this appendix applies to multifamily and residential developments, commercial and industrial developments, and road improvement projects.

When requesting new service, upgraded service, or road improvement projects in the Portland General Electric (PGE) service territory, PGE requires that specific forms and files be submitted to PGE Service Coordination. The phone and fax numbers for Service Coordination can be found in the Preliminary Information section.

The forms for new or upgraded service can be found in Appendix B and Appendix C. The requirements for formatting and submitting electronic files are included here.

1. Submit one of the following forms:
   - Request for Multifamily and Residential Development
   - Request for New Commercial Service
   - Request for Upgrade or Relocation of Existing Commercial Service

2. Send a hard copy of the full set of drawings, along with a cover letter, to the appropriate PGE Regional Design Center:
   - Gresham 1705 E Burnside St. Gresham 97030
   - Portland 3700 SE 17th Ave. Portland 97202
   - Southern 4245 Kale St. Salem 97305
   - Western 2213 SW 153rd Drive Beaverton 97006

3. The Service Design Project Manager (SDPM) assigned to your project will provide you with an email address. The PGE email address format is:
   
   firstname.lastname@pgn.com

4. Provide computer-aided drafting (CAD) files with civil engineering drawings of the site plan and profile. PGE accepts MicroStation version 8 and AutoCAD version 10 and older. PGE will use your files in the original survey coordinate system or datum. Updates to these files are requested at milestones in the project.

5. Include the same layers in the CAD files as shown on the site plan and profile hard copy. The minimum layers needed are:
   - Survey control points
   - Existing and future street right of way
   - Lot lines
   - Lot numbers
   - Street names
   - Building footprints
   - Curbs
   - Sidewalks
   - Centerlines of streets and roadways
Appendix A: Required Files for Service

- Easements
- Stationing
- Existing electrical facility locations

5.1. If survey control points are not available in CAD format, PGE software will accept these points in text or Excel file format.

5.2. If you use nonstandard file and layer naming conventions, provide guidelines for reference.

5.3. If your data contains attachments—such as aerial imagery—provide the attachments or delete the files from your reference before submittal.

5.4. If you send a 90-percent completed file, and later send a 93-percent completed file, it is critical that you let PGE know what has changed. Itemize in an email or on the CAD drawing all data that has changed.

5.5. If you send multiple files, provide a description of what is included in each file.

6. You may make your files available on your File Transfer Protocol (FTP) or by email. Zipped files are acceptable, but do not send executable (.exe) files. If it is not possible to send files electronically, you may use a DVD or CD.

7. For road construction projects specify the datum of the file sent. PGE uses North Oregon State Plane (NAD83, international ft.). If there is a local datum plane (LDP), provide the conversion factor.
Appendix B: Single-Family and Multifamily Service

Requirements for Obtaining New Single-Family Residential Electric Service

Customer Responsibilities

1. Obtain building and electrical permits from the appropriate municipality. Obtain easements and tree-trimming permits if required.


3. Provide a hard copy of the scaled plot or site plan that was submitted for the building permit. See the following page for a sample site plan. New connected load data without a site plan may delay initiation of service.

4. All pertinent documents, such as the signed Line Extension Cost Agreement and any permits or easements—as well as any money owed to PGE—must be received by PGE prior to the final inspection of your service by PGE and before a PGE line crew can be scheduled to connect your service.

5. Before digging a trench, contact the Service and Design Project Manager (SDPM) for design approval.

6. All costs associated with digging trenches, installing pads, vaults, conduit, handling road crossings, and permits are the responsibility of the Customer.

7. Right-of-way excavation requires a permit. A PGE-approved contractor may be required. Contact the SDPM for further information.

8. Arrange a preconstruction meeting between the excavation contractor and PGE at the job site.

9. Request an inspection by PGE and obtain PGE approval of the trench, conduit, and vault before backfilling.

10. After passing the appropriate municipal electrical inspection, request an inspection by PGE by contacting a Service Coordinator at 800-542-8818 or 503-323-6700 in the Portland metro area. PGE will not energize the service until all inspections have been performed.

11. Contact the Oregon Utility Notification Center (OUNC) for location of underground utilities. Call 8-1-1, 800-332-2344, or 503-246-6699 in the Portland metro area, or visit www.callbeforeyoudig.com.

PGE Responsibilities

1. PGE prepares an installation design and determines the Customer costs owed to PGE, if any. Allow 60 days for preparation of an installation design.

2. PGE inspects all electrical services, trenches, conduits, and vault systems.

3. PGE schedules the connection of service after all Customer responsibilities have been met.
Appendix B: Single-Family and Multifamily Service

Minimum Plot Requirements

- Show Footage (see sample) and Print Plot Plan to Scale.
- Add Street Names, Nearest Cross Street, Thomas Guide Page, Township/Range (if known)

Project Name: Smith Residence    Date: 1/01/08
Customer Name: John Smith
Site Address: 1234 Smith RD    Thomae Guide: 659-G5
Township/Range: 2 S 3 E 01
NE
Anytown, OR 97777
Cross Street: Power LN
Request for Single-Family Residential Service

Fill out all fields. If the field is not applicable, enter N/A.

<table>
<thead>
<tr>
<th>Date (mm-dd-year)</th>
<th>PGE Work Request No.</th>
<th>Permit No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Customer/Applicant**

- Name ________________________________________________
- Service address ____________________________________________
- City ___________________________ State _____ Zip _______
- Email address ____________________________________________
- Nearest cross street _______________________________________
- Legal description __________________________________________
  (tax lot number, lot number, block number)

**Billing Information** (for construction costs only)

- Name ________________________________________________
- Company name ____________________________________________
- Mailing address __________________________________________
- City ___________________________ State _____ Zip _______
- Email address ____________________________________________
- Contact person ____________________________________________
- Phone number(s) ____________________________________________
- Existing customer account number (if applicable) ____________________________

**Contact Information** (if different from billing information)

- Name ________________________________________________
- Company name ____________________________________________
- Mailing address __________________________________________
- City ___________________________ State _____ Zip _______
- Email address ____________________________________________
- Contact person ____________________________________________
- Phone number(s) ____________________________________________
Appendix B: Single-Family and Multifamily Service

### Single-Family Service Information

| Square footage of house | ______________ square feet |

**New permanent service size:**

- **Amps** _________  
- **Voltage** _________  

**Overhead or Underground (circle one)**

**Estimated connection date of permanent service (mm-dd-year)** ___________________________

**Is temporary service required?**  
- Yes _____  
- No _____

**If service exists:**

- **Customer account number** _____________________
- **Meter number** _______________________________

- **Overhead to underground conversion?**  
  - Yes _____  
  - No _____

- **Upgrade and/or relocation of existing service?**  
  - (circle one or both)
    - **Existing size in amps** __________
    - **Requested size in amps** __________

---

<table>
<thead>
<tr>
<th>New Connected Load</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Customer Load</strong></td>
</tr>
<tr>
<td>heater</td>
</tr>
<tr>
<td>Range</td>
</tr>
<tr>
<td>Space heater/furnace; enter kW if electric</td>
</tr>
<tr>
<td>Air conditioning (AC) or heat pump (HP)? (circle one)</td>
</tr>
<tr>
<td>Number of AC or HP units</td>
</tr>
</tbody>
</table>
| Electric vehicle (EV) charging unit? | Yes _______ kW  
  No _______ |
| Other loads (such as pump and hot tub) | _________ kW |

**NOTE:** When inadequate or inaccurate information results in design changes, the cost will be borne by the property owner or electrician.

Site grading, utility, and landscaping plans are required to complete the PGE electrical design. Hard copies of the service request form, scaled plot or site plan, and building footprint may be mailed to 7800 SW Mohawk St., Tualatin, OR 97062. See Appendix A, Required Files for Service. Contact a Service Coordinator at 503-323-6700 or 800-542-8818; files may be faxed to 503-612-3501.
Requirements for Obtaining Multifamily and Residential Development Electric Service

Customer Responsibilities

1. Obtain building and electrical permits from the appropriate municipality. Obtain easements and tree-trimming permits if required.

2. Complete the Request for Multifamily and Residential Development Service form. See pages B-7 and B-8.

3. Provide a hard copy of the scaled plot or site plan that was submitted for the building permit. The site plan must show the preferred ground level service and meter locations. Include the electrical room(s) and switchgear specifications, if applicable. A full-size set of drawings and CAD files must be submitted. Refer to Appendix A, Required Files for Service.

4. If applicable, check the local jurisdiction for streetlight requirements.

5. All pertinent documents, such as the signed Line Extension Cost Agreement, permits, and easements—as well as any money owed to PGE—must be received by PGE prior to the final inspection of the service by PGE and before a PGE line crew can be scheduled to connect your service.

6. Before digging a trench, contact the Service and Design Project Manager (SDPM) for design approval.

7. All costs associated with digging trenches, installing pads, vaults, conduit, handling road crossings, and permits are the responsibility of the Customer.

8. Right-of-way excavation must be performed by a PGE-approved contractor. Contact the SDPM for further information.

9. Arrange a preconstruction meeting between the excavation contractor and PGE at the job site.

10. Request an inspection by PGE and obtain PGE approval of the trench, conduit, and vault before backfilling.

11. After passing the appropriate municipal electrical inspection, request an inspection by PGE by contacting a Service Coordinator at 800-542-8818 or 503-323-6700 in the Portland metro area. PGE will not energize the service until all inspections have been performed.

12. Contact the Oregon Utility Notification Center (OUNC) for location of underground utilities. Call 8-1-1, 800-332-2344, or 503-246-6699 in the Portland metro area, or visit www.callbeforeyoudig.org.
PGE Responsibilities

1. PGE prepares an installation design and determines the Customer costs from PGE, if any. Allow 60 days for preparation of an installation design.

2. PGE inspects all electrical services, trenches, conduits, and vault systems.

3. PGE schedules the connection of service after all Customer responsibilities have been met.
Request for Multifamily and Residential Development Service

Fill out all fields. If the field is not applicable, enter N/A.

Date (mm-dd-year)  PGE Work Request No. ______________________
_______________________  Permit No. ______________________

Customer/Applicant
Name ________________________________________________________
Service address __________________________________________________
City __________________________________________ State _____ Zip ______
Email address ________________________________________________
Nearest cross street ____________________________________________
Legal description ______________________________________________
(tax lot number, lot number, block number)

Billing Information (for construction costs only)
Name ________________________________________________________
Company name ________________________________________________
Mailing address ______________________________________________
City __________________________________________ State _____ Zip ______
Email address ________________________________________________
Contact person ______________________________________________
Phone number(s) _____________________________________________
Existing customer account number (if applicable) __________________

Contact Information (if different from billing information)
Name ________________________________________________________
Company name ________________________________________________
Mailing address ______________________________________________
City __________________________________________ State _____ Zip ______
Email address ________________________________________________
Contact person ______________________________________________
Phone number(s) _____________________________________________
Multi-family Service Information

Type of dwelling: Subdivision     Minor partition     Manufactured home park     (circle one)
Number of lots _________
Apartment     Condominium     Row house     Town house     (circle one)
Number of units _________
Number of individual services _________
Number of buildings _________
Apartments per unit _________     Service size ________ amps
Square feet per unit _________     Service voltage _________
Estimated connection date of permanent service
(mm-dd-year) ___________________________

Service type: Overhead or Underground (circle one)
If service exists: Conversion or Relocation (circle one)
Is streetlighting required? If so...     Quantity _____     Type ______

New Connected Load

<table>
<thead>
<tr>
<th>Customer Load</th>
<th>Energy Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lighting</td>
<td>Electric _________</td>
</tr>
<tr>
<td>heater</td>
<td>Electric ________ or Gas ________</td>
</tr>
<tr>
<td>Range</td>
<td>Electric ________  or Gas ________</td>
</tr>
<tr>
<td>Space heater/furnace; enter kW if electric</td>
<td>Electric _______ kW or Gas ________</td>
</tr>
<tr>
<td>Air conditioning (AC) or heat pump (HP)? (circle one)</td>
<td>Tons ___________  Locked rotor amps ________</td>
</tr>
<tr>
<td>Number of AC or HP units</td>
<td>__________________</td>
</tr>
<tr>
<td>Largest motor</td>
<td>__________________</td>
</tr>
<tr>
<td>Electric vehicle (EV) charging unit?</td>
<td>Yes _____ kW  No ________</td>
</tr>
<tr>
<td>Number of EV units</td>
<td>__________________</td>
</tr>
<tr>
<td>Other loads (such as pump and hot tub)</td>
<td>________ kW</td>
</tr>
</tbody>
</table>

For mixed-use development a separate Request for New Commercial Service form must be submitted for the nonresidential load.

NOTE: When inadequate or inaccurate information results in design changes, the cost will be borne by the property owner or electrician.

Site grading, utility, and landscaping plans are required to complete the PGE electrical design. Hard copies of the service request form, scaled plot or site plan, and building footprint may be mailed to 7800 SW Mohawk St., Tualatin, OR 97062. See Appendix A, Required Files for Service. Contact a Service Coordinator at 503-323-6700 or 800-542-8818; files may be faxed to 503-612-3501.
Requirements for Obtaining New Commercial Electric Service

Customer Responsibilities

1. Obtain building permits and electrical permits from the appropriate municipality. Obtain easements and tree-trimming permits if required.

2. Complete the Request for New Commercial Service form. See pages C-3 and C-4.

3. Provide a hard copy of the scaled plot or site plan that was submitted for the building permit. The site plan must show the preferred ground level service and meter locations. Include the electrical room(s) and switchgear specifications, if applicable. Refer to Appendix A, Required Files for Service.

4. Check the local jurisdiction for streetlight requirements.

5. All pertinent documents, such as the signed Line Extension Cost Agreement, permits, and easements—as well as any money owed to PGE—must be received by PGE prior to the final inspection of the service by PGE and before a PGE line crew can be scheduled to connect your service.

6. Before digging a trench, contact the Service and Design Project Manager (SDPM) for design approval.

7. All costs associated with digging trenches, installing pads, vaults, conduit, handling road crossings, and permits are the responsibility of the Customer.

8. Right-of-way excavation must be performed by a PGE-approved contractor. Contact the SDPM for further information.

9. Arrange a preconstruction meeting between the excavation contractor and PGE at the job site.

10. Request an inspection by PGE and obtain PGE approval of the trench, conduit, and vault before backfilling.

11. After passing the appropriate municipal electrical inspection, request an inspection by PGE by contacting a Service Coordinator at 800-542-8818 or 503-323-6700 in the Portland metro area. PGE will not energize the service until all inspections have been performed.

12. Contact the Oregon Utility Notification Center (OUNC) for location of underground utilities. Call 8-1-1, 800-332-2344, or 503-246-6699 in the Portland metro area, or visit www.callbeforeyoudig.org.
PGE Responsibilities

1. PGE prepares an installation design and determines the Customer costs from PGE, if any. Allow 60 days for preparation of an installation design.
2. PGE inspects all electrical services, trenches, conduits, and vault systems.
3. PGE schedules the connection of service after all Customer responsibilities have been met.
## Request for New Commercial Service

Fill out all fields. If the field is not applicable, enter N/A.

<table>
<thead>
<tr>
<th>Field</th>
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<tr>
<td>Permit No.</td>
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<table>
<thead>
<tr>
<th><strong>Customer/Applicant</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td></td>
</tr>
<tr>
<td>Service address</td>
<td></td>
</tr>
<tr>
<td>City</td>
<td>State</td>
</tr>
<tr>
<td>Email address</td>
<td></td>
</tr>
<tr>
<td>Nearest cross street</td>
<td></td>
</tr>
<tr>
<td>Legal description</td>
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<tr>
<td>(tax lot number, lot number, block number)</td>
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<table>
<thead>
<tr>
<th><strong>Billing Information</strong> (for construction costs only)</th>
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</thead>
<tbody>
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<td>Name</td>
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</tr>
<tr>
<td>Company name</td>
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<tr>
<td>Mailing address</td>
<td></td>
</tr>
<tr>
<td>City</td>
<td>State</td>
</tr>
<tr>
<td>Email address</td>
<td></td>
</tr>
<tr>
<td>Contact person</td>
<td></td>
</tr>
<tr>
<td>Phone number(s)</td>
<td></td>
</tr>
<tr>
<td>Existing customer account number (if applicable)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Contact Information</strong> (if different from billing information)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td></td>
</tr>
<tr>
<td>Company name</td>
<td></td>
</tr>
<tr>
<td>Mailing address</td>
<td></td>
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<tr>
<td>City</td>
<td>State</td>
</tr>
<tr>
<td>Email address</td>
<td></td>
</tr>
<tr>
<td>Contact person</td>
<td></td>
</tr>
<tr>
<td>Phone number(s)</td>
<td></td>
</tr>
</tbody>
</table>
Appendix C: Commercial Service

New Commercial Service Information

Type of business:  Office     Food store     Medical office/Health care facility     Restaurant
Retail     Warehouse     (circle one)     Other ________________________

Operating hours: One shift     Two shifts     Continuous     (circle one)     Other ____________

Service size: Amps _______     Voltage _______
Overhead or Underground     (circle one)
Single-phase or Three-phase     (circle one)

Estimated connection date of permanent service (mm-dd-year) _________

Is temporary service required?     Yes _____ No _____

Is streetlighting required? If so...     Quantity ______     Type ______

New Connected Load

<table>
<thead>
<tr>
<th>Load Type</th>
<th>Load1</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Single-Phase (kW)</td>
<td>Three-Phase (kW)</td>
</tr>
<tr>
<td>Lighting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receptacles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>heater</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electric heat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refrigeration/HVAC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Largest size</td>
<td>______ tons</td>
<td></td>
</tr>
<tr>
<td>Motors²</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Largest size and locked rotor amps (LRA)</td>
<td>______ kW</td>
<td>______ LRA</td>
</tr>
<tr>
<td>Welders</td>
<td></td>
<td></td>
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<tr>
<td>Largest size</td>
<td>______ kW</td>
<td></td>
</tr>
<tr>
<td>Computers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elevators</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electric vehicle (EV) charging unit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of EV units</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other loads</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total connected kW</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Typical conversion factor: 1 hp = 1 kW; 1 ton = 1 kW
2. Motors that are 10 hp or larger may be required to be equipped with reduced voltage starters.

NOTE: When inadequate or inaccurate information results in design changes, the cost will be borne by the property owner or electrician.

Site grading, utility, and landscaping plans are required to complete the PGE electrical design.

Hard copies of the service request form, scaled plot or site plan, and building footprint may be mailed to 7800 SW Mohawk St., Tualatin, OR 97062. See Appendix A, Required Files for Service. Contact a Service Coordinator at 503-323-6700 or 800-542-8818; files may be faxed to 503-612-3501.
Appendix C: Commercial Service

Requirements for Upgrade or Relocation of Existing Commercial Electric Service

Customer Responsibilities

1. Obtain building and electrical permits from the appropriate municipality. Obtain easements and tree-trimming permits if required.

2. Complete the Request for Upgrade or Relocation of Existing Commercial Service form. See pages C-7 and C-8.

3. Provide a hard copy of the scaled plot or site plan that was submitted for the building permit. The site plan must show the preferred ground level service and meter locations. Include the electrical room(s) and switchgear specifications, if applicable. Refer to Appendix A, Required Files for Service.

4. All pertinent documents, such as the signed Line Extension Cost Agreement, permits, and easements—as well as any money owed to PGE—must be received by PGE prior to the final inspection of the service by PGE and before a PGE line crew can be scheduled to connect your service.

5. Before digging a trench, contact the Service and Design Project Manager (SDPM) for design approval.

6. All costs associated with digging trenches, installing pads, vaults, conduit, handling road crossings, and permits are the responsibility of the Customer.

7. Right-of-way excavation must be performed by a PGE-approved contractor. Contact the SDPM for further information.

8. Arrange a preconstruction meeting between the excavation contractor and PGE at the job site.

9. Request an inspection by PGE and obtain PGE approval of the trench, conduit, and vault before backfilling.

10. After passing the appropriate municipal electrical inspection, request an inspection by PGE by contacting a Service Coordinator at 800-542-8818 or 503-323-6700 in the Portland metro area. PGE will not energize the service until all inspections have been performed.

11. Contact the Oregon Utility Notification Center (OUNC) for location of underground utilities. Call 8-1-1, 800-332-2344, or 503-246-6699 in the Portland metro area, or visit www.callbeforeyoudig.org.
PGE Responsibilities

1. PGE prepares an installation design and determines the Customer costs from PGE, if any. Allow 60 days for preparation of an installation design.
2. PGE inspects all electrical services, trenches, conduits, and vault systems.
3. PGE schedules the connection of service after all Customer responsibilities have been met.
# Request for Upgrade or Relocation of Existing Commercial Service

Fill out all fields. If the field is not applicable, enter N/A.

<table>
<thead>
<tr>
<th>Date (mm-dd-year)</th>
<th>PGE Work Request No.</th>
<th>Permit No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

### Customer/Applicant

- **Name**: 
- **Service address**: 
- **City**: ___________________  **State**: ___  **Zip**: ______
- **Email address**: 
- **Nearest cross street**: 
- **Legal description**: (tax lot number, lot number, block number)
- **Existing customer account number (if applicable)**: 
- **Meter number(s)**: 

### Billing Information (for construction costs only)

- **Name**: 
- **Company name**: 
- **Mailing address**: 
- **City**: ___________________  **State**: ___  **Zip**: ______
- **Email address**: 
- **Contact person**: 
- **Phone number(s)**: 

### Contact Information (if different from billing information)

- **Name**: 
- **Company name**: 
- **Mailing address**: 
- **City**: ___________________  **State**: ___  **Zip**: ______
- **Email address**: 
- **Contact person**: 
- **Phone number(s)**: 
**Upgrade or Relocation of Existing Service Information**

Existing size: Amps _______ Voltage _______
Overhead or Underground (circle one)
Single-phase or Three-phase (circle one)
Estimated connection date of permanent service (mm-dd-year) _________
Is temporary service required? Yes _____ No _____

Requested size: Amps _______ Voltage _______
Overhead or Underground (circle one)
Single-phase or Three-phase (circle one)

### New Connected Load

<table>
<thead>
<tr>
<th>Load Type</th>
<th>Load(^1)</th>
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<tbody>
<tr>
<td></td>
<td>Single-Phase (kW)</td>
<td>Three-Phase (kW)</td>
<td>Connected (kW)</td>
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<tr>
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<td>heater</td>
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<td>Cooking</td>
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<td>Electric heat</td>
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<tr>
<td>Refrigeration/HVAC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Largest size</td>
<td>______ tons</td>
<td></td>
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<tr>
<td>Motors(^2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Largest size and locked rotor amps (LRA)</td>
<td>______ kW</td>
<td>______ LRA</td>
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<tr>
<td>Welders</td>
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<tr>
<td>Largest size</td>
<td>______ kW</td>
<td></td>
<td></td>
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<tr>
<td>Computers</td>
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<td>Elevators</td>
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<td></td>
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<tr>
<td>Electric vehicle (EV) charging unit</td>
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</tr>
<tr>
<td>Number of EV units</td>
<td></td>
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<tr>
<td>Other loads</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total connected kW</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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1. Typical conversion factor: 1 hp = 1 kW; 1 ton = 1 kW
2. Motors that are 10 hp or larger may be required to be equipped with reduced voltage starters.

**NOTE:** When inadequate or inaccurate information results in design changes, the cost will be borne by the property owner or electrician.

Site grading, utility, and landscaping plans are required to complete the PGE electrical design.

Hard copies of the service request form, scaled plot or site plan, and building footprint may be mailed to 7800 SW Mohawk St., Tualatin, OR 97062. See Appendix A, Required Files for Service. Contact a Service Coordinator at 503-323-6700 or 800-542-8818; files may be faxed to 503-612-3501.
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