

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.

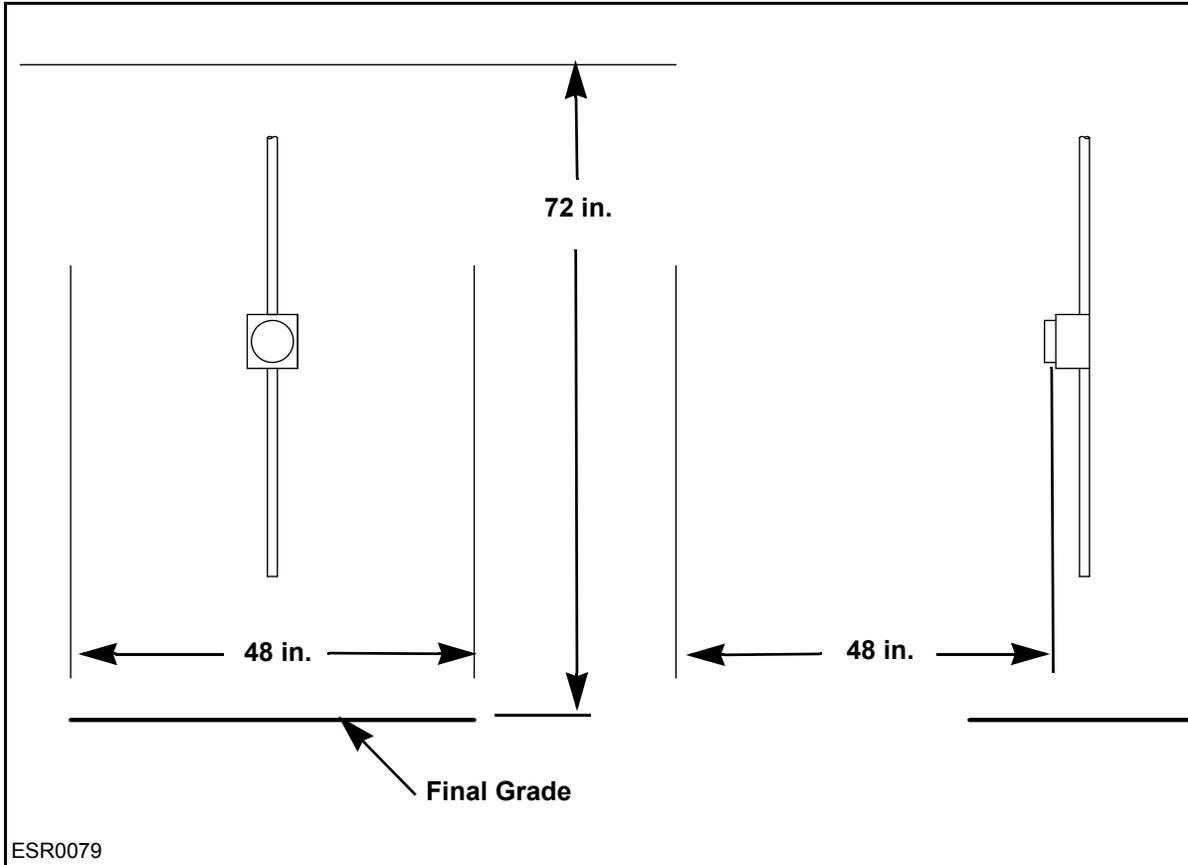


Figure 5-1: Minimum Unobstructed Workspace

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**.

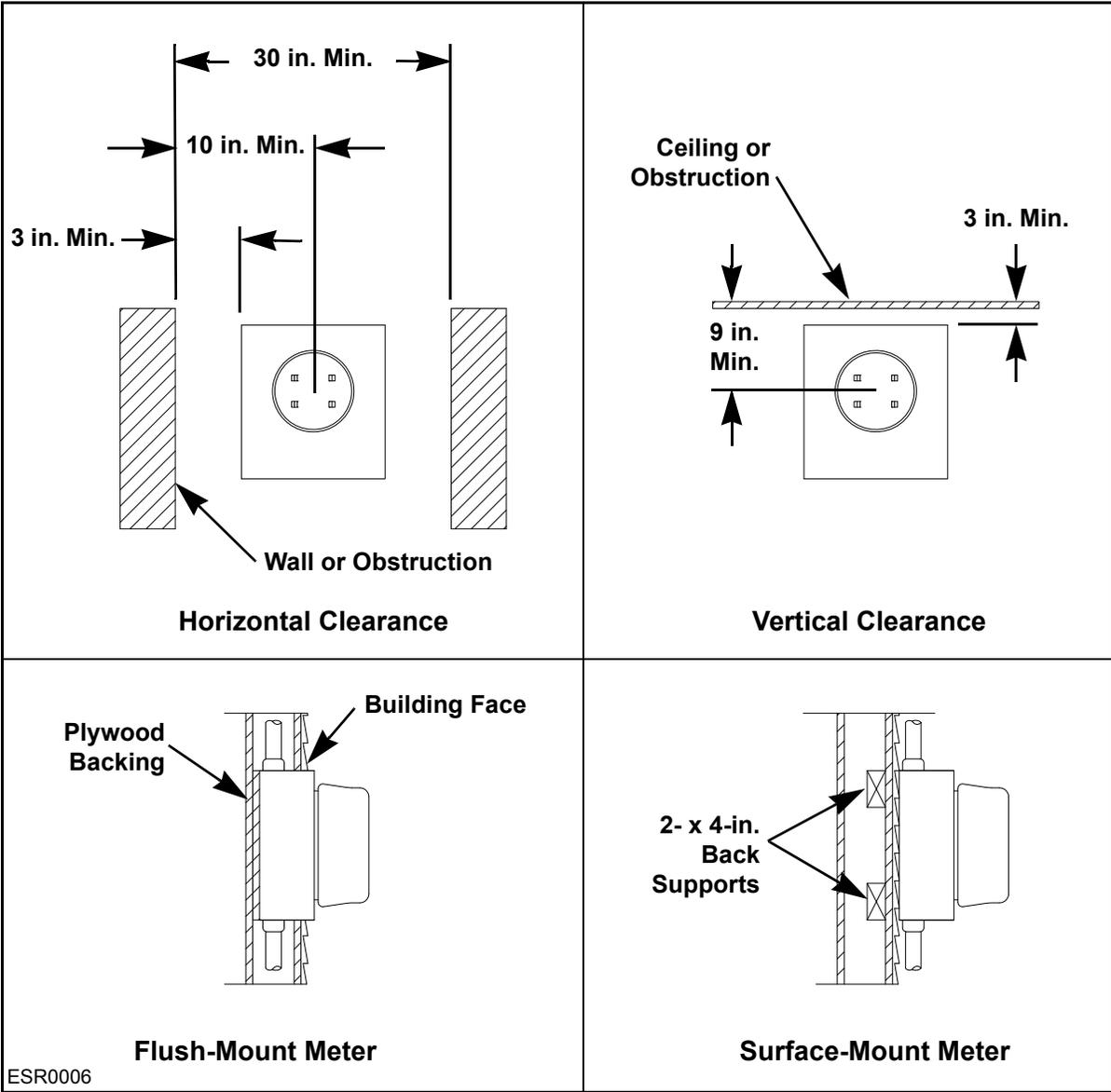


Figure 5-2: Meter Clearances for Single-Meter Installations

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.

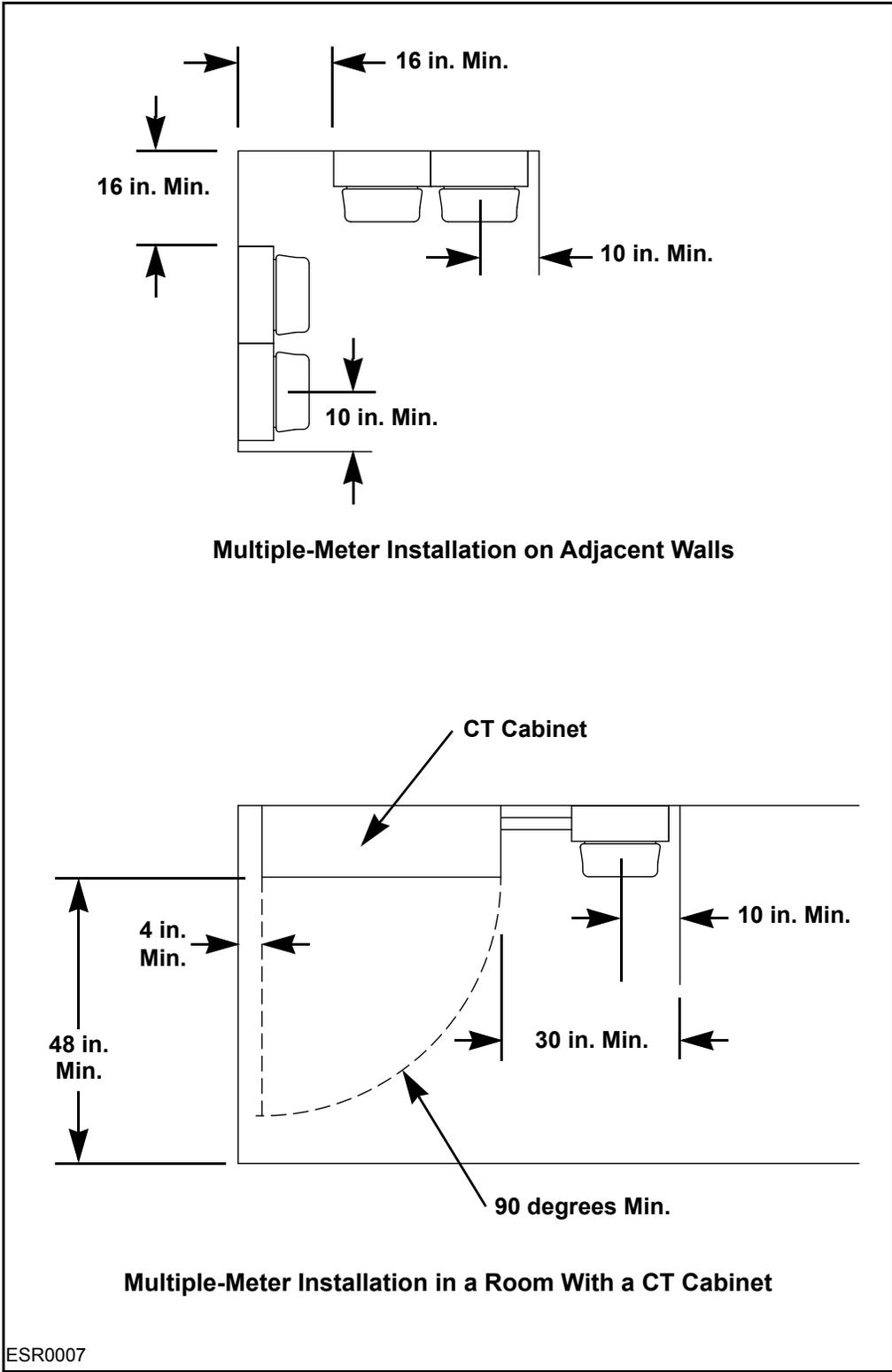


Figure 5-3: Meter Clearances for Multiple-Meter Installations

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**.

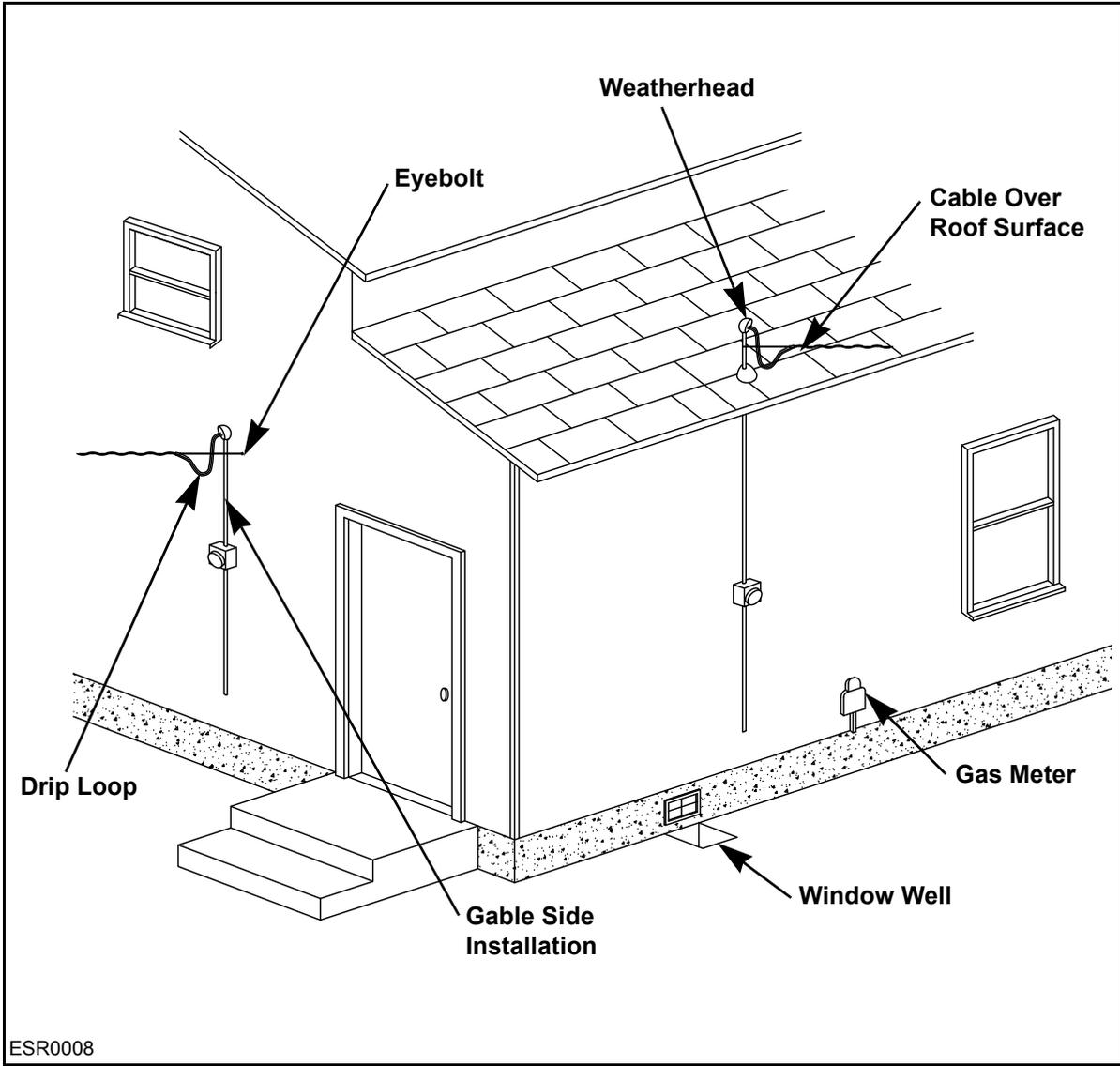


Figure 5-4: Metering Equipment for Overhead Service

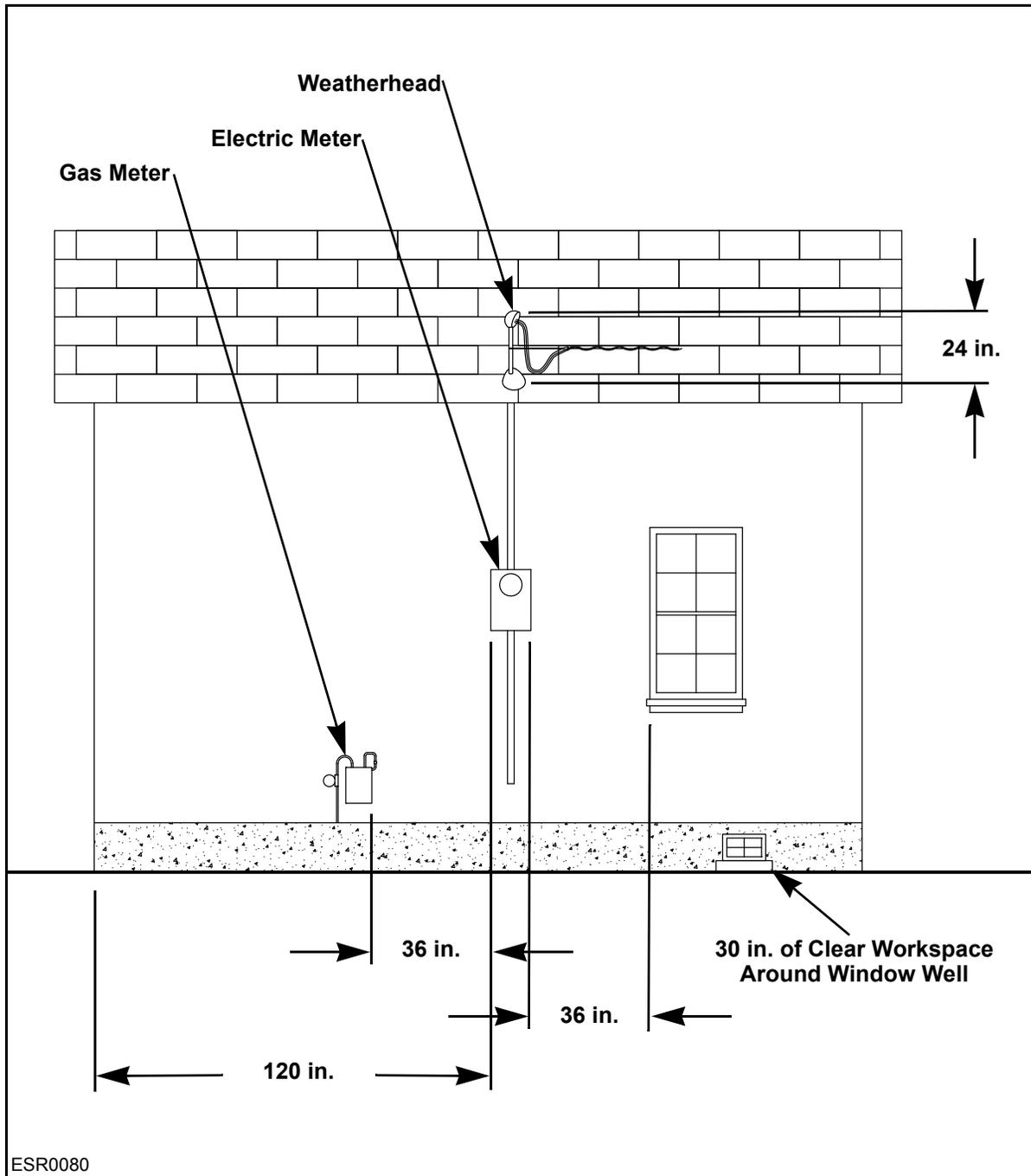


Figure 5-5: Residential Meter Clearances for Overhead Service

Table 5-1: Minimum Clearances for Service Drops, 750 Volts and Lower, Based on NESC C2-2012

Type of Clearance	Type of Structure or Feature	Clearance (feet)
Minimum service drop clearance. ¹ (NESC Table 232-1)	Over roads, streets, and other areas subject to truck traffic	16 ²
	Over alleys, parking lots, and driveways	16 ²
	Over land traveled by vehicles	16
	Over state highways (ODOT may require greater clearances)	19
Minimum clearances over spaces and ways subject to pedestrians/restricted traffic only. (NESC Table 232-1)	At height of attachment	14
	Drip loops of service drops for 120/240, 208Y/120 volts, and 480Y/277 volts	12
Minimum clearances from buildings for service drops not attached to the building. (NESC Table 234-1)	Vertical clearance over or under balconies and roofs accessible to pedestrians	11 ³
	Vertical clearance over or under balconies and roofs not accessible to pedestrians	3.5 ³
	Horizontal clearance to walls, projections, windows, balconies, and areas accessible to pedestrians	5 ³
	Radio and television antennas not accessible to pedestrians	3 ³
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)	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.	10 ³
	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	1.5 ³
	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	3

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**.

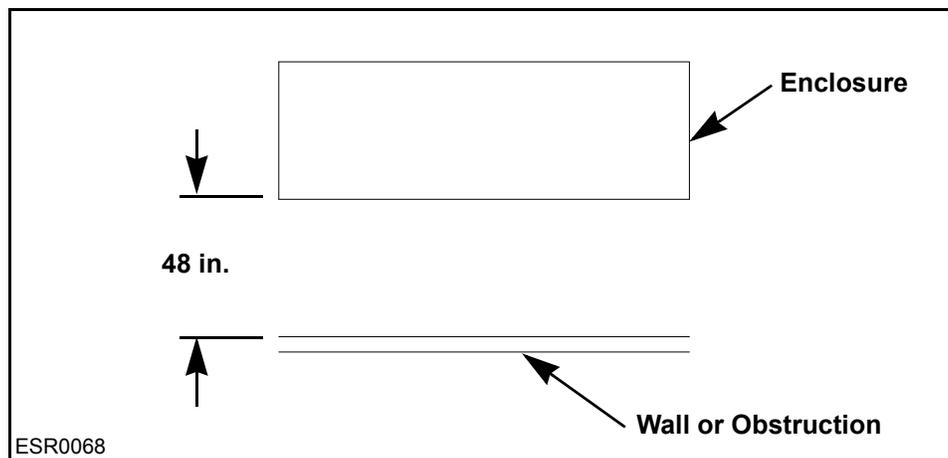


Figure 5-6: Workspace When There Is One Enclosure

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**.

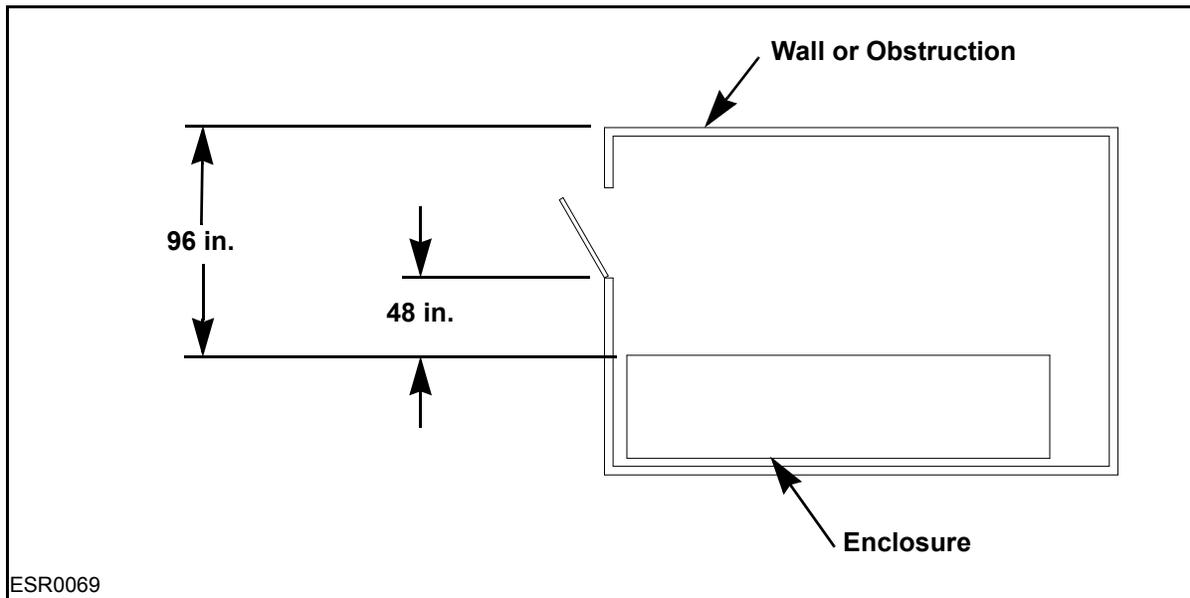


Figure 5-7: Workspace When There Is One Enclosure and One Doorway

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**.

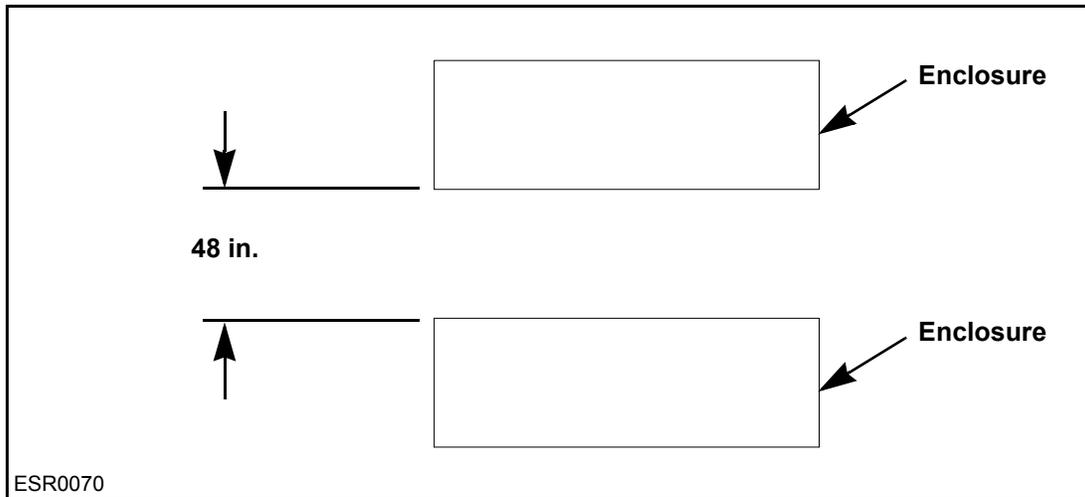


Figure 5-8: Workspace When There Are Two Enclosures

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 closets 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.

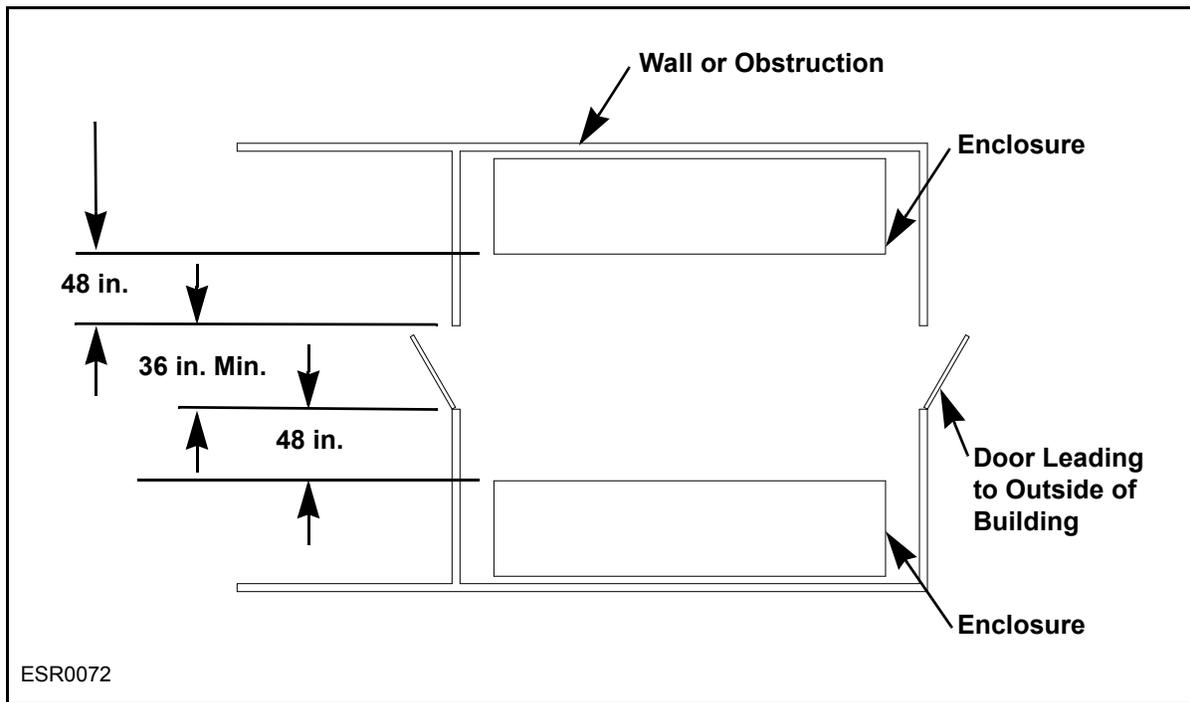


Figure 5-9: Workspace When There Are Two Enclosures and Two Doorways

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.

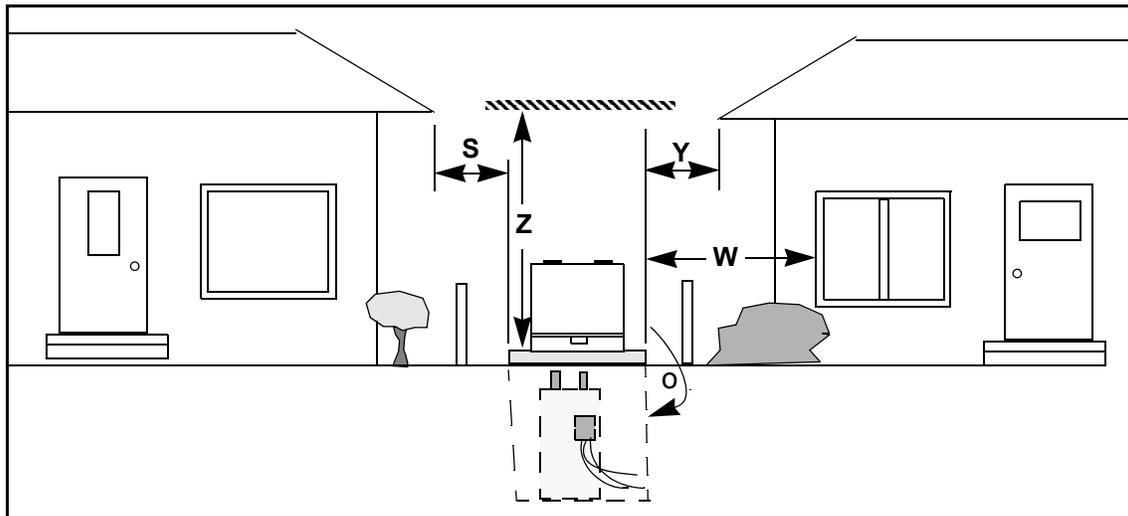


Figure 5-10: Minimum Separation of a Standard Transformer from a Building

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

Oil Capacity (gallons)	Minimum Separation (feet)			
	Noncombustible Structure ¹ (S)	Combustible Structure ² (Y)	To Any Opening in Structure ³ (W)	Vertical Distance ⁴ (Z)
0–499	3	8	8	25
500–5000	25	50	50	50
5001 or more	50	100	100	100

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 Equipment¹

Fluid Capacity of Either Container (gallons)	Horizontal Distance (feet)
0–499	5
500–5000	25
5001 or more	50

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 Building¹

Oil Capacity (gallons)	Minimum Separation (feet)			
	Noncombustible Structure ² (S)	Combustible Structure ³ (Y)	To Any Opening in Structure ⁴ (W)	Vertical Distance ⁵ (Z)
All sizes	3	3	8	20

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 Equipment¹

Fluid Capacity of Either Container	Horizontal Distance (feet)
All sizes	3

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.

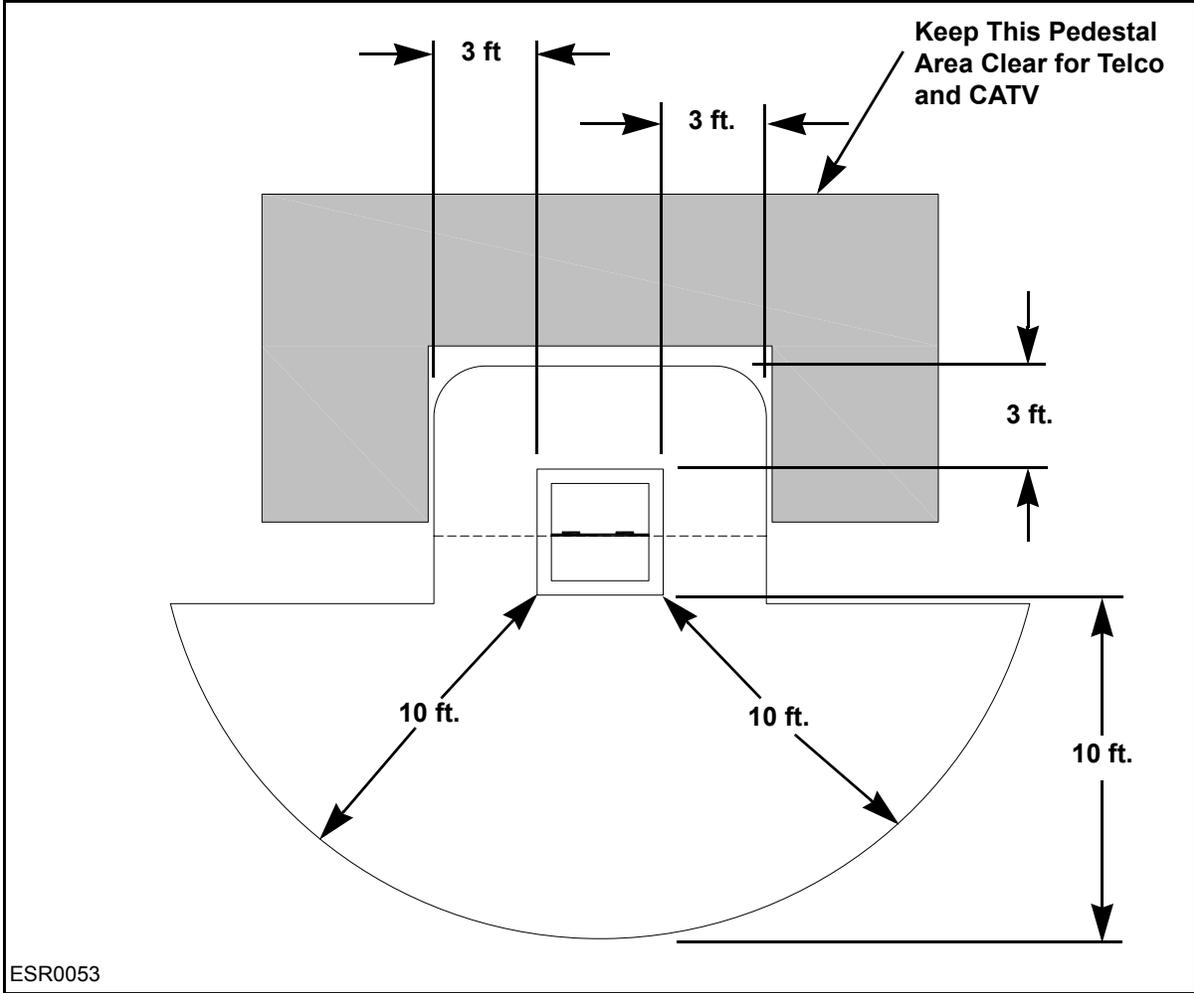


Figure 5-11: Working Clearances Around Pad-Mounted Electrical Equipment Adjacent to a Noncombustible Structure

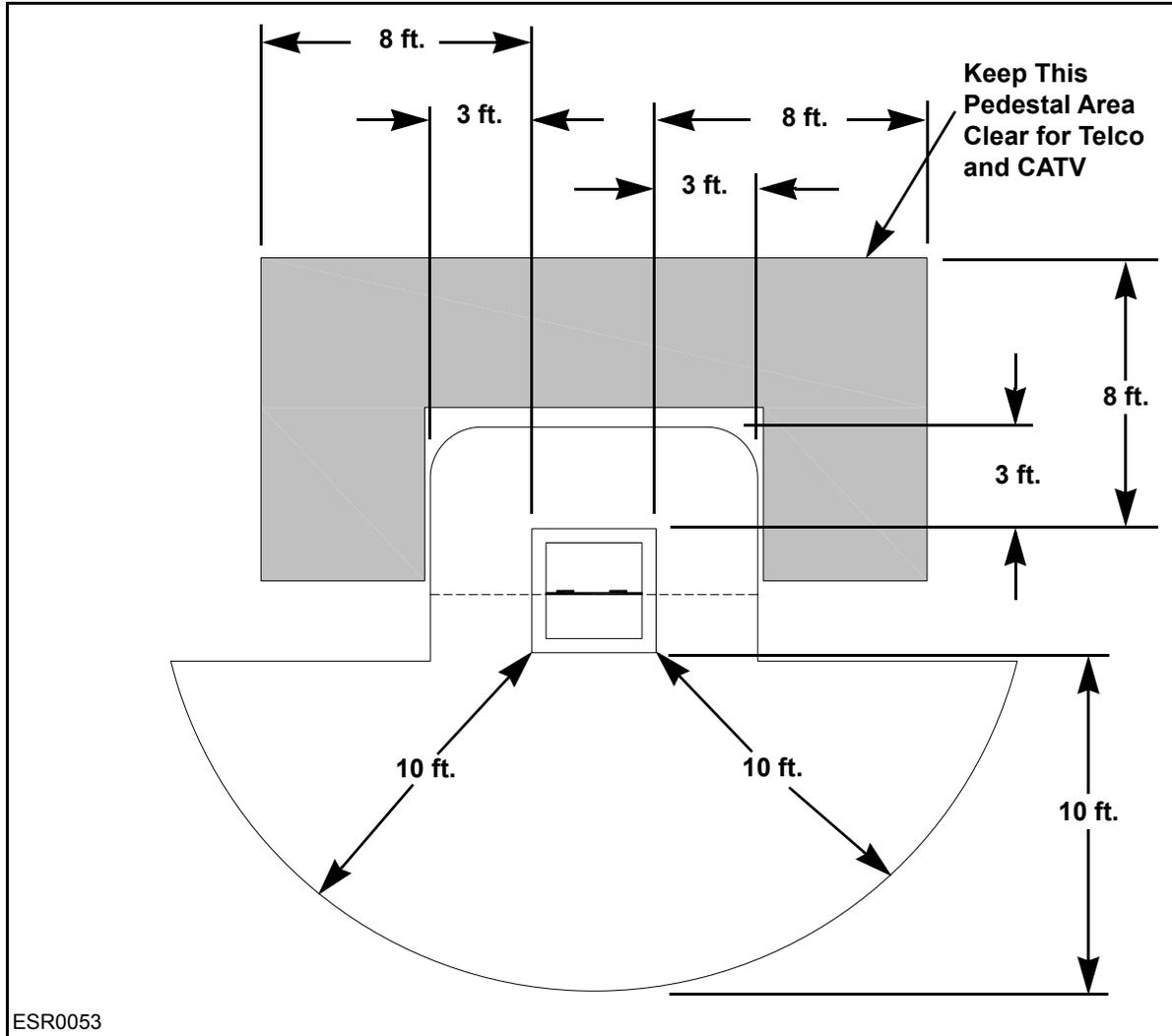


Figure 5-12: Working Clearances Around Pad-Mounted Electrical Equipment Adjacent to a Combustible Structure

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.

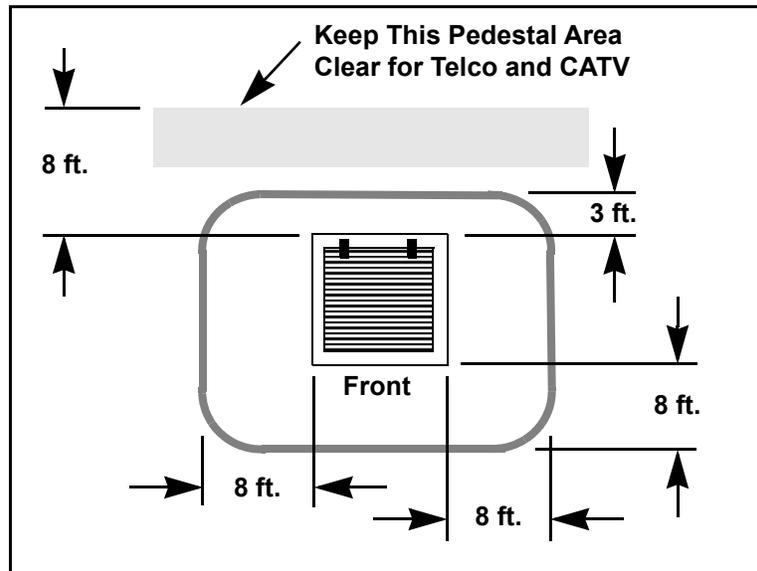


Figure 5-13: Working Clearances Around PGE Submersible Equipment

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.

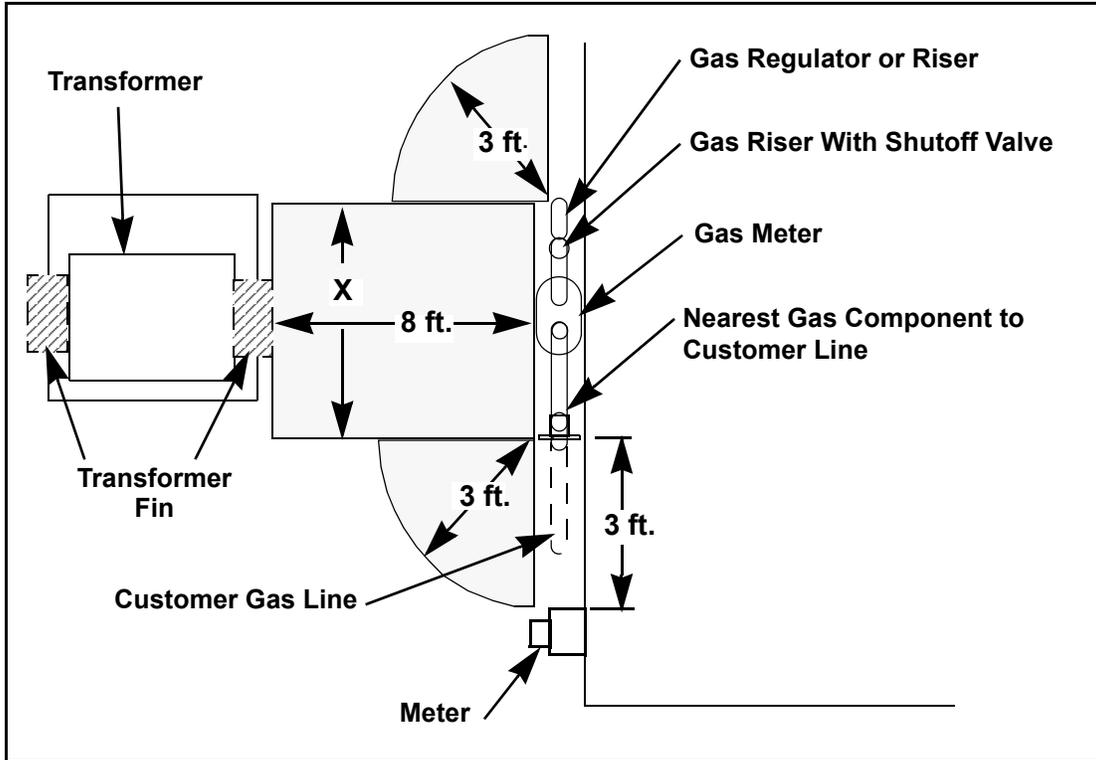


Figure 5-14: Separation of Electrical Equipment and a Meter from a Gas Meter Set

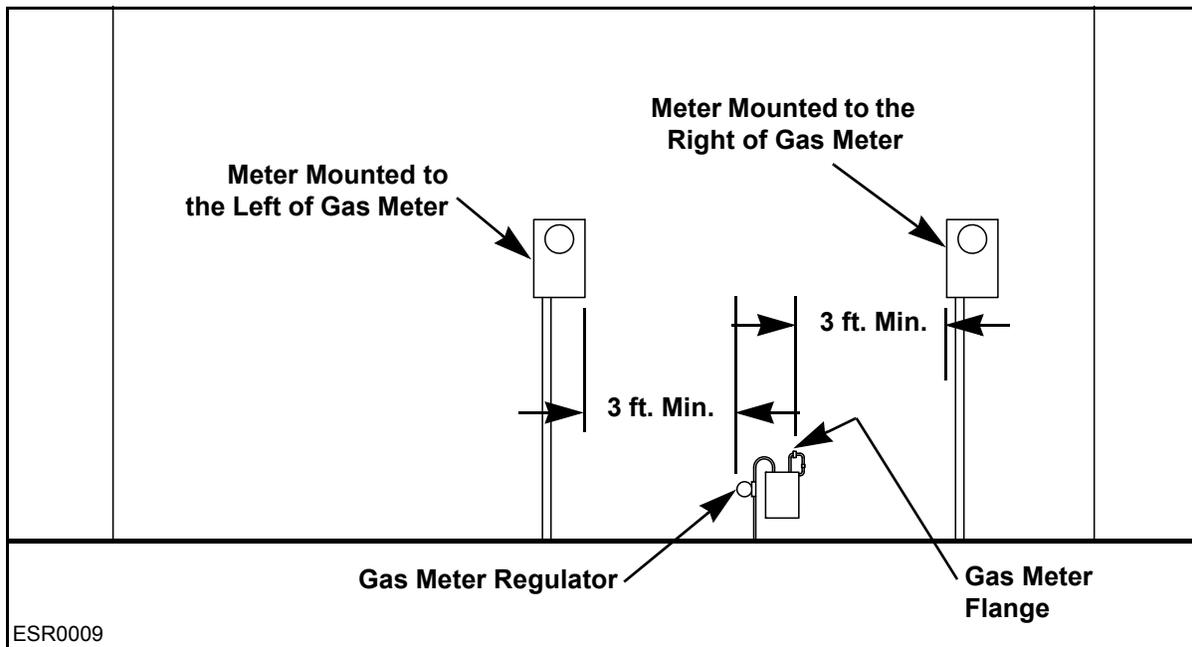


Figure 5-15: Separation of a Meter from a Gas Meter Regulator and Gas Meter Flange

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.

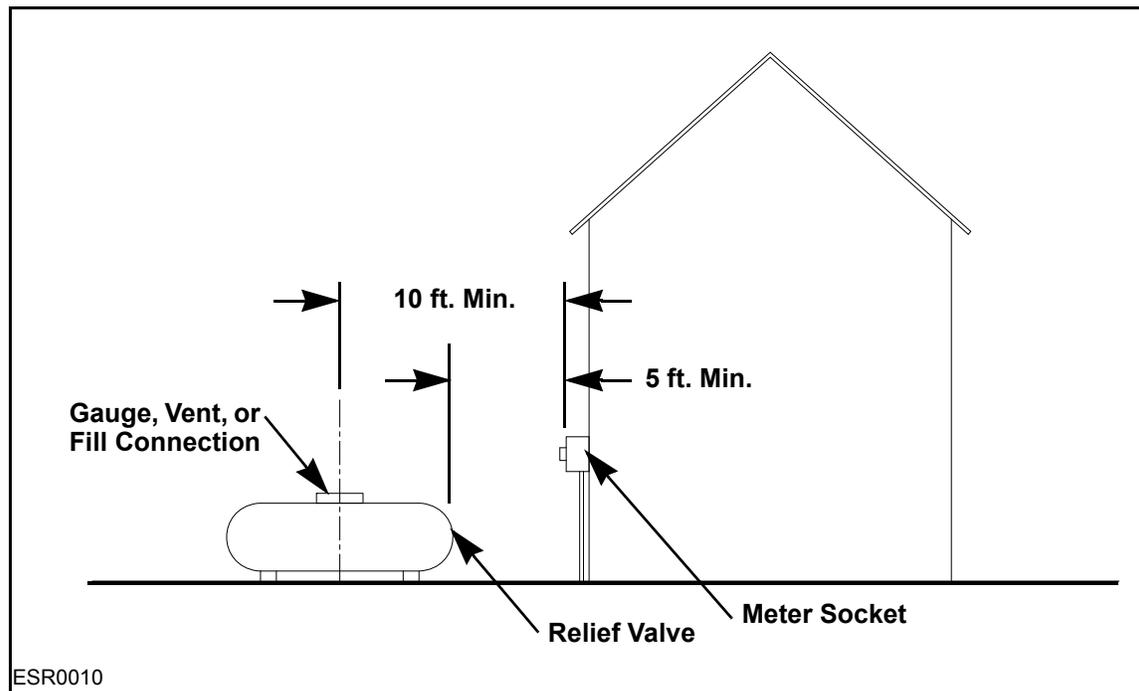


Figure 5-16: Minimum Distances from an Aboveground LP Storage Tank

Table 5-6: Minimum Separation of a Less-Flammable-Rated Transformer from Other Oil-Filled Equipment¹

Container Type ²	Tank Location	Container Size ³	Minimum Separation from Electrical Equipment in Any Direction (feet)	
			From Relief Valve of Container Not Filled On Site	From Fill Tubes or Relief/Vent Valves of Containers Filled On Site
DOT	Aboveground	All sizes	5	10
ASME			—	10
ASME	Belowground	0 to 2000	—	10
		2001 to 120,000	—	50

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.