

## CUSTOMER-OWNED METER ROOM DESIGN STANDARDS

### Engineering Standards Policy 368

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# CUSTOMER-OWNED METER ROOM DESIGN STANDARDS

## Engineering Standards Policy 368

### 1 General

This policy outlines customer responsibilities and design requirements for meter rooms housing customer-owned and maintained meter service equipment (switchboards, meter sockets, CT cabinets). An overview of the options covered in this design standard policy is provided below:

- **Service Point Entrance:** The point of connection between the facilities of the company and the premises' (customer) wiring (also known as point of delivery). The service point entrance is located exterior to the structure, is not surrounded completely by building walls, or is in an open area within proximity of the service transformer.
- **Meter Room:** Equipment located interior to the structure, fully surrounded by building walls, or in a separate walled or fenced enclosure in a location remote from the service point.
- **Alcove:** Equipment located exterior to the structure, recessed into a nook, and partially surrounded by walls.

This design standard policy should be interpreted in its entirety and in conjunction with the referenced codes and standards. Individual pages will not represent all the requirements necessary for an installation. Printed versions of this document may be out of date. Please consult our websites for the most recent version.

#### 1.1 Limitations on Availability

The company's standard construction practice is to not cross a customer's foundation with company conductors. This design aligns with industry best practices and the company's obligation to build a safe, reliable, and cost-effective electric system.

Service requests incorporating meter rooms should only be made when extenuating circumstances exist that make outdoor service equipment impractical or unfeasible.

The customer is responsible for submitting engineering conditions that justify meter rooms.

#### 1.2 Customer Cost Responsibility

Customer responsibilities and financial obligations vary based upon state tariff for line extensions. Construction of facilities that are beyond the standard construction may require the customer to pay additional costs; please review the relevant state line extension documents:

[13 Line Extensions.pdf Oregon \(pacificpower.net\)](#)

[13 Line Extensions.pdf Washington \(pacificpower.net\)](#)

[13 Line Extensions.pdf California \(pacificpower.net\)](#)

## 2 References, Codes, and Standards

- 40 Code of Federal Regulations (CFR) 112, *Oil Pollution Prevention*
- Electric Utility Service Equipment Requirements Committee, *EUSERC Manual*
- IBC, *International Building Code*
- IEEE C2, *National Electric Safety Code*
- NFPA 70, *National Electric Code*
- NFPA 2001, *Standard on Clean Agent Fire Extinguishing Systems*
- [PacifiCorp Six-State Electric Service Requirements \(ESR\) Manual](#)

## 3 Division of Responsibility

The customer shall be responsible for design, construction, labor, and furnishing of all materials, including but not limited to the following:

- Service equipment (including switchboard, pull boxes, meter stacks, CT cabinets, and CT meter sockets)
- Conduit from service transformer to service equipment
- Conductor or bussing from service entry equipment to meter rooms
- 120 V station service (lighting, convenience receptacles, etc.)
- Oil containment
- Ventilation
- Fire safety plan (containment, protection, suppression)

The customer will retain ownership of the meter room and will be responsible for all maintenance including: the meter room structure, preventing water ingress, 120 V station service, ventilation, fire suppression, drainage systems, and ensuring meter rooms are not used for storage.

Upon acceptance of the completed installation the company will install and maintain the following outdoor equipment:

- Service transformers
- Primary cables and terminations
- Primary cable conduit sealing
- Service cable from transformer secondary to service entrance

Note: the company will not install, own, or maintain service cables penetrating the buildings foundation.

- Communication equipment for SCADA

### 3.1 Design Review and Drawing Submittal

Requests for new service or modifications to existing meter rooms will require an Engineering Service Agreement (ESA). A System Impact Study (SIS) may be required. Verify with local engineering for instructions on ESA and SIS.

The customer shall submit to the company for approval a comprehensive package with design plans, drawings, and equipment submittals demonstrating compliance with this

design standard policy in accordance with Table 1. Incomplete or unapproved submittals shall be revised by the customer as noted on the returned plans and resubmitted. A minimum of 15 business days is required for the company to review submittals and revised submittals.

Design and construction drawings must be approved by the company before the customer submits a building permit application to the authority having jurisdiction (AHJ). The purpose of this requirement is to reduce the likelihood of delays and costly modifications should design changes be required. Company approval is limited to areas and aspects of the design necessary for the safe, efficient operation and maintenance of company equipment.

**Table 1 – Design Review Drawing Submittals**

| Item | Submittal   | Description   |
|------|---|---|
| 1    | Engineering conditions  | Customer justification to the company on why a meter room is required   |
| 2    | Overall site plan   | Entire property outline showing property boundaries, utility easements, building layout, location of transformers, service equipment, and metering points; primary/service conduit routes, vehicular access routes  |
| 3    | Per building site plan(s)   | Required for multi-building complexes; the same details are required as in overall site plans   |
| 4    | Enlarged site plans for all service equipment and transformer locations       | Transformer and service equipment locations with working clearances depicted, surface finish details (curbs, parking, landscaping, bollards, etc.), and primary/service conduit routes  |
| 5    | electrical one-line   | One-line drawings that show service transformer, service conductors (quantity/size), service entrance switchboards, pull sections and metering stacks, service disconnects; metering points shall differentiate between CT style and direct connect                           |
| 6    | Overcurrent protection coordination study                                     | Coordination study for service equipment and primary protective elements interfacing with the distribution system   |
| 7    | Metering and service entrance equipment submittals                            | Manufacturer drawings and equipment submittals with reference to applicable EUSERC designs sections; including all switchboards, pull sections, CT cabinets, and meter sockets.<br><br>Note: Tamper sealing provisions are required for all unmetered bus and panel sections. |
| 8    | Metering and service entrance equipment elevation drawings                    | Elevation drawings that include switchboards, pull sections, and metering stacks; show working clearances and meter stack socket height with relationship to final grade  |
| 9    | Metering rooms  | Detailed top view of meter room locations showing working clearances, egress paths, access points, and doors' panic hardware  |
| 10   | Ventilation plan  | Ventilation system diagram with calculated heat load, drawings showing all vents, ducts, louvers, etc., and design aspects of electrical/mechanical systems with equipment submittal  |
| 11   | Oil containment and spill prevention, control, and countermeasure (SPCC) plan | If the site is required to meet Rule 40 CFR Part 112, which is implemented by the U.S. Environmental Protection Agency (Oil Spill Prevention and Preparedness Regulations   US EPA)   |

| Item | Submittal                                    | Description   |
|------|--|---|
| 12   | Fire rating, protection, and detection plans | Drawings and submittals showing all elements of the fire safety plan<br><br>Note: The fire safety plan shall be subject to AHJ review and approval. |
| 13   | 120 V station service and lighting           | Electrical one-line and equipment submittal   |

#### 4 Design General

1. Each meter room or alcove shall be serviced by service entry equipment located exterior to the structure and shall meet requirements stated in the [Electrical Service Requirement Manual](#).
2. Meter room(s) are permitted for equipment 600 V and below.
3. Exterior service entry equipment shall follow design standards in the ESR Section 9.5 for service entry pull section.
4. Conduit lengths from transformer to service entry equipment shall follow design standards in the ESR Section 5.
5. Meter room(s) are permitted for every three levels. First meter room shall be located on the ground floor.
6. Where a floor is permitted to have a meter room, a total of one meter room is permitted. A maximum of two meter rooms are permitted when more than one service point is servicing the structure.
7. Customer-owned unmetered conductor shall be capable of being sealed.
8. Meter room(s) or alcove(s) shall not be used for storage.

##### 4.1 Location and Access Requirements

1. The company shall be provided with unencumbered access to meter room(s) or alcove(s) at all times. Access shall not require customer contact, coordination with site management, or be blocked by intermediary gates.

Note: Power-operated gates or garage doors do not meet the requirements for unencumbered access.

2. Meter room(s) shall start on the ground floor; sub-ground floor meter room(s) are not permitted.
3. Ground floor meter room(s) shall be directly accessible from the exterior of the building.
4. Ground floor meter room(s) or alcove(s) paths shall be accessed from a public right-of-way or recorded and dedicated easements that are transferrable with the property.
5. Upper-level meter room(s) shall be in the same location on each floor.
6. A plaque shall be installed at the ground floor meter room describing the location of the upper level meter rooms.



#### 4.1.1 Vehicular Access to Site

1. The road surface shall be a paved or well-maintained gravel surface free of large rocks and vegetation.
2. Where applicable, vehicle access will require roll curbs or driveways.
3. Minimum roadway widths, overhead clearances, and maximum distance to ground floor meter room(s) or alcove(s) shall be as defined in Table 2. A clear unobstructed path from parking locations shall be provided to ground floor meter room(s) or alcove(s).

**Table 2 – Vehicular Access Roadway Requirements**

| Access Point Type | Minimum Roadway Width (ft.) | Minimum Vertical Clearance (ft.) | Maximum Distance from Parking Location to Ground Floor Meter Room (ft.) |
|-------------------|-----------------------------|----------------------------------|---|
| Personnel         | 12                          | 14                               | 100   |

4. Parking and staging areas for vehicles shall be located in such a manner that the impact on adjacent public and commercial activities is minimized.

#### 4.1.2 Personnel Access/Egress Requirements To and From Meter Room Alcove

1. For meter room equipment rated 1,200 amps (A) and below, only one egress point is required if the minimum working clearances in 4.2 Table 3 are met.
2. For meter room equipment rated 1,201 – 4,000 A, two egress points are required if double working clearances cannot be obtained. One egress point is allowed if there are double working clearances or there is a continuous and unobstructed way of exit.

Note: The company defines “continuous and unobstructed way of exit” when the egress is located directly in front of equipment and on the opposite side of the working space. See Appendix A [Figure 4](#) for more details.

3. Equipment shall not be placed such that the egress is on the opposite side of the equipment. See Appendix A [Figure 8](#) for more details.
4. For all additional egress requirements, the customer shall follow NEC Article 110.
5. Access/egress paths shall not open directly into roadways or create other unsafe conditions.
6. Access/egress paths shall not open into or directly above electrical equipment or conductors.
7. The access/egress point shall be located within 30 feet of an emergency exit (stairwell) if located above ground floor.
8. Access/egress points shall be located in a way that minimizes impact on adjacent public and commercial activities, should they be blocked or in use for extended periods of time.
9. Stairs or ramps shall not be permitted inside meter room(s) or alcove(s). If stairs or ramps are required, they must be located outside the meter room or alcove with no less than an 8-foot landing.

#### 4.1.3 Doorways and Doors

1. Each doorway shall:
  - Have a minimum opening of 36" W × 80" H
  - Be provided with a clear unobstructed access and egress path
2. Each door shall:
  - Open in the direction of egress
  - Be listed with a minimum Type A, fire and smoke rating of three hours
  - Be supplied with photoluminescent exit signage
  - Be equipped with an automatic door closure device (interior side)
  - Be equipped with a flat bar panic egress hardware (interior side)
  - Be equipped with doorstop mechanism to keep the door open
  - Be equipped with lock set (exterior side); hardware functionality shall be set up as ANSI 09 "storeroom," as described in Figure 1



**Figure 1 – Equipment Room Door Lockset Functionality**

- Be equipped with electrical hazard warning/danger signage, and signage to restrict blocking and assist with locating egress points

#### 4.1.4 Swing Gates and Roll-Up Coil Doors for Ground Floor Meter Rooms

1. Roll-up coil doors and swing gates shall:
  - Be manually operated
  - Be lockable and securable from the interior and exterior using padlocks
  - Have minimum three-hour fire and smoke rating
  - Have a minimum clear opening of 15' H × 10' W
2. Swing gates and roll-up coil doors may be used to facilitate equipment working clearances, which may allow reduction in meter room depth. If used for this purpose they should be located such that the impact on pedestrian and vehicle traffic is minimal.
3. Swing gates used for equipment installation/removal may also serve as a personnel access point, if equipped with panic hardware for egress, see Section 4.1.3.

#### 4.2 Equipment Clearances

1. For adjacent pieces of equipment, the clearance boundaries may overlap.

2. Working clearances shall follow NEC 110.26(A)(1). See Table 3 for details.
3. For equipment 1,201 – 4,000 A, if two ways of egress or a single egress with a continuous and unobstructed way of exit is not available, double working clearances shall be required.
4. For all additional working clearance requirements, the customer shall follow NEC Article 110.

**Table 3 – 1,000 Volts, Nominal, or Less Working Clearances**

| Nominal Voltage to Ground | Minimum Clear Distance |                      |                 |
|---------------------------|------------------------|----------------------|-----------------|
|                           | Condition 1            | Condition 2          | Condition 3     |
| 0 – 150                   | 900 mm. (3 ft.)        | 900 mm. (3 ft.)      | 900 mm. (3 ft.) |
| 151 – 600                 | 900 mm. (3 ft.)        | 1.0 m. (3 ft. 6 in.) | 1.2 m. (4 ft.)  |
| 601 – 1000                | 900 mm. (3 ft.)        | 1.2 m. (4 ft.)       | 1.5 m. (5 ft.)  |

Note: Where the conditions are as follows:

**Condition 1** – Exposed live parts on one side of the working space and no live or grounded parts on the other side of the working space, or exposed live parts on both sides of the working space that are effectively guarded by insulating materials.

**Condition 2** – Exposed live parts on one side of the working space and grounded parts on the other side of the working space. Concrete, brick, or tile walls shall be considered as grounded.

**Condition 3** – Exposed live parts on both sides of the working space.

National Fire Protection Association. (2023). *NFPA 70, National Electrical Code*. Table 110.26(A)(1). [NFPA]

#### 4.3 Oil Containment and Spill Prevention, Control and Countermeasures (SPCC)

Customers who own oil-filled equipment may be required to accommodate a Spill Prevention, Control, and Countermeasure (SPCC) Plan. SPCC plans are required by 40 CFR Part 112, *Oil Pollution Prevention*, which is enforced by the U.S. Environmental Protection Agency. The customer shall be responsible for providing oil-containment system, as specified by the company, to meet the site-specific SPCC plan. See [ESR WP SPCC](#) for more information.

#### 4.4 Fire Ratings

1. Meter rooms, alcoves, and building elements adjacent to the installations shall be designed for passive fire resistance and containment.
2. Fire ratings for the meter room, alcoves, and protection of the building shall be subject to review and approval of the AHJ. The company requires a minimum three-hour fire and smoke rating and sealing of all penetrations to prevent the spread of fire and smoke.
3. Sealants, dampers, and barriers shall be listed for the intended application.

##### 4.4.1 Fire Protection and Detection Systems

1. The AHJ may require a fire detection and protection system to be installed. The company assumes no responsibility for the permitting or operation of the system.

2. Automatic sprinklers or other water-based fire suppression systems shall not be used within meter rooms.


Note: Water-based systems are not allowed due to the risks of electrical shock with high-voltage equipment, ability to spread oil-based fires, and potential for leaks that could cause failure of electrical equipment resulting in additional hazards.

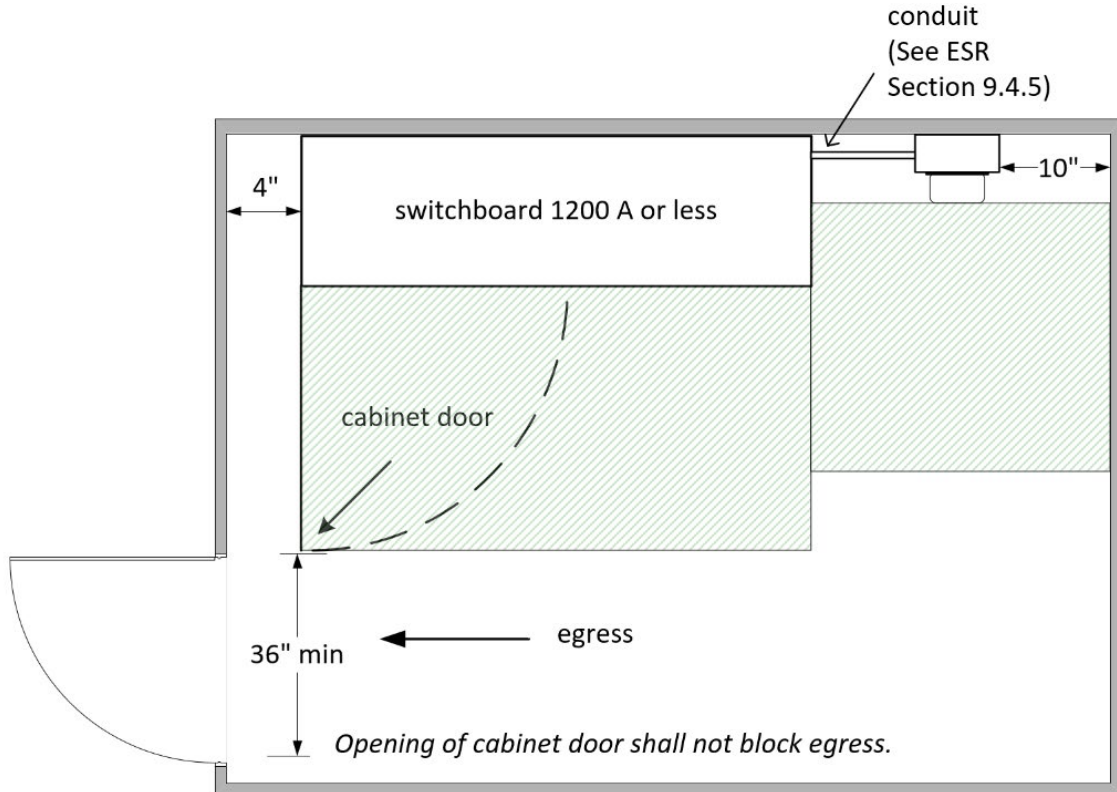
3. When automatic fire suppression (non-water based) systems are installed:
  - Fire suppression piping, nozzles and equipment shall be located so as not to interfere with electrical cables and equipment. A minimum 4-foot radial clearance shall be maintained.
  - Prominent warning signage shall be installed at all entrances advising personnel of potential hazards with system operation.
  - Audible and visual predischage alarm devices and emergency abort switch shall be provided.
  - Control panels, suppression agent cylinders, and containers shall be located outside of the meter room.
  - Control systems, supervisory switches, and alarms shall be tested by the customer on an annual basis.

#### **4.5 Ventilation**

Meter rooms shall be well ventilated to dissipate the heat from the electrical equipment. Ventilation requirements shall meet NEC 110.13 (B). The customer shall follow NEC 450.9 if customer-owned transformers are installed in meter rooms.

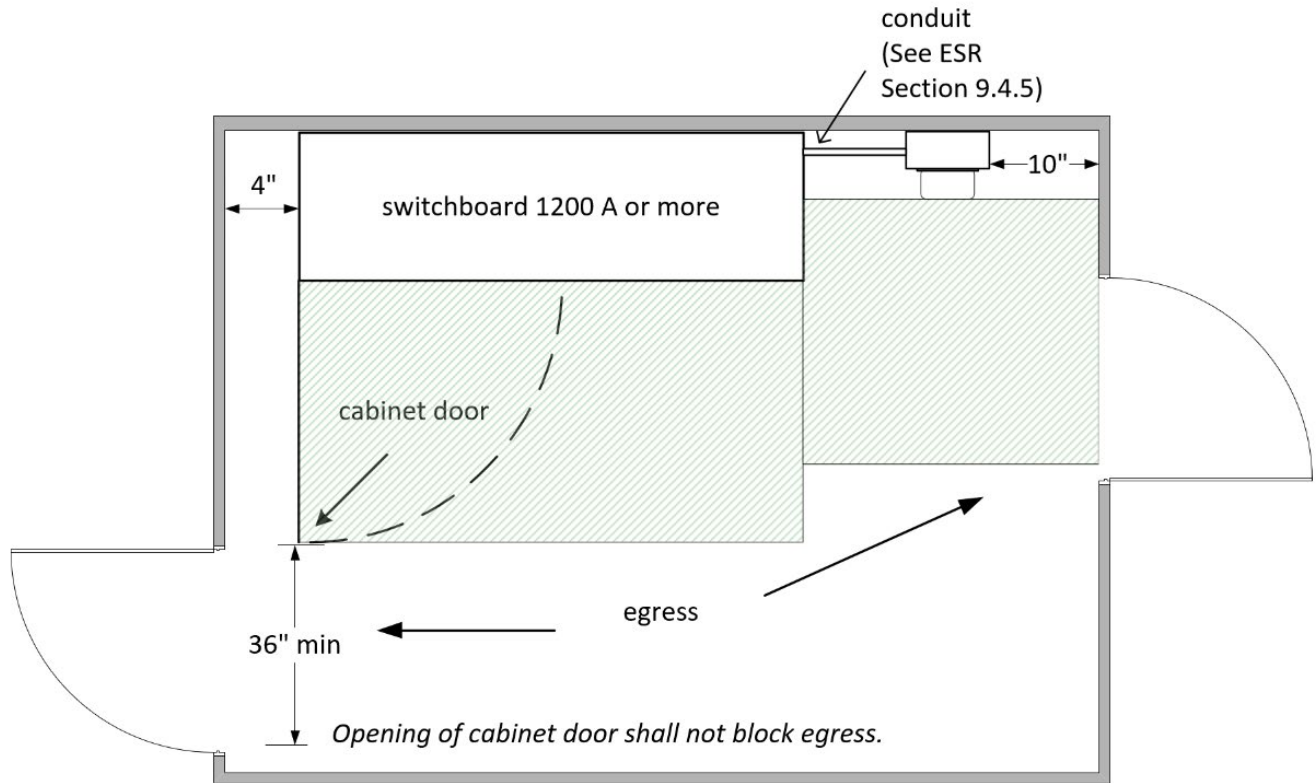
**Appendix A – Example Layouts**

 Working Clearance Per Requirement 4.2



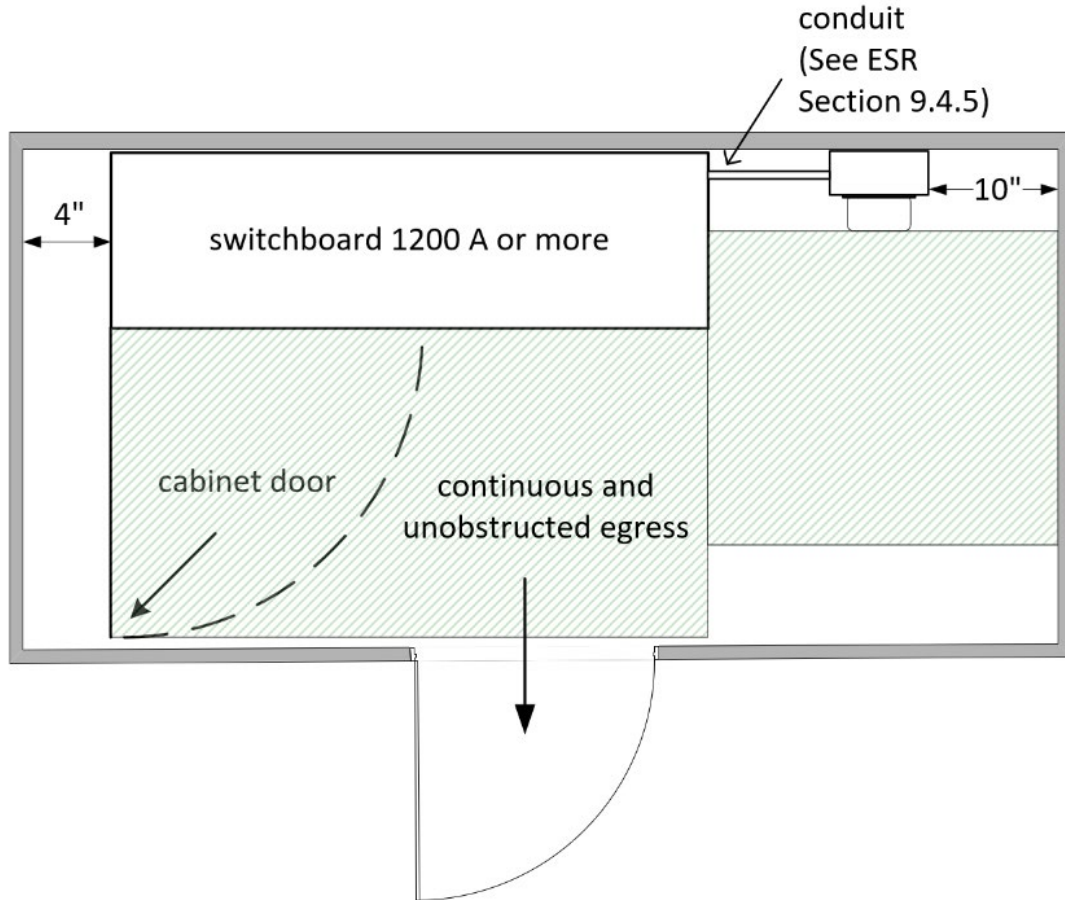
See Table 3 for minimum working clearances

**Figure 2 – 1,200 A, One Egress**



See Table 3 for minimum working clearances

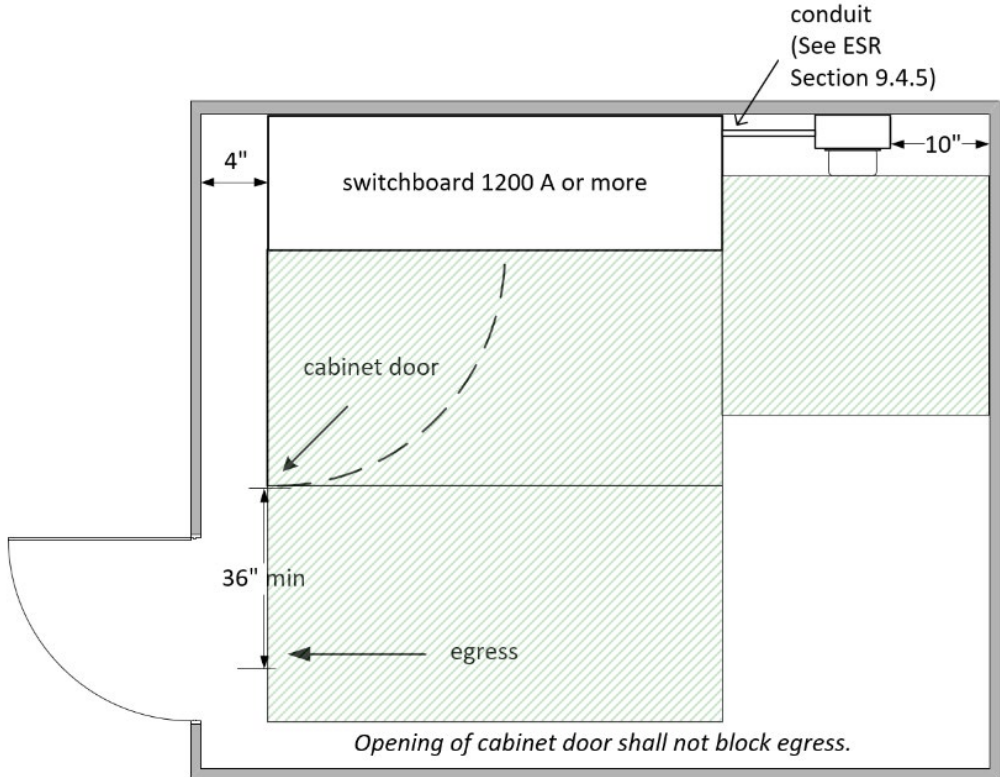
**Figure 3 – 1,200 A or More, Two Egress**



See Table 3 for minimum working clearances

**Figure 4 – 1,200 A or More, One Egress**

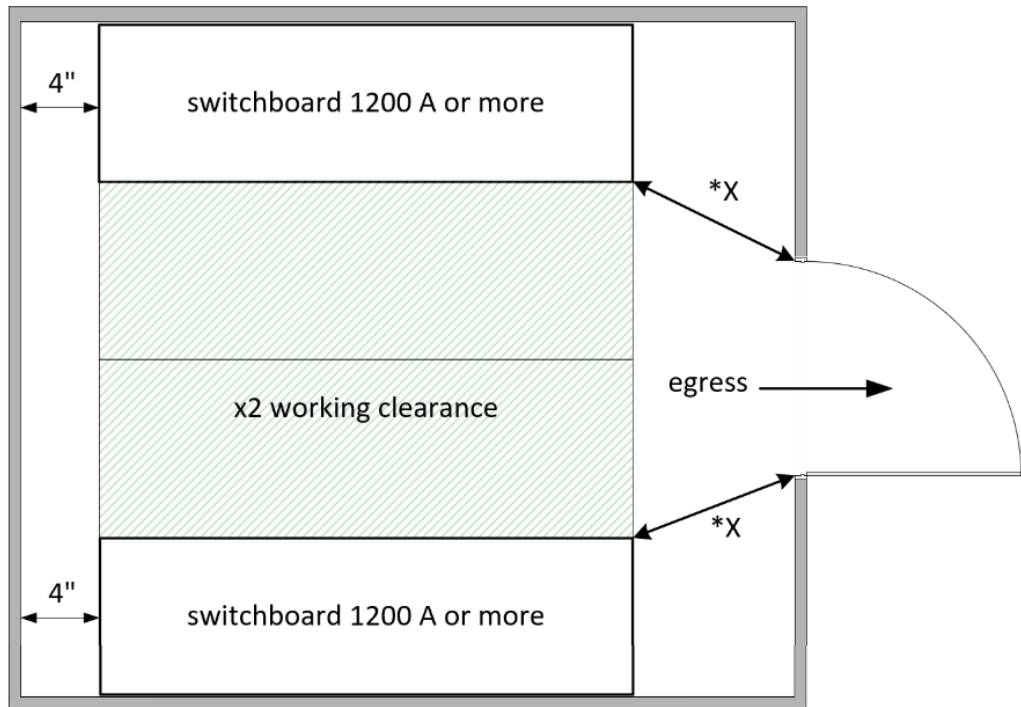




See Table 3 for minimum working clearances

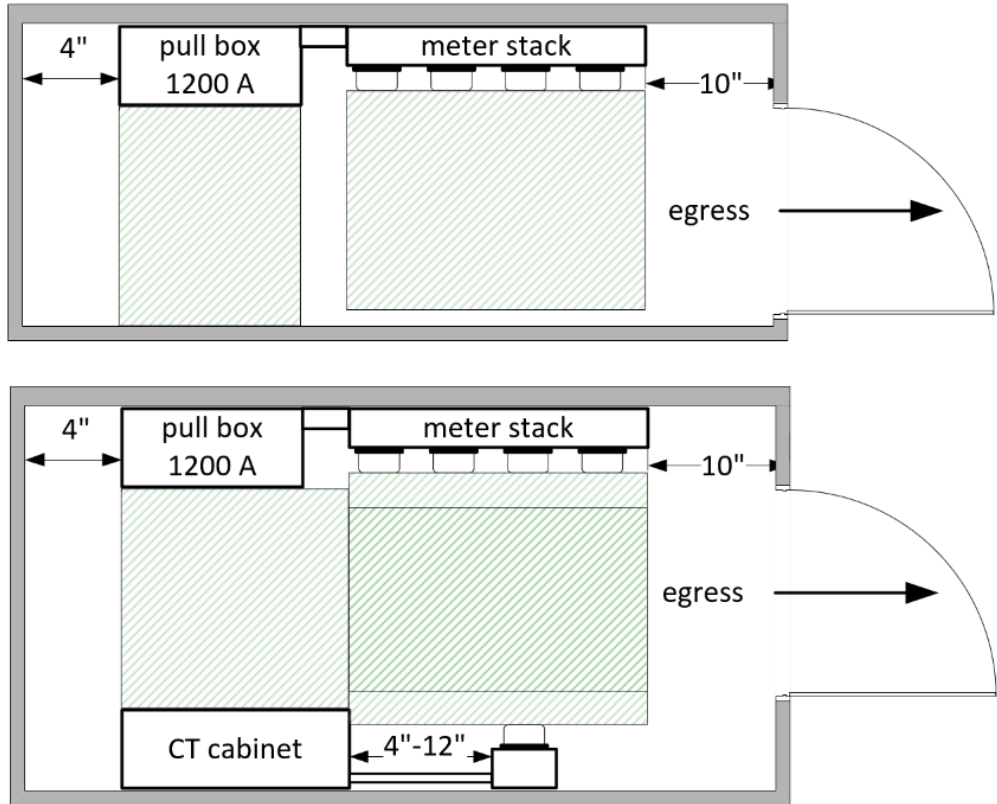
**Figure 5 – 1,200 A or More, One Egress, and Double Working Clearance (a)**





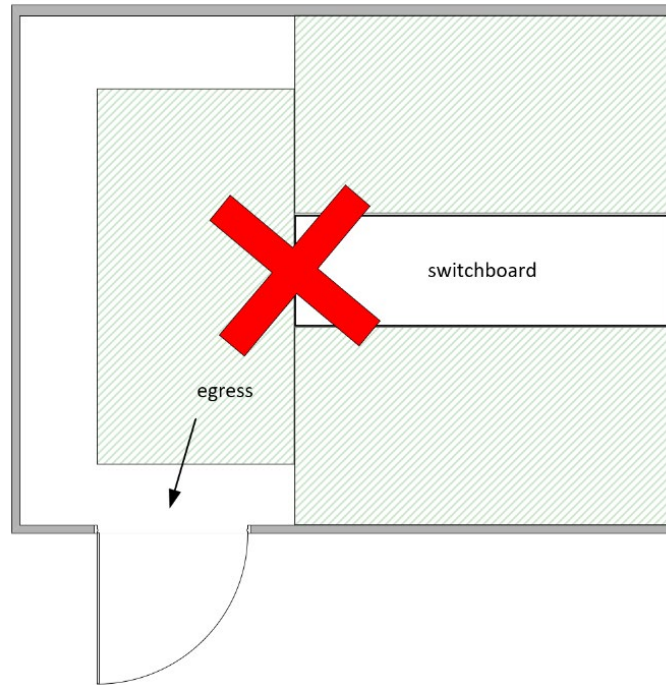
\*X: see Table 3 for minimum distance

**Figure 6 – 1,200 A or More, One Egress, and Double Working Clearance (b)**



See Table 3 for minimum working clearances

**Figure 7 – 1,200 A With Meter Stacks, One Egress**



See Table 3 for minimum working clearances

**Figure 8 – Prohibited Equipment Location**