

PRIMARY METERING COMPARTMENT REQUIREMENTS, 27 kV



figure 1

1. Scope

This construction standard covers the requirements for customer-owned, 27 kV, primary metering compartments connected to Seattle City Light's 26.4 kV, three-phase, 60 Hz, 4-wire, solidly grounded, isolated neutral, distribution system.

2. Application

This standard was created to assist Seattle City Light's customers, consultants, and contractors specify and acquire safe and reliable primary switchgear.

3. Industry Standards

Metering compartment shall meet the applicable requirements of the latest revisions of the following industry standards:

- NFPA 70; National Electrical Code (NEC)
- Electric Utility Service Equipment Requirements Committee (EUSERC)

4. Conflicts

Where conflict exists, the following order of precedence shall apply:

1. NFPA 70
2. Site-specific requirements
3. This Seattle City Light Construction Standard
4. EUSERC
5. Other industry standards

5. Definition

EUSERC (*pronounced U-SERC*) - Stands for Electric Utility Service Equipment Requirements Committee. The purpose of EUSERC is to promote uniform electric service requirements among the member utilities, publish existing utility service requirements for electric service equipment and provide direction for development of future metering technology. EUSERC's goal is to support the development of metering and service equipment that is safe and cost effective to the serving agencies and their customers, and to establish manufacturing and installation requirements for metering and service equipment that are acceptable to all member utilities. The term EUSERC may refer to the committee or their set of requirements.

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6. Discussion

Because it is revised on an annual basis, Seattle City Light's customers, consultants, and contractors are advised to refer to the latest revision of EUSERC.

A form for ordering copies of EUSERC may be found at www.euserc.com.

This standard was developed based on the April 2011 EUSERC.

7. Basic Requirements**7.1 Revenue Metering Compartment**

The revenue metering compartment shall meet the requirement of EUSERC drawing 400.

7.2 High Voltage Metering Enclosure

The high voltage metering enclosure shall meet the requirements of EUSERC drawing 404.

7.3 Instrument Transformers

The mounting patterns for instrument transformers shall meet the requirements of EUSERC drawing 407.

Instrument transformers will be furnished and installed by Seattle City Light.

7.4 Meter Panel

Hinged meter panel shall meet the requirements of EUSERC drawing 408 with the following clarification: panel shall be furnished with a single, 13-terminal socket.

7.5 Meter Location

In an exception to EUSERC drawing 404, the meter shall be located in front of the potential transformer disconnect switch.

7.6 Current Transformer

Current transformer dimensions shall meet the requirements of EUSERC drawing 414.

7.7 Installation

Equipment installation shall meet the applicable requirements of EUSERC Section G, with the following clarification: Section 17 – Working Space shall be read as to reference the “bottom of the cabinet” for working surface and height dimensions.

8. Seattle City Light Requirements**8.1 Clearances**

Distance from conduit end to middle phase termination landing pad shall be 60 inches minimum. Seattle City Light will allow a pit up to 25 inches deep to obtain minimum clearance.

Note: this requirement supersedes EUSERC drawing 404, revision 0, dated 01/09, sheet 1 of 3

which shows a 48-3/4 inch clearance between termination phase landing pads and the floor of the compartment.

Distance from **end** of grounding ball to inside protective inner door shall be 12 inches minimum.

*Note: this requirement supersedes EUSERC drawing 404, revision 0, dated 01/09, sheet 1 of 3 which shows a 15-inch distance from **base** of grounding ball to inside edge of protective inner door.*

8.2 Conduit

Grounding bushings shall be provided and installed if conduit is rigid galvanized steel (RGS).

8.3 Lifting Eyes

Three lifting eyes shall be provided to facilitate installation or replacement of metering current transformers.

8.4 Neutral Pad

Neutral pad shall be insulated for phase-to-ground voltage passing between the termination compartment and the metering compartment. A copper pad predrilled with one set of 3/8-inch diameter holes on a 1-3/4-inch center shall be provided inside the termination compartment.

8.5 Bus

Bus shall be bare or plated copper.

8.6 Grounding Studs and Covers

Enclosure shall be equipped with a total of nine one-inch diameter ball-type grounding studs (one on each side of each current transformer plus ground), Salisbury catalog number 21191, to allow each phase to be safely checked for voltage with a hot stick-type voltage sensor and then grounded with hot stick-installed, ball and socket-type, grounding system.



figure 2, ball-type grounding stud (Salisbury catalog Number 21191)

One hotstick-removable insulating cover, Salisbury catalog number 21236, shall be provided for each normally energized ball-type grounding stud.

8.7 Landing Pads

Each phase landing pad shall be provided with two sets of two 5/8-inch diameter holes on

8. Seattle City Light Requirements**8.7 Landing Pads, continued**

1-3/4-inch vertical centers, each set separated horizontally 4-1/2-inch on center. Provide an additional 7/16-inch diameter hole per pad at least 1-3/4 inches away from the other holes for connecting surge arrester leads.

8.8 Surge Arresters

A grounded base plate shall be provided inside the termination compartment, predrilled with three 7/16-inch diameter holes for mounting surge arresters.

Surge arresters will be furnished and installed by Seattle City Light. Refer to Seattle City Light Material Standard 6801.4 / Stock Number 680117. *Note: Seattle City Light Material Standards are available online. Refer to: www.seattle.gov/light/engstd/*

8.9 Cable Support

A vertically mounted length of 1-5/8 inches by 1-5/8 inches strut channel shall be mounted on each side of the termination compartment. A third length of 1-5/8 inches by 1-5/8 inches strut channel shall be installed between the first two for mounting cable support hardware (provided by Seattle City Light).

8.10 Inner Door

A protective inner door consisting of a solid, high-strength, transparent, full-length, hinged, bolted-closed barrier (Lexan, clear polycarbonate, or approved equivalent) shall be provided inside each compartment main door in order to comply with Washington Administrative Code (WAC) 296-45-325, Table 1. *Note: Table 1 states for phase-to-phase voltages between 15.1 and 36.0 kV, the AC live work minimum approach distance shall be two feet ten inches.*

8.11 Padlock

Compartment door handles shall be designed to accommodate a padlock shackle for physical access control.

8.12 Termination Compartment Doors

Termination compartment doors shall be designed to accommodate a penta head bolt for back-up physical access control.

8.13 Humidity Control and Venting

Inside ceiling surfaces shall be coated with anti-condensation material.

An anti-condensation heater shall be provided near the floor.

Vents shall be provided at the top and bottom of the enclosure for air circulation.

Vents shall be equipped with filters to minimize dust and dirt ingress.

Vent filters shall be accessible from outside of the enclosure to allow the filters to be maintained without having to de-energize the switchgear.

Vents shall be designed to prevent the entrance of foreign objects.

8.14 Rain Shield

If for outdoor application, compartment entrances shall be provided with rain shields.

9. Project-Specific Requirements

Project-specific requirements, if any, shall be cited in Seattle City Light's Service Letter.

10. Approval Process

Seattle City Light's assigned Electric Service Engineer (ESE) shall be the customer's point of contact for all communication and submittals.

Customer shall submit two copies each of the following documents for review and approval.

- Project one line diagram
- Equipment manufacturer's design drawings

Seattle City Light's assigned Electric Service Engineer (ESE) shall coordinate the review of the manufacturer's design drawings with Seattle City Light's Meter Section.

Customer shall obtain Seattle City Light approval before releasing metering compartment design to the switchgear manufacturer for construction.

11. References

6801.4; "21 kV Heavy Duty Distribution Class, Polymer, Metal-Oxide Surge Arrester;" Material Standard; SCL

Byrnes, Devyn; SCL Standards Student Intern and subject matter expert for Standard 1562.05 (devyn.byrnes@seattle.gov)

EUSERC Manual; Electric Utility Service Equipment Requirements Committee (EUSERC); April 2009; www.euserc.com

Gallagher, Patrick; Technical Metering, Industrial Crew Chief and subject matter expert for Standard 1562.05 (patrick.gallagher@seattle.gov)

Requirements for Electrical Service Connection; SCL; January 26, 2007

Salisbury Catalog; WH Salisbury Co.; 2006

Seattle City Light Standards web site: www.seattle.gov/light/engstd/

Shipek, John; SCL Standards Engineer, subject matter expert and originator of Construction Standard 1562.05 (john.shipek@seattle.gov)

WAC 296-45-325; [working on or near exposed energized parts]; Washington Administrative Code