

Cast-in-Place Risers



1. Scope

This standard covers the requirements for cast-in place risers to bring the vault access to grade.

This standard addresses 42-inch round risers and 5496 equipment hatch risers. The "5496" refers to the riser's inside dimension of 54 in x 96 in.

2. Application

This standard provides direction to SCL crews and contractors regarding proper installation of cast-in place risers for slope adjustment on Seattle City Light (SCL)-owned and maintained vaults. Cast-in place risers will be used where standard height risers do not work, or access is located on a sloped grade.

This standard reflects content presented in SCL Power Production & Substations Drawing B-7470. See Appendix.

3. Requirements

3.1 General

The minimum compressive strength of the concrete shall not be less than 4,000 pounds per square inch in 28 days as determined by the ASTM Method C39.

Concrete finish shall be free of rock pockets and honeycombed areas.

The interior walls and exterior exposed surfaces shall be smooth.

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Quan Wang

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Rock pockets over 3/8-inch-deep and other imperfections on all surfaces shall be patched and troweled to match the surrounding surface.

Steel reinforcing bars shall conform to ASTM A615, Grade 60 or ASTM A706, Grade 60
 Reinforcing bar size shall be a minimum of #4.

The ends of the reinforcing bars shall have an overlap minimum of 18 in.

Welding of the reinforcing bars shall conform to the Structural Welding Code, Reinforcing Steel (AWS D1.4) of the American Welding Society.

The number of reinforcing bar hoops shall be as described in Table 3.1.

Table 3.1. Reinforcing Bar Hoop Requirements

Riser Height of the Low End (t) (in)	# of Rebar Hoops Required
3-4	1
4-6	2
6-8	3
8-10	4

The concrete cover (measured from the surface of the concrete to the outside surface of the reinforcement) for reinforcement shall be a minimum of 2 inches for main reinforcing bars, with a 2-in typical cover on the bottom of the riser.

Dimensions shall be as shown in Figure 3.1a.

The keyway shall either 1) be of the dimensions and configuration as shown in Figure 3.1b, or 2) match the surface profile of adjoining piece (roof opening, other riser or casting frame).

A 2-day minimum cure time shall be required prior to installation of steel cover and frame.

A 4-day minimum cure time shall be required prior to traffic loading.

Figure 3.1a. Riser Height and Rebar Detail

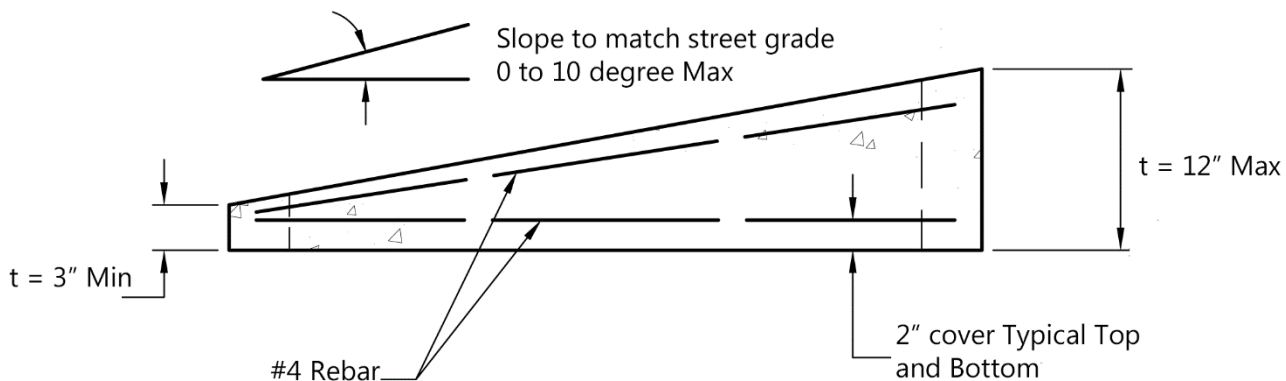
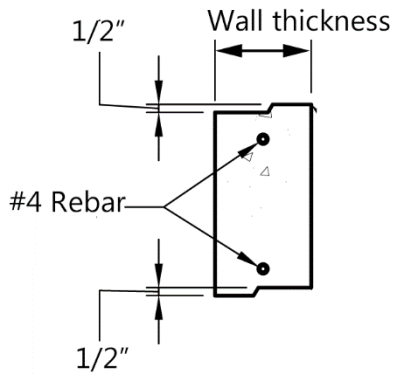


Figure 3.1b. Keyway Detail



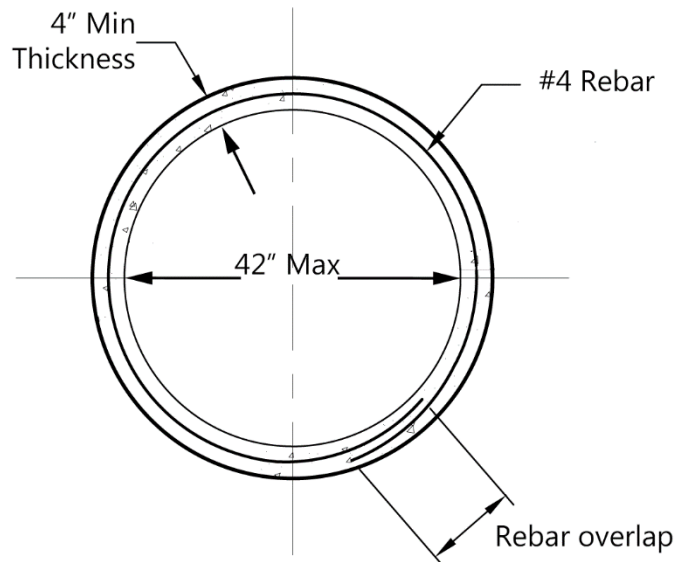
3.2 Round Riser

Round risers shall meet the requirements as shown in Table 3.2 and Figure 3.2.

Table 3.2. Round Riser Requirements

Wall thickness, minimum	4 in
Inside diameter, maximum	42 in
Outside diameter, maximum	50 in

Figure 3.2. Round Riser



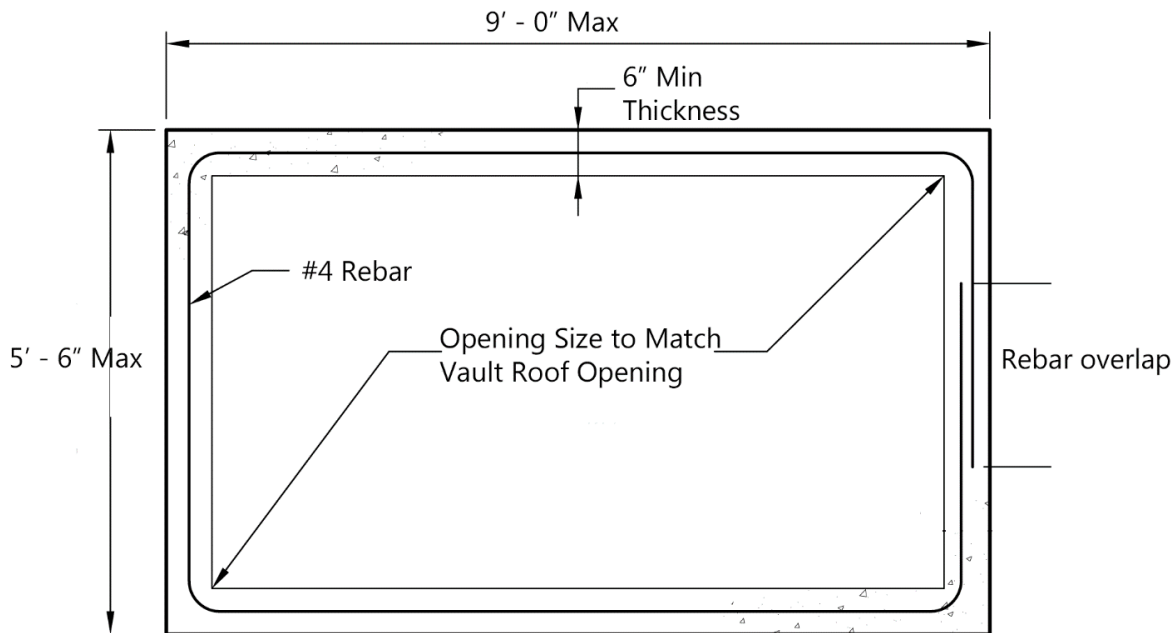
3.3 5496 Equipment Hatch Riser

Equipment hatch risers shall meet the requirements as shown in Table 3.3 and Figure 3.3.

Table 3.3. Equipment Hatch Riser Requirements

Wall thickness, minimum	Match existing riser outline, 6 in minimum
Outside dimensions, maximum	5 ft-6 in x 9 ft
Inside opening dimensions	Match vault roof opening, 4 ft-6 in x 8 ft (typical)

Figure 3.3. Equipment Hatch Riser



4. References

- ASTM A615/A615M-09b**, "Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement"
- ASTM C39/C39M-10**, "Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens"
- ASTM A706**, "Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement"
- AWS D1.4**, "Structural Welding Code—Reinforcing Steel"
- SCL Power Production & Substations Drawing No. B-7470**, "Cast-in-Place Grade Adjustment Vault Riser"

5. Sources

- Ng, Sharon**; Senior Civil Engineer and subject matter expert for 0231.03 (sharon.ng@seattle.gov)
- SCL Construction Standard U2-6/NVH-20**; "Inspection and Repair Procedures for Precast Vaults and Manholes"
- SCL Construction Standard U2-14.2**; "Vault Installation"
- SCL Construction Standard U2-15.1**; "Installation of Ring Type Vaults"
- SCL Material Standard 7204.15**; "Cover Slabs and Risers for Electric Vaults"

SCL Material Standard 7203.21; “Precast Reinforced Concrete Structures – General”

SCL Material Standard 7204.70; Frames and Covers, 42-Inch Round, Iron”

Wang, Quan; SCL Standards Engineer and coordinator for 0231.03
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Appendix: SCL Drawing B-7470, Cast-in-Place Vault Riser

NOTES:

- CAST IN PLACE RISER SHALL BE USED WHEN A SLOPED RISER OR WHEN STANDARD PRECAST RISER SIZE OR HEIGHT DOES NOT WORK FOR THE SITUATION. USE PRECAST RISER (SCL MATERIAL STANDARD 7204.15) WHEN POSSIBLE.
- CONCRETE MINIMUM COMPRESSIVE STRENGTH, $f_c = 4,000$ PSI AT 28 DAYS.
- CURE TIME: INSTALLING ACCESS COVER/ FRAME - 2 DAYS; TRAFFIC LOADING - 4 DAYS.
- REBAR SHALL BE GRADE 60, ASTM A615. MINIMUM REBAR LAP LENGTH SHALL BE 18".
- RISER KEY SHALL MATCH SURFACE PROFILE OF ADJOINING PIECE (ROOF OPENING, OTHER RISER OR CASTING FRAME).

RISER REINFORCEMENT

RISER	NUMBER OF REBAR HOOPS
t= 3" TO 4"	1
t= 4" TO 6"	2
t= 6" TO 8"	3
t= 8" TO 11"	4

PLAN - ROUND RISER
 1/2"-1'-0"

PLAN - RECTANGULAR RISER
 1/2"-1'-0"

ELEVATION A
 1"-1'-0"

SECTION B-B
 1"-1'-0"

STANDARDS GENERAL
 SYSTEM WIDE
CAST IN PLACE GRADE ADJUSTMENT VAULT RISER

REVISIONS

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ENDORSEMENTS

DATE: 7/17/17
 SIGNATURE: [Signature]
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 CHECK: [Signature]

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 DATE: 7/10/17

Seattle City Light Power Production & Substitutions

STATION 1.0000

REVISIONS

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WORK ORDER #

DESCRIPTION

WORK ORDER #

DRAWN BY / **CHECKED BY** / **APPROVED BY**

REV / **DATE** / **MAKE**

AT FULL SIZE

ONE INCH

SEATTLE CITY LIGHT

STATION 1.0000

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REBAR

LOCATION

TITLE

CLASS / **SHEET** / **1** of **1**

DRAWING NO. / **B-7470**

SCALE / **REV. NO.** / **AS SHOWN** / **0**