Retrofit Grounding for Secondary Handholes

1. Scope

This standard covers the retrofit grounding requirements for existing, ungrounded secondary handholes located between the service transformer and a customer. This standard does not cover streetlight handholes. See SCL 0231.01 for new handhole installations.

2. Application

This document provides direction to SCL crews and contractors about how to install proper grounding for existing SCL secondary service handholes. The goal is to assure handhole grounding is uniformly and properly installed by SCL crews and contractors. The required grounding includes grounding handhole lids constructed of conductive material.

The handholes in this Standard are all rated for H-20 loading.

3. Definitions

Heavy Traffic: constant vehicular loading (i.e. roadway)

Medium Traffic: occasional vehicular loading (i.e. driveway)

Light Traffic: rare vehicular loading (i.e. sidewalk)

4. Grounding Handhole Lid and Frame Installations

Figures 4a and 4b provide detail on how the secondary handhole grounding should be connected.

Bond any metal conduits using grounding bushing (stock number 013270).

Figure 4a, Schematic, handhole wiring

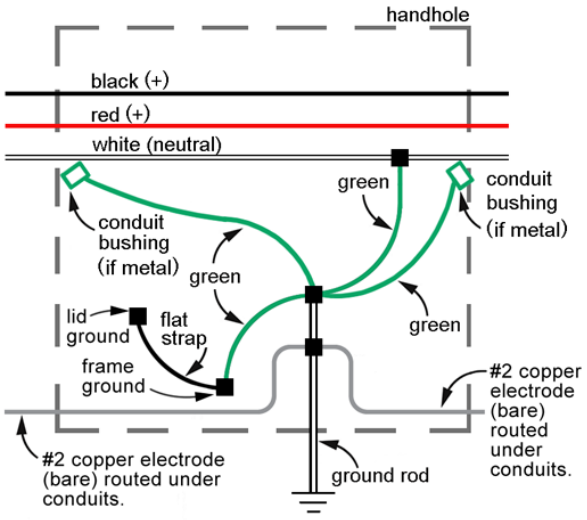
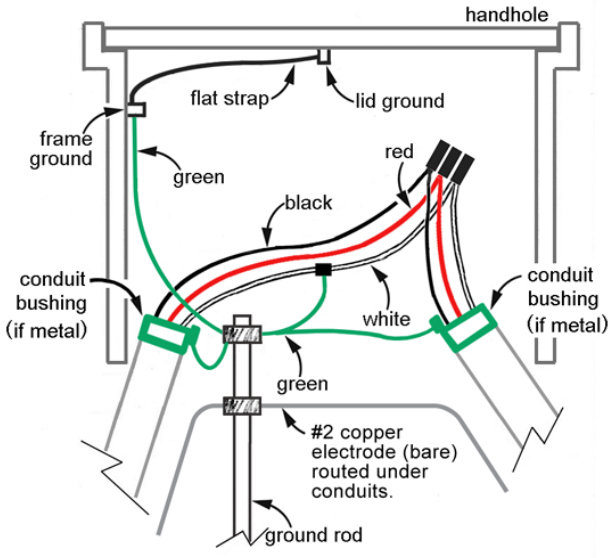


Figure 4b, Elevation, handhole wiring



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5.1 Choose appropriate method based on traffic load:

Traffic Load	Method
heavy	**A**
medium	**A**
light	**B**

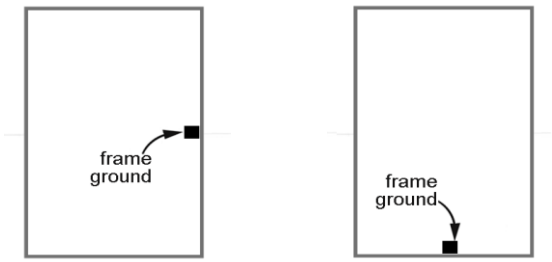
5.2 Method A, example, 17″ x 28″ handhole, heavy or medium traffic

Use precast handhole (stock number 720391) with lid that has factory installed ground strap.

Connect factory ground strap from lid to frame:

1. Install and test grounding electrodes per SCL 0461.10.
2. Install green #8 THWN ground wire (stock number 612277) from frame using factory bolt and set screw lug (stock number 012564) to ground rod using a ground rod clamp (stock number 564012).
   - Fog-Tite – manufacturer frame ground bolt is on the center of the long side wall below lip – see Figure 5.
   - Christy/Old Castle – frame ground bracket is on the short side wall – see Figure 5.
3. Bond neutral conductor to a #8 green THWN ground wire (Stock Number 612277) with an irreversible connection. Connect ground wire to ground rod electrode with an irreversible connection listed for direct burial use.

Figure 5, Frame ground location



Fog-Tite Cristy/Old Castle

5.3 Method B, example, 17″ x 28″ handhole, Light Traffic

Use composite fiberglass, reinforced plastic, polymer mortar/concrete handholes (stock number 720393) and lid (stock number 720397). This handhole and lid do not require grounding.

6. Existing Handhole Installations

6.1 Remove and replace

Whenever possible: remove the existing handhole and replace with a new up-to-date handhole. See SCL 0231.01.

6.2 Grounding retrofit of existing handholes *with* factory frame ground

Where the removal of the old handhole and the installation of a new one is not possible it is necessary to retrofit the existing handhole to add grounding.

Determine if the existing handhole has access to the factory frame ground. For handholes with factory frame ground, follow directions in sections 4 and 5.2. If any components of the grounding system are missing (factory installed ground strap, etc.) or inadequate refer to section 6.3, below.

6.3 Grounding retrofit of existing handholes *without* factory frame ground

For handholes without access to frame ground:

1. Install frame ground (performed by appropriate personnel).
2. Install ground rod or series of ground rods (stock number 564238).
3. Test the ground rod or series of ground rods to insure the rods have a resistance to ground of 25 ohms or less.
4. Replace lid with new lid that has factory ground strap installed (stock number 012660).
5. Connect ground strap from lid to ground rod using a ground rod clamp (stock number 564012).
6. Bond neutral to ground using split bolt connector (stock number 668861), green #8 THWN ground wire (stock number 612277) and ground rod clamp (stock number 564012).

7. Material List

Description	Stock No.
Setscrew lug, #14 str to #6 str	012564
Type 2 handhole cover, labeled “ELECTRIC”	012660
Grounding insulated bushing, 3-in	013270
Clamp for 5/8-in ground rods	564012
Ground rods, copper-covered, sectional	564238
Copper wire, type THWN thermoplastic polyvinyl chloride	612277
Conductor fittings, copper, parallel tap, split bolt cable connectors	668861
Type 2 handhole, with frame and cover, “ELECTRIC”	720391
Handhole, secondary, composite fiberglass, reinforced plastic type	720393
Handhole cover, secondary, composite fiberglass, reinforced plastic type	720397

8. References

SCL Construction Standard 0231.01; “Secondary Handhole Installation”

SCL Construction Standard 0461.10; “Grounding Electrodes for Handholes and Vaults”

9. Sources

Barnett, John; SCL Engineer and subject matter expert for 0233.05 (john.barnett@seattle.gov)

Hanson, Brett; SCL Standards Engineer and subject matter expert for 0233.05

Lu, Curtis; SCL Standards Engineer, originator and subject matter expert for 0233.05 (curtis.lu@seattle.gov)

NEC 2008 Handbook, Article 250; "Grounding and Bonding"; 11th Edition; NFPA; 2008

NESC 2007 Edition, Section 9; “Grounding Methods for Electric Supply and Communications Facilities”; IEEE, 2006

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