

Hot Tie Installation



1. Scope

This work practice describes how to perform a hot hand tie to attach a bare conductor to a line post insulator in the Looped Radial distribution system.

A hot hand tie is also referred to as a sissy tie.

For cold (primary) hand tie installation, see SCL 0100.31.

For neutral hand tie installation, see SCL 0100.35.

2. Application

This work practice is for Seattle City Light (SCL) lineworkers who tie conductors to line post insulators by hand in the Looped Radial distribution system.

Hot hand ties are used on F-neck insulators and both bare aluminum and copper conductor.

3. Definitions

Button: Wire that is wrapped tightly onto the conductor where the wire is almost vertical for the entire revolution. Each button should be touching the other.

Twist: Wire that is laid around the conductor where you go up straight up and then down at a 45-degree angle per revolution.

Loop: Wire that is trained back so that the end of the wire is contacting itself.

4. Ties

There are two styles of hot ties: single and double.

There are multiple variations of these styles of hot ties as shown in Table 4.

Table 4. Types of Hot Ties

Style	Material	Location	Conductor Size (AWG/kcmil)	Tie Wire Size (Solid, AWG)	Tie Wire Length (ft)
Double	Aluminum	Top	397.5	#4	7
Double	Aluminum	Side	397.5	#4	7
Single	Copper	Top	#4	#6	4
Single	Copper	Side	#4	#6	4
Double	Copper	Top	4/0	#4	6
Double	Copper	Side	4/0	#4	6

Hot ties bare wire.

Hot ties are prepared on the ground and tied in the air.

Hot ties are performed in the air from a bucket.

The tie wire that you will be using will be made of the same material as the conductor that you are tying to the insulator.

When tying down stranded conductor, the tie wire shall be wrapped in the same direction as the strands of the conductor.

Side ties are performed the same as top ties.

5. Single Tie Procedure

Proper PPE shall be worn when performing tie installations. Hand and eye protection are particularly important.

5.1 Ground Preparation

Step 1. Cut or obtain tie wire of the length shown in Table 4.

Step 2. Start tie by wrapping wire one revolution around neck of insulator where the one of the remaining legs should be twice the length of the other leg. The wrap should not be too tight where the wire cannot swivel around the insulator.

Step 3. Using a pair of lineman's pliers (commonly referred to as Kleins), wrap the shorter leg tightly around the longer leg three times to create three (3) buttons. Cut off any excess wire.

Step 4. Take the longer leg and measure down to the bottom of insulator and cut off any extra length.

Step 5. Form in a hook at the end of the longer leg for easier installation in the air.

Step 6. Repeat steps 1-5 on opposite side. Do not overlap the ties; they should sit directly on top of each other.

5.2 Tying in the Air

Step 1. With the conductor seated on the insulator, wrap tie wire around the conductor (twists) 7 times where you come up at 90 degrees and then across at 45 degrees.

Step 2. Using an approved hot line tool, direct the end of the hook back toward the insulator and have the end of the wire/hook contact the tie wire or conductor to create a loop. A loop will reduce any noise or arcing.

Step 3. Repeat steps 1-2 with other tie on the opposite side.

6. Double Tie Procedure

Proper PPE shall be worn when performing tie installations.

6.1 Ground Preparation

Step 1. Cut or obtain tie wire of the length shown in Table 4.

Step 2. Start tie by placing the middle of the tie wire back of the insulator neck and bringing both ends around to the front. Now reposition the wire so that one end is a few inches longer than the other.

Step 3. Twist wires together 2 to 3 times. From the remaining wire on each end, measure off two insulator lengths of wire by bending the wire down to the bottom of the insulator and then bending it back up to the top. Cut off any wire that extends past the top of the insulator.

Step 4. Using a pair of lineman's pliers, bend the ends into a hook shape.

Step 5. Repeat steps 1-4 with another tie wire for the other side of the insulator.

6.2 Tying in the Air

Step 1. Take both wires from the first tie and wrap (twist) tie wires in parallel around the conductor seven (7) times where you come up at 90 degrees and then across at 45 degrees.

Step 2. Using an approved hot line tool, direct the ends of the hooks back toward the insulator and have the end of the wire/hook contacting the tie wire or conductor to create a loop. A loop will reduce any noise or arcing.

Step 3. Repeat steps 1-2 with other tie on the opposite side.

7. References

SCL Work Practice 0100.31; "Cold Hand Tie Installation"

SCL Work Practice 0100.35; "Neutral Hand Tie Installation"

8. Sources

Alexander, James; SCL Crew Chief and subject matter expert for 0100.33

Anderson, Jeff; SCL Craft Instructor of Apprenticeship and subject matter expert for 0100.33

Lu, Curtis; Standards Engineer and originator of 0100.33

SCL Construction Standard D15-2.3 (canceled); "Installing Single "Hot" Tie on Single Insulator for Copper or Aluminum Conductors"

SCL Construction Standard D15-2.4 (canceled); "Installing Double "Hot" Tie on Single Insulator for Copper or Aluminum Conductors"

SCL Construction Standard D15-2.6 (canceled); "Angle Tie On Single Insulator and Single Side Tie on Horizontal Insulator for Copper or Aluminum Conductors"