

28 kV, 3/C, TRXLPE Insulated, Tape Shielded Cable with Ground Conductors



1. Scope

This standard covers the detailed requirements for 28 kV, tree retardant, cross-linked polyethylene (TRXLPE), three conductor cable used for the distribution of electric energy.

Industry designation: **3/C + 3G**

This standard applies to the following Seattle City Light (SCL) stock numbers:

Stock No.	Size
613540	#1 AWG
613543	350 kcmil

2. Application

This cable is intended for use on a nominal 26.4 kV, three-phase, three-wire, delta, 60 Hz power system.

3. General Requirements

Use this detailed material standard in conjunction with the latest revision SCL 6015.00, "Medium Voltage Cable – General."

4. Industry Standards

This cable shall meet the requirements of the following industry standard:

ICEA S-97-682-2013; "Utility Shielded Power Cables Rated 5 Through 46 kV"

See SCL 6015.00 to obtain the appropriate revision date for other referenced industry standards.

Standard Coordinator
Todd Oki

Standards Engineering Supervisor
Brett Hanson

Division Director
Bob Risch

5. Construction

5.1 General

Unless indicated otherwise, all values in the following tables are consistent with industry standards. They are repeated here for the convenience of the reader.

The ▲ symbol indicates special City Light requirements, some which are detailed in SCL 6015.00.

5.2 Conductor

	Stock No.		Reference
	613540	613543	
Size	#1 AWG	350 kcmil	various
Diameter (in): minimum	0.316	0.604	ICEA S-97-682, Section 2.5
nominal	0.322	0.616	ASTM B8/ASTM B496
maximum	0.328	0.628	ICEA S-97-682, Section 2.5
Metal	copper	copper	ASTM B49
Stranding type	concentric-lay	concentric-lay	ASTM B8/ASTM B496
Class	B	none	ASTM B8
Stranding subtype	compressed	compact	ASTM B8/ASTM B496
Number of strands	19	35-37	ASTM B8/ASTM B496, Table 1
Temper	SD, annealed prior to stranding	SD, annealed prior to stranding	ASTM B3
Lay, outer layer	left hand	left hand	ASTM B3, Section 5.5.1/ASTM B496, Section 5
Lay, successive layers	reversed	reversed	ASTM B3, Section 5.5.1/ASTM B496, Section 5
Sealant for stranded conductors	required▲	required▲	ICEA S-97-682, Section 2.2

5.3 Conductor Shield (Stress Control Layer)

Stock No.	Size ^a (AWG/kcmil)	Thickness, minimum point ^b (mil)
613540	#1	12 mil
613543	350	16 mil

Notes:

- a. Various references
- b. ICEA S-97-682, Part 3, Table 3-1

5.4 Insulation

	Stock No.		Reference
	613540	613543	
Size	#1 AWG	350 kcmil	various
Material	unfilled tree retardant cross-linked polyethylene (TRXLPE)		ICEA S-97-682, Section 4.1
Approved material formulations	specified in general material standard		SCL 6015.00
Thickness (mil): minimum	265		ICEA S-97-682, Section 4.2, Table 4-11
nominal	280		ICEA S-97-682, Table 8-1
maximum	310		ICEA S-97-682, Section 4.2, Table 4-11
Insulation level	100%		ICEA S-97-682, Section 4.2, Table 4-11
Basic impulse level (BIL)	150 kV crest		ICEA S-97-682, Section 4.3, Table 4-10

5.5 Extruded Insulation Shield

	Stock No.		Reference
	613540	613543	
Size	#1 AWG	350 kcmil	various
Material	discharge-free (thermosetting material)		ICEA S-97-682, Section 5.1 to 5.5.1.5
Thickness (mil): minimum	24		ICEA S-97-682, Section 5.2, Table 5-1
maximum	60		ICEA S-97-682, Section 5.2, Table 5-1

5.6 Metallic Shield

	Stock No.		Reference
	613540	613543	
Size	#1 AWG	350 kcmil	various
Metal	copper, uncoated		ICEA S-97-682, Section 6.1 to 6.2
Type	helically applied tape ▲		ICEA S-97-682, Section 6.1 to 6.2 and SCL 6015.00
Water blocking components for metallic shield	not required		ICEA S-97-682, Section 6.7

5.7 Jacket (Non-Metallic Covering)

Jacket shall be applied over 3/C + 3/ground assembly.

	Stock No.		Reference
	613540	613543	
Size	#1 AWG	350 kcmil	Various
Material	linear low density polyethylene (LLDPE)		ICEA S-97-682, Section 7.1.1
Color	black		ICEA S-97-682, Section 7.1.1
Type	overlying		ICEA S-97-682, Section 7.2
Thickness (mil): minimum	100		ICEA S-97-682, Section 7.2.1, Table 7-10 and SCL preference
maximum	150		
Maximum diameter over jacket (in)	2.65 ▲	3.45 ▲	SCL preference

5.8 Sheath (Continuous Metallic Covering)

Cable shall not be provided with a sheath.

5.9 Assembly and Identification ▲

Three separate ground conductors shall be provided under the jacket of the 3/C assembly.

Each ground conductor shall be located at an interstice of the 3/C assembly.

	Stock No.		Reference
	613540	613543	
Size	#1 AWG	350 kcmil	various
Ground Conductor Quantity	3 ▲		SCL preference
Size	#4 AWG ▲	2/0 AWG ▲	SCL preference
Diameter (in), nominal	0.232	0.419	ASTM B8
Metal	copper, bare		ASTM B49
Stranding type	concentric-lay		ASTM B8
Class	B		ASTM B8
Stranding subtype	concentric round		ASTM B8
Number of strands	7	19	ASTM B8
Temper	SD, annealed prior to stranding		ASTM B3
Lay, outer layer	left hand		ASTM B3, Section 5.5.1
Lay, successive layers	reversed		ASTM B3, Section 5.5.1
Sealant for stranded conductors	not required		ICEA S-97-682, Section 2.2
Jacket	not required		ICEA S-97-682, Section 8.2.1.1
Red stripe identification	not required		

6. Packaging

	Stock No.		Reference
	613540	613543	
Size	#1 AWG	350 kcmil	Various
Reel type	steel, fluted	steel, fluted	WC 26, Section 2.1.2
Reel dimension: Flange diameter, maximum:	96 in ▲	96 in ▲	SCL preference
Outside width, maximum	56 in ▲	64 in ▲	SCL preference
Drum diameter, minimum	38 in ▲	48 in ▲	SCL preference
Length per reel ± 10%	2300 ft ▲	1500 ft ▲	SCL preference
Gross weight, maximum	17,000 lb ▲		SCL preference

7. Issuance

Stock unit: FT

8. Approved Manufacturing Plants

Manufacturer	Location
Prysmian Group	DuQuoin, IL
	Marshall, TX
	Moose Jaw, SK, Canada
	St. Jerome, QC, Canada
Southwire	Heflin, AL
	Starkville, MS

9. References

SCL Material Standard 6015.00, "Medium Voltage Cable – General"

10. Sources

Shipek, John; SCL Standards Supervisor, subject matter expert, and originator of 6020.05