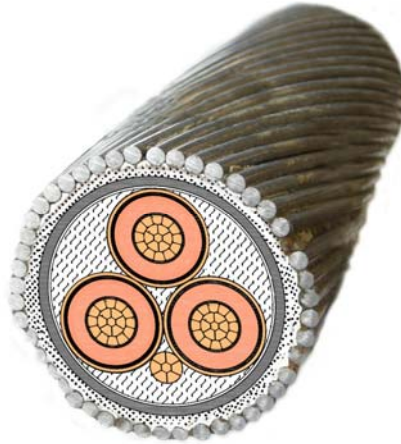


**15 KV, 3/C, ARMORED, EPR INSULATED, TAPE SHIELDED CABLE**



**1. Scope**

This standard covers the detailed requirements for 15 kV, armored, ethylene propylene rubber (EPR) insulated, three conductor cable (with one bare ground wire) used for the distribution of electric energy.

Industry designation: **3/C +1G**

This standard applies to the following Seattle City Light Stock Number:

<b>Stock Number</b>	<b>013306</b>
<b>Size</b>	4/0 AWG

**2. Application**

Cable is intended for use on a nominal 13.8 kV, three-phase, three-wire, delta, 60 Hz, power system. This product has particular application as a vertical riser cable. Cable will be installed within high-rise buildings and suspended from one end.

Users should be aware that this cable has 220 mil of insulation – a less common value for 15 kV cable at Seattle City Light.

Cable length requirements are site specific. Engineers and Material Control shall plan for minimum order runs of 1,000 feet. Cable shall be shipped only in combinations of the options cited in Table 2.

**Table 2**

Cable Cut Length, ft	Reel Size and Type	Cable Net Weight, lb	Reel Tare Weight, lb	Total Gross Weight, lb
300	78 x 36 x 48 RT	2,523	890	3,413
600	78 x 41 x 48 RT	5,047	925	5,972
900	84 x 48 x 48 RT	7,570	1,030	8,600

**3. General Requirements**




This detailed material standard is to be used in conjunction with the latest revision of Seattle City Light Material Standard 6015.00, "Medium Voltage Cable – General."

**4. Industry Standards**

Cable shall meet the requirements of the following industry standards:

- ICEA S-97-682-2006
- ICEA S-93-639-2000 (Utilized only for its section on metallic and associated coverings.)

Refer to Material Standard 6015.00 to obtain the appropriate revision date for other referenced industry standards.

<i>standards coordinator</i>	<i>standards supervisor</i>	<i>unit director</i>
 John Shipek	 John Shipek	 Darnell Cola

**MATERIAL STANDARD**

15 kV, 3/C, Armored, EPR Insulated, Tape Shielded Cable

superseding: new  
effective date: September 16, 2011  
page: 2 of 5**5. Construction****5.1 General**

Unless indicated otherwise, all values cited below should be consistent with industry standards - they are repeated here for the convenience of the reader. Values or requirements different from industry standards are identified with the symbol ▲. In some situations, the ▲ symbol offers warning that special requirements are located in Material Standard 6015.00.

**5.2 Conductor**

		Requirements	Reference
<b>Stock Number</b>		<b>013306</b>	<b>SCL</b>
<b>Size</b>		4/0 AWG	various
<b>Diameter</b>	minimum	0.466 in	ICEA S-97-682, Section 2.5
	nominal	0.475 in	ASTM B496
	maximum	0.485 in	ICEA S-97-682, Section 2.5
<b>Metal</b>		uncoated copper	ASTM B49
<b>Stranding type</b>		concentric-lay	ASTM B496
<b>Class</b>		B	ASTM B496
<b>Stranding subtype</b>		compact	ASTM B496
<b>Number of strands</b>		19	ASTM B496
<b>Temper</b>		soft drawn, annealed prior to stranding	ASTM B496
<b>Lay, outer layer</b>		left hand	ASTM B3, Section 5.5.2
<b>Lay, successive layers</b>		reversed	ASTM B3, Section 5.5.2
<b>Sealant for stranded conductors</b>		not required	ICEA S-97-682, Section 2.2

**5.3 Conductor Shield (Stress Control Layer)**

		Requirements	Reference
<b>Stock Number</b>		<b>013306</b>	<b>SCL</b>
<b>Size</b>		4/0 AWG	various
<b>Thickness, minimum point</b>		12 mil	ICEA S-97-682, Part 3, Table 3-1

**5.4 Insulation**

		Requirements	Reference
<b>Stock Number</b>		<b>013306</b>	<b>SCL</b>
<b>Size</b>		4/0 AWG	various
<b>Material</b>		ethylene propylene rubber (EPR), Class III	ICEA S-97-682, Section 4.1
<b>Thickness</b>	minimum point	210 mil	ICEA S-97-682, Section 4.2, Table 4-7
	nominal	220 mil	ICEA S-97-682, Table 8-1
	maximum point	250 mil	ICEA S-97-682, Section 4.2, Table 4-7
<b>Insulation level</b>		133%	ICEA S-97-682, Section 4.2, Table 4-7
<b>Basic impulse level (BIL)</b>		110 kV crest	ICEA S-97-682, Section 4.3, Table 4-6

**MATERIAL STANDARD**

15 kV, 3/C, Armored, EPR Insulated, Tape Shielded Cable

superseding: new  
effective date: September 16, 2011  
page: 3 of 5**5. Construction, continued****5.5 Extruded Insulation Shield**

	Requirements	Reference
<b>Stock Number</b>	<b>013306</b>	<b>SCL</b>
<b>Size</b>	4/0 AWG	various
<b>Material</b>	discharge-free (thermosetting material)	ICEA S-97-682, Section 5.1 to 5.5.1.5
<b>Thickness</b>	minimum point	ICEA S-97-682, Section 5.2, Table 5-1
	maximum point	ICEA S-97-682, Section 5.2, Table 5-1

**5.6 Metallic Shield**

	Requirements	Reference
<b>Stock Number</b>	<b>013306</b>	<b>SCL</b>
<b>Size</b>	4/0 AWG	various
<b>Metal</b>	copper, uncoated	ICEA S-97-682, Section 6.1 to 6.2
<b>Type</b>	helically applied tape with 12.5% nominal overlap	ICEA S-97-682, Section 6.1 to 6.2
<b>Water blocking components for metallic shield</b>	not required	ICEA S-97-682, Section 6.7

**5.7 Jacket (Non-Metallic Covering)**

Jacket shall be applied over 3/C assembly.

	Requirements	Reference
<b>Stock Number</b>	<b>013306</b>	<b>SCL</b>
<b>Size</b>	4/0 AWG	various
<b>Material</b>	polyvinyl chloride (PVC)	ICEA S-97-682, Section 7.1.6
<b>Color</b>	black	ICEA S-97-682, Section 7.1.6
<b>Type</b>	overlying	ICEA S-97-682, Section 7.2.1
<b>Thickness</b>	minimum point	ICEA S-97-682, Section 7.2.1, Table 7-10
	maximum point	ICEA S-97-682, Section 7.2.1, Table 7-10
<b>Maximum diameter over jacket</b>	2.73 in ▲	SCL preference

**5.8 Sheath (Continuous Metallic Covering)**

Cable shall be sheathed for the purpose of armor according to the requirements of ICEA S-93-639, Division II, Section 7.4.4 - Vertical Riser Cable.

Sheath shall be applied over jacket.

Wire band servings shall be according to the requirements of ICEA S-93-639, Division II, Section 7.4.1.2 – Wire Band Serving and Table 7-26, with the following clarification:

- Maximum band spacing shall be 25 feet.

Alternative methods of securing the armor wire may be considered.

**MATERIAL STANDARD**

15 kV, 3/C, Armored, EPR Insulated, Tape Shielded Cable

standard number: **6025.02**

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**5. Construction, continued**

**5.8 Sheath (Continuous Metallic Covering), continued**

	Requirements	Reference
<b>Stock Number</b>	<b>013306</b>	<b>SCL</b>
<b>Size</b>	4/0 AWG	various
<b>Armor composition</b>	galvanized round steel wire	ICEA S-93-639, Section 7.4.3.2, Table 7-25
<b>Armor wire size</b>	#8 BWG	ICEA S-93-639, Section 7.4.3.2, Table 7-25 and Birmingham Wire Gage
thickness/diameter	165 mil	ICEA S-93-639, Section 7.4.3.2, Table 7-25
<b>Maximum diameter over sheath</b>	3.27 in ▲	SCL preference

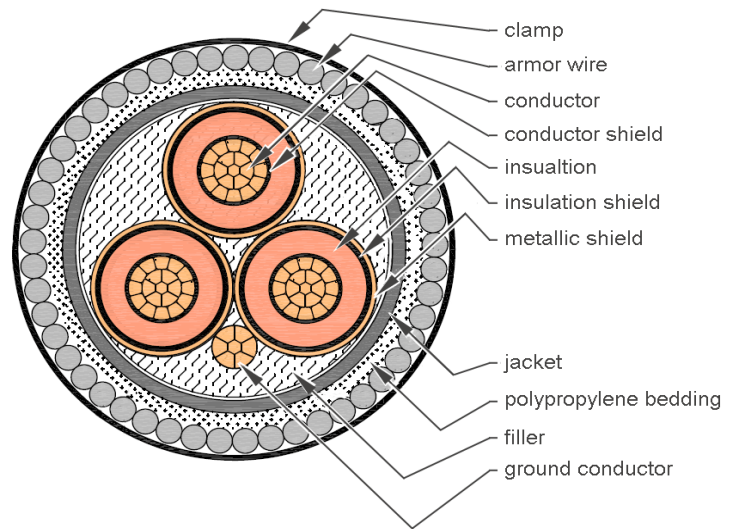
**5.9 Assembly and Identification**

One bare ground conductor shall be provided under the jacket of the 3/C assembly. The ground conductor shall be located at the interstice of the 3/C assembly.

Bedding shall be applied over the jacket and under the armor sheath.

Alternate bedding methods or materials may be considered.

An asphalt coating over the bedding and/or armor is expressly prohibited.



	Requirements	Reference
<b>Stock Number</b>	<b>013306</b>	<b>SCL</b>
<b>Size</b>	4/0 AWG	various
<b>Ground conductor</b>		
quantity	1 ▲	SCL preference
size	#3 AWG ▲	SCL preference
diameter, nominal	0.24 in	calculation
metal	copper, bare	ASTM B49
stranding type	compact	ASTM B496
stranding subtype	concentric round	ASTM B496
number of strands	7	ASTM B496
temper	soft drawn	ASTM B3
lay, outer layer	left hand	ASTM B3, Section 5.5.1
lay, successive layers	reversed	ASTM B3, Section 5.5.1
<b>Bedding material</b>	jute or polypropylene rove ▲	ICEA S-93-639, Section 7.3.6.2
<b>Thickness, nominal</b>	110 mil	ICEA S-93-639, Section 7.3.6.2, Table 7-18
<b>Red stripe identification</b>	not required	ICEA S-97-682, Section 8.2.1.1

**MATERIAL STANDARD**

15 kV, 3/C, Armored, EPR Insulated, Tape Shielded Cable

standard number: **6025.02**

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**6. Packaging**

	Requirements	Reference
<b>Stock Number</b>	<b>013306</b>	<b>SCL</b>
<b>Size</b>	4/0 AWG	various
<b>Reel type</b>	*	SCL preference
<b>Reel dimension</b>		
flange diameter, maximum	*	SCL preference
outside width, maximum	*	SCL preference
drum diameter, minimum	*	SCL preference
length per reel +10%, - 0%	*	SCL preference
gross weight, maximum	*	SCL preference

\* to be determined at the time of order, refer to Section 2, Application

**7. Issuance**

	Requirements
<b>Stock Number</b>	<b>013306</b>
<b>Size</b>	4/0 AWG
<b>Stock unit</b>	FT

**8. Approved Manufacturing Plants**

Manufacturer	Location
<b>Okonite</b>	Orangeburg, SC
	Paterson, NJ
	Richmond, KY
	Santa Maria, CA

**9. References**

**CS-17783**; Okonite Drawing No.; September 7, 2011

**Okoguard Okoseal type MV-105**; Product Data Section 2, Sheet 20

**Shipek, John**; SCL Standards Engineer, subject matter expert and originator for 6025.02 (john.shipek@seattle.gov)