

15 kV, 3-1/C, EPR/EAM Insulated, Flat Strap Shielded Cable



1. Scope

This standard covers the detailed requirements for 15 kV, ethylene propylene rubber (EPR) and ethylene alkene copolymer (EAM), three conductor triplexed cable used for the distribution of electric energy.

Industry designation: 3-1/C

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

| Stock Number | Size |
|--------------|------------|
| 012735 | 500 kcmil |
| 623670 | 1000 kcmil |

2. Application

Cable is intended for use on a nominal 13.8 kV, three-phase, three-wire, delta, 60 Hz power system.

For a cable fault occurring between two vaults, full fault current flows in the metallic shield from the fault location to the first splice vault nearest the source. Because the phases of a 3-1/C cable are individually jacketed, adjacent metallic shields (or separately-pulled, bare ground conductors) cannot be counted upon to dissipate fault current.

3. General Requirements

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

4. Industry Standards

Cable shall meet the requirements of the following industry standard: ICEA S-94-649-2013.

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

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

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Seattle City Light
MATERIAL STANDARD

15 kV, 3-1/C, EPR/EAM Insulated, Flat Strap Shielded Cable

standard number: **6025.60**
 superseding: November 16, 2022
 effective date: September 8, 2023
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5.2 Conductor

| Requirement | Stock Number | | Reference |
|---------------------------------|---|---|----------------------------|
| | 012735 | 623670 | |
| Size | 500 kcmil | 1000 kcmil | |
| Diameter | | | |
| minimum | 0.773 in | 1.095 in | ICEA S-94-649, Section 2.5 |
| nominal | 0.789 in | 1.117 in | ASTM B8 |
| maximum | 0.805 in | 1.139 in | ICEA S-94-649, Section 2.5 |
| Metal | copper | copper | ASTM B49 |
| Stranding type | concentric-lay | concentric-lay | ASTM B496 |
| Class | B | B | ASTM B8 |
| Stranding subtype | compressed | compressed | ASTM B8 |
| Number of strands | 37 | 61 | ASTM B8 |
| Temper | soft drawn, annealed prior to stranding | soft drawn, annealed prior to stranding | ASTM B3 |
| Lay, outer layer | left hand | left hand | ASTM B3, Section 5.5.1 |
| Lay, successive layers | reversed | reversed | ASTM B3, Section 5.5.1 |
| Sealant for stranded conductors | required ▲ | required ▲ | ICEA S-94-649, Section 2.2 |

5.3 Conductor Shield (Stress Control Layer)

| Requirements | Stock Number | | Reference |
|--------------------------|--------------|------------|-----------------------|
| | 012735 | 623670 | |
| Size | 500 kcmil | 1000 kcmil | |
| Thickness, minimum point | 16 mil | 20 mil | ICEA S-94-649, Part 3 |

5.4 Insulation

| Requirements | Stock Number | | Reference |
|---------------------------|--|--|---------------------------------------|
| | 012735 | 623670 | |
| Size | 500 kcmil | 1000 kcmil | |
| Material | ethylene propylene rubber (EPR)/ethylene alkene copolymer (EAM), Class III | ethylene propylene rubber (EPR)/ethylene alkene copolymer (EAM), Class III | ICEA S-94-649, Section 4.1 |
| Thickness | | | ICEA S-94-649, Section 4.2, Table 4-7 |
| minimum point | 165 mil | 165 mil | |
| nominal | 175 mil | 175 mil | " |
| maximum point | 205 mil | 205 mil | " |
| Insulation level | 100% | 100% | ICEA S-94-649, Section 4.3, Table 4-7 |
| Basic impulse level (BIL) | 110 kV crest | 110 kV crest | ICEA S-94-649, Section 4.3, Table 4-6 |

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5.5 Extruded Insulation Shield

| Requirements | Stock Number | | Reference |
|---------------|---|---|---------------------------------------|
| | 012735 | 623670 | |
| Size | 500 kcmil | 1000 kcmil | |
| Material | discharge-free (thermosetting material) | discharge-free (thermosetting material) | ICEA S-94-649, Section 5.1 to 5.4.1.5 |
| Thickness | | | |
| minimum point | 24 mil | 24 mil | ICEA S-94-649, Section 5.2, Table 5-2 |
| nominal | 60 mil | 60 mil | ICEA S-94-649, Section 5.2, Table 5-2 |

5.6 Metallic Shield

| Requirements | Stock Number | | Reference |
|---|---------------------------------|---------------------------------|----------------------------|
| | 012735 | 623670 | |
| Size | 500 kcmil | 1000 kcmil | |
| Metal | copper, uncoated or tin coated | copper, uncoated or tin coated | ICEA S-94-649, Section 6 |
| Type | flat strap, helically applied ▲ | flat strap, helically applied ▲ | ICEA S-94-649, Section 6 |
| Number of straps | 13 + 3, - 2 ▲ | 23 + 3, - 3 ▲ | SCL preference |
| Cross-sectional area, minimum | 48,000 cmil ▲ | 106,000 cmil ▲ | SCL preference |
| Water blocking components for metallic shield | required ▲ | required ▲ | ICEA S-94-649, Section 6.6 |

5.7 Jacket

| Requirements | Stock Number | | Reference |
|------------------------------|---|---|--|
| | 012735 | 623670 | |
| Size | 500 kcmil | 1000 kcmil | |
| Material | linear low density polyethylene (LLDPE) | linear low density polyethylene (LLDPE) | ICEA S-94-649, Section 7.1.1 |
| Color | black | black | ICEA S-94-649, Section 7.1.1 |
| Type | extruded-to-fill | extruded-to-fill | ICEA S-94-649, Section 7.2.1 |
| Thickness | | | |
| minimum point | 45 mil | 70 mil | ICEA S-94-649, Section 7.2.1, Table 7-10 |
| maximum point | 80 mil | 120 mil | ICEA S-94-649, Section 7.2.1, Table 7-10 |
| Maximum diameter over jacket | 1.55 in ▲ | 1.99 in ▲ | SCL preference |

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5.8 Sheath (Continuous Metallic Covering)

Cable shall not be provided with a sheath.

5.9 Assembly and Identification

| Requirements | Stock Number | | Reference |
|---------------------------|--------------|------------|--------------------------------|
| | 012735 | 623670 | |
| Size | 500 kcmil | 1000 kcmil | |
| Red stripe identification | required ▲ | required ▲ | ICEA S-94-649, Section 8.2.1.1 |

6. Packaging

| Requirements | Stock Number | | Reference |
|----------------------------|---------------|---------------|-----------------------------|
| | 012735 | 623670 | |
| Size | 500 kcmil | 1000 kcmil | |
| 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 | 68.00 in ▲ | 68 in ▲ | SCL preference ^a |
| drum diameter, minimum | 42 in ▲ | 42 in ▲ | SCL preference |
| length per reel +10%, - 0% | | | SCL preference |
| length per reel +0%, - 10% | | 1,200 ft ▲ | SCL preference |
| gross weight, maximum | 17,000 lb ▲ | 17,000 lb ▲ | SCL preference |

^aDue to maximum arm width of equipment at SCL, reels greater than 68 inches cannot be accepted.

7. Issuance

| Requirements | Stock Number | | Reference |
|--------------|--------------|------------|-----------|
| | 012735 | 623670 | |
| Size | 500 kcmil | 1000 kcmil | |
| Stock unit | FT | FT | |

8. Approved Manufacturing Plants – Manufacturers and Plant Locations

| Prysmian Group | Okonite | Southwire | CME Wire and Cable |
|------------------------|-----------------|----------------|--------------------|
| DuQuoin, IL | Orangeburg, SC | Carrollton, GA | Monterrey, Mexico |
| Marshall, TX | Richmond, KY | Heflin, AL | |
| St. Jerome, QC, Canada | Santa Maria, CA | | |

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9. References

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

10. Sources

Shipek, John; SCL Standards Engineering Supervisor, subject matter expert, and originator of 6025.60