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Standard for Application and Installation Guidelines for Service-Entrance Cable

National Electrical Manufacturers Association

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Application and Installation Guidelines for Service-Entrance Cable

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Foreword

These application and installation guidelines offer practical information on correct application and industry-recommended practices for service-entrance cable installation in accordance with the *National Electrical Code*® (NEC). They address service masts, sunlight resistance, submerged cable, conduit markings, aerial installation, suitability for branch and feeder circuits, termination requirements in wet locations, and important changes for the 2017 NEC.

These guidelines have been developed by the NEMA Building Wire and Cable Section, which has committed to periodically reviewing them for any revisions necessary to address changing conditions, product listing and installation requirements, and technical progress. Comments for proposed revisions are welcomed and should be submitted to:

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At the time of approval, the Building Wire and Cable Section of the National Electrical Manufacturers Association had the following members:

AFC Cable Systems, Inc., a part of Atkore International—New Bedford, MA
Anamet Electrical, Inc.—Mattoon, IL
Cerro Wire LLC—Hartselle, AL
Colonial Wire & Cable Co., Inc.—Hauppauge, NY
Conductores Monterrey S.A. de C.V.—San Nicolás de los Garza, MEX
Electri-Flex Company—Roselle, IL
Encore Wire Corporation—McKinney, TX
General Cable—Highland Heights, KY
International Metal Hose Company—Bellevue, OH
Nexans North America—Chester, NY
Prysmian Cables & Systems USA, LLC—Lexington, SC
Service Wire Company—Culloden, WV
Southwire Company—Carrollton, GA
The Okonite Company—Ramsey, NJ
United Copper Industries—Denton, TX

The following members participated in the working group that contributed to the development of this standard:

Cerro Wire LLC—Hartselle, AL
General Cable—Highland Heights, KY
Southwire Company—Carrollton, GA

Section 1
Application Guidelines for Service-Entrance Cable

1.1 Construction

1.1.1 General

Service-entrance cable constructed in accordance with NFPA 70 (NEC) is permitted to employ copper, copper-clad aluminum, or aluminum alloy conductors. Copper conductors are of sizes 14 AWG to 2000 kcmil. Aluminum conductors are between 12 AWG and 2000 kcmil. All conductors 6 AWG and larger are stranded.

The NEC recognizes two service-entrance cable types—Type SE (above ground) and Type USE (below ground). Listed service-entrance cable complies with the UL 854, *Standard for Service-Entrance Cables*.

> Note: NFPA 70*, National Electrical Code,* and NEC are registered trademarks of the National Fire Protection Association, Quincy, MA.

1.1.2 Insulated Conductors

The conductors of Type USE and USE-2 are always of a thermoset or thermoset-based material and rated 90°C or 75°C in wet locations. Insulation rated 75°C in wet locations is also permitted at 90°C in dry locations. The "-2" rating allows the conductor to be used at 90°C in wet locations rather than 75°C. Conductors in Type SE cable are insulated with either a thermoplastic material with a nylon covering or a thermoset material.

UL 854 governs the wire stranding and sizes used in single-conductor cable and insulated conductors of multi-conductor cable (jacketed cable or submersible pump cable). Table 310.104(A) of the NEC governs insulation thickness by size range.

1.1.3 Grounding Conductors

Although not required in service-entrance cable, an equipment grounding conductor can be used. Insulated grounding conductors are always of the same material as the circuit conductors. In coverless Type USE cable with a bare conductor, the bare conductor is metal-coated copper regardless of the metal used in the insulated conductors.

1.1.4 Separators

A separator between the insulation and conductor may be part of the cable construction. The separator is used to keep thermoset insulation from penetrating between the wires of a stranded conductor for certain manufacturing methods. When used, the separator must be colored or opaque in order to allow the installer to clearly distinguish it from the conductor once the insulation is removed.

1.1.5 Fillers

The manufacturer may add fillers in order to maintain the firmness or shape of the cable, allowing it to comply with various required UL performance tests and helping maintain the watertight seal that a service-entrance cable fitting provides. Fillers could be fibrous and moisture-resistant or an integral but separable part of the cable jacket.

1.1.6 Coverings

Multi-conductor service-entrance cable includes flexible, smooth, sunlight-resistant nonmetallic coverings. These fit snugly but are easily separable from the cable assembly.