

GP 16-03-01	Wiring Methods and Material Selection	February 2002
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Wiring Methods and Material Selection

GP 16-03-01

Scope

[I] This Global Practice (GP) covers the design of wiring and cable systems.

[I] An asterisk (*) indicates that a decision or approval by Purchaser is required or that additional information is to be furnished by Purchaser.

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1. Required References

[I] This Section lists Practices and Standards that are generically referenced and assumed to be a part of this document. Unless otherwise specified herein, use the latest edition.

1.1. Global Practices–ExxonMobil Engineering Practices

GP 14-03-01	Fireproofing
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2. Additional Requirements

* [I] Purchase and use of wire, cable, and wiring materials shall conform to nationally recognized codes and standards which are approved by Owner's Engineer and which are acceptable within the country where the equipment and materials will be used. This Section lists specifications and standards which shall be applied for wire, cable, and wiring materials purchased to U.S. standards.

2.1. Documentation

- 1) [M] "As-Built" layout drawings of all underground electrical distribution shall be furnished in sufficient detail and accuracy to serve as a record of the installation for maintenance. The drawings shall show all underground splice points.
- 2) [S] For direct buried cable systems, Contractor drawings shall specify procedures to be followed in the field to ensure that aboveground cable markers accurately show cable trench locations in final installation. These drawings shall also include cross-section diagrams of all trenches and duct banks showing location of all cables.
- 3) [R] For cables rated over 1000 volts, Contractor construction drawings shall show complete details of, or specific reference to, cable manufacturer specifications for all splices and terminations.
- 4) * [S] A list of all aboveground wiring circuits or sections of wiring circuits requiring fireproofing shall be prepared by Contractor for approval by the Owner's Engineer. The list shall include:
 - a) An identification of the sources of sustained fire and the proximity to wiring.
 - b) The length and location of that section of each circuit requiring fire protection.
- 5) [I] Vendor shall provide documentation showing equipment meets approval requirements of the local authority. Approval requirements may include labeling, listing, or certification by a nationally-recognized testing organization acceptable to the local authority.

2.2. AEIC–Association of Edison Illuminating Companies

AEIC CS1	Impregnated-Paper-Insulated Metallic-Sheathed Cable, Solid Type
AEIC CS3	Impregnated-Paper-Insulated, Metallic-Sheathed Cable, Low-Pressure Gas-Filled Type

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AEIC CS4	Impregnated-Paper-Insulated, Low and Medium Pressure Self-Contained Liquid Filled Cable
AEIC CS5	Cross-Linked Polyethylene Insulated Shielded Power Cables Rated 5 Through 46 kV
AEIC CS6	Ethylene Propylene Rubber Insulated Shielded Power Cables Rated 5kV Through 46 kV

2.3. ANSI–American National Standards Institute

ANSI C80.5	Aluminum Rigid Conduit - (ARC)
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2.4. IEEE–Institute of Electrical and Electronic Engineers

IEEE C2-2002	National Electrical Safety Code (ANSI/IEEE)
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2.5. NEMA–National Electrical Manufacturers Association

NEMA C80.1	Rigid Steel Conduit - Zinc Coated (GRC)
NEMA C80.3	Electrical Metallic Tubing - Zinc Coated (EMT)
NEMA FB 1	Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable
NEMA VE 1	Metal Cable Tray Systems
NEMA WC 70	Nonshielded Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy
NEMA WC 71	Standard for Nonshielded Cables Rated 2001-5000 Volts for Use in the Distribution of Electric Energy
NEMA WC 72	Continuity of Coating Testing for Electrical Conductors
NEMA WC 74	5-46 kV Shielded Power Cable for Use in the Transmission & Distribution of Electric Energy

2.6. NFPA–National Fire Protection Association

NFPA 70	National Electrical Code
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2.7. UL–Underwriters Laboratories, Inc.

UL 1	UL Standard for Safety Flexible Metal Conduit
UL 4	UL Standard for Safety Armored Cable
UL 5	UL Standard for Safety Surface Metal Raceways and Fittings

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UL 6	UL Standard for Safety Rigid Metal Conduit - Steel
UL 44	UL Standard for Safety Thermoset-Insulated Wires and Cables
UL 83	UL Standard for Safety Thermoplastic-Insulated Wires and Cables
UL 209	UL Standard for Safety Cellular Metal Floor Raceways and Fittings
UL 493	UL Standard for Safety Thermoplastic-Insulated Underground Feeder and Branch-Circuit Cables
UL 514A	UL Standard for Safety Metallic Outlet Boxes
UL 514B	UL Standard for Safety Fittings for Cable and Conduit
UL 514C	UL Standard for Safety Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
UL 651	UL Standard for Safety Schedule 40 and 80 Rigid PVC Conduit
UL 651A	UL Standard for Safety Type EB and A Rigid PVC Conduit and HDPE Conduit
UL 719	UL Standard for Safety Nonmetallic-Sheathed Cables Tenth Edition; Reprint with Revisions Through and Including
UL 797	UL Standard for Safety Electrical Metallic Tubing
UL 870	UL Standard for Safety Wireways, Auxiliary Gutters, and Associated Fittings
UL 884	UL Standard for Safety Underfloor Raceways and Fittings

3. Definitions

- 1) * [I] Acceptable and Preferred Practices. Where this Practice lists more than one type of equipment or method as acceptable, Contractor shall make the selection based on total installed cost. Where one particular type of equipment or method is listed as preferred, it shall be selected, provided it is lower or equivalent in total installed cost to other acceptable types or methods. Optimum cost benefits may be achieved by reducing maintenance and operating expense through initial added investment. Economic basis for calculating optimum cost benefits will be included in the general job specification. Owner's Engineer shall approve alternative choices.
- 2) [I] Metal covered cables are defined as cables having one of the following metallic coverings over the insulation:
 - a) * Armor, including: flat or interlocked galvanized-steel tape; interlocked aluminum tape; galvanized-steel wire, polymer-coated steel wire, or copper wire; seamless or welded corrugated-steel or corrugated-bronze tube, or corrugated-aluminum tube (when approved by Owner's Engineer)
 - b) Lead sheath
 - c) Copper or stainless steel sheath, for mineral insulated (MI) type cables

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