METRIC/INCH-POUND

KSC-SPEC-E-0022B
July 24, 1996
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September 27, 1977

# AC POWER CABLE, 5,000-VOLT, 60-HERTZ, PROCUREMENT OF, SPECIFICATION FOR

## ENGINEERING DEVELOPMENT DIRECTORATE

National Aeronautics and
Space Administration

**John F. Kennedy Space Center**

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# AC POWER CABLE, 5,000-VOLT, 60-HERTZ, PROCUREMENT OF, SPECIFICATION FOR

Approved:

Walter T. Murphy

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Director of Engineering Development

## JOHN F. KENNEDY SPACE CENTER, NASA

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# AC POWER CABLE, 5,000-VOLT, 60-HERTZ,
# PROCUREMENT OF, SPECIFICATION FOR

## 1. SCOPE

This specification provides data for the procurement of single-conductor 5,000-volt, 60-hertz, alternating current (ac) power cable with ethylene propylene rubber (EPR) insulation, concentric neutral and overall jacket for replacement of existing circuits only. New 5-kilovolt (kV) circuits should use 15,000-volt cable per KSC-SPEC-E-0023.

Cables included in this specification shall be suitable for single phase or three phase circuit in aerial or underground in ducts or direct burial. The cable shall be rated for 90 degree Celsius (°C) continuous conductor temperature, 130 °C emergency overload, and 133-percent insulation level.

## 2. APPLICABLE DOCUMENTS

The following documents form a part of this document to the extent specified herein. When this document is used for procurement, including solicitation, or is added to an existing contract, the specific revision levels, amendments, and approval dates of said documents shall be specified in an attachment to the Solicitation/Statement of Work/Contract.

2.1 Governmental.

2.1.1 Specifications.

John F. Kennedy Space Center (KSC), NASA

| | |
|---|---|
| KSC-SPEC-E-0023 | AC Power Cable, 15,000-Volt, 60-Hertz, Procurement of, Specification for |

2.2 Non-Governmental.

Association of Edison Illuminating Companies (AEIC)

| | |
|---|---|
| AEIC CS6 | Ethylene Propylene Rubber Insulated Shielded Power Cable Rated 5 through 69 kV |

(Applications for copies should be addressed to the Association of Edison Illuminating Companies, 600 North 18th Street (P.O. Box 2641), Birmingham, AL 35291-0992.)

National Electric Manufacturers Association (NEMA)

| | |
|---|---|
| NEMA WC8/ICEA S-68-516 | Ethylene-Propylene-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy |

(Applications for copies should be addressed to NEMA Publication Sales, 2101 L Street, Suite 300, Washington, DC 20037.)

3. REQUIREMENTS

3.1 Conformance Criteria. - The cable shall conform to NEMA WC8/ICEA S-68-516, AEIC CS6, and the following provisions of this specification. In case of differences or conflict, this specification shall govern.

3.2 Conductors. - All conductors shall be sized as specified and shall be of soft, annealed-coated copper, concentric stranded, Class B. Conductor core assembly shall be strand-filled to prevent moisture migration.

3.3 Conductor Shielding. - Conductor shielding shall consist of an extruded semiconducting compound which is compatible with the conductor and insulation. The minimum temperature rating shall be 90 °C and the minimum thickness shall be in accordance with NEMA WC8/ICEA S-68-516.

3.4 Insulation. - The minimum average and minimum insulation thickness shall be 2.92 millimeters (mm) (115 mils) and 2.629 mm (103 mils) respectively. Insulation shall be ozone-resistant EPR, applied in the second stage of a triple extrusion process.

3.5 Insulation Shielding. - The nonmetallic insulation shall consist of an extruded thermoset material compatible with the insulation and jacket and complying with AEIC CS6. The metallic shielding shall consist of concentric neutral copper wires.

3.5.1 Concentric Neutral. - The minimum metallic shield size shall be one-third of the core conductor and at least 29 No. 14 American Wire Gage (AWG), 19 No. 12 AWG, or 12 No. 10 AWG shield wires. Minimum size of an individual shield wire is No. 14 AWG. Where *full neutral* is specified, minimum shield size is equal to the core conductor size.

3.6 Jacket. - Polyethylene (PE) jacket shall be extruded over the concentric neutral to a minimum thickness of 2.032 mm (80 mils).

3.7 Surface Marking. - Cables identified shall be marked by surface printing on the jacket giving type of cable, manufacturer's name, and date of manufacture at intervals not exceeding 1.8 meters (6 feet).

## 4. QUALITY ASSURANCE PROVISIONS

The supplier is responsible for the performance of all inspection and test requirements as specified in referenced standards. The supplier shall provide written results of all such tests at the time the cable is delivered. Provision shall also be made for customer observation of the cables during manufacture, if so required.

## 5. PREPARATION FOR DELIVERY

5.1 Preservation. - Cable ends shall be sealed to exclude moisture during shipment and storage.

5.2 Packaging. - Cables and reels shall be firmly secured and protected from damage during shipment.

5.2.1 Reels. - Cables shall be shipped on nonreturnable wooden reels. Reels shall be well made of wood construction and each reel shall be lagged around its circumference with wooden planks. The drum diameter shall not be less than 14 times the overall cable diameter. Those reels less than 1524 mm (60 inches) in diameter shall have arbor holes sized for 63.5-mm (2.5-inch) spindles; those greater than 1524 mm (60 inches) shall have arbor holes sized for 76-mm (3-inch)-diameter spindles.

5.2.2 Quantity. - Each reel shall contain only one length of cable cut to order.

5.2.3 In-Transit Requirements. - During transportation, reels shall be blocked in bed of vehicle in a vertical position. Transportation or receipt of loaded reels with the flanges in a horizontal position shall be sufficient cause for rejection of cable.

5.3 Marking.

5.3.1 General. - Each reel shall be plainly marked on each flange with the purchaser's order number, length ordered, length shipped, conductor size and type, and destination. A tag bearing identical information shall be attached to the cable end inside the lagging.

5.3.2 Reel Rotation. - Each reel shall have an arrow and appropriate wording stenciled in plain view on each flange. This arrow shall indicate proper rotation of reels.

6. NOTES

6.1 Intended Use. - This document is intended to provide information for the procurement of 5,000-volt, 60-hertz ac power cable for use at the Kennedy Space Center (KSC).

6.2 Ordering Data. - Procurement documents should specify the following:

a. Title, number, and date of this specification.

b. Length of wire required and number of lengths (reel types).

c. Number of conductors.

d. Wire and neutral size (for example: #4/0 full neutral and 500 kcmil 1/3 neutral).

NOTICE. The Government drawings, specifications, and/or data are prepared for the official use by, or on the behalf of, the United States Government. The Government neither warrants these Government drawings, specifications, or other data, nor assumes any responsibility or obligation, for their use for purposes other than the Government project for which they were prepared and/or provided by the Government, or an activity directly related thereto. The fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded, by implication or otherwise, as licensing

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Custodian:

NASA - John F. Kennedy Space Center

Preparing Activity:

John F. Kennedy Space Center
Electrical Division
Engineering Development Directorate

# STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8 In block 1, both the document number and revision letter should be given
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form

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| I RECOMMEND A CHANGE: | 1 DOCUMENT NUMBER | 2 DOCUMENT DATE |
|---|---|---|
| | KSC-SPEC-E-0022 Rev. B | July 24, 1996 |

3 DOCUMENT TITLE
AC Power Cable, 5000-Volt, 60-Hertz, Procurement Of, Specification For

4 NATURE OF CHANGE *(Identify paragraph number and include proposed rewrite, if possible Attach extra sheets as needed )*

5 REASON FOR RECOMMENDATION

**6. SUBMITTER**

| a. NAME *(Last, First, Middle Initial)* | b. ORGANIZATION | |
|---|---|---|
| c ADDRESS *(Include Zip Code)* | d. TELEPHONE *(Include Area Code)* | 7. DATE SUBMITTED |
| | | |

**8. PREPARING ACTIVITY**

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|---|---|
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KSC FORM 21-610NS (2/94) (C/G 2/94)