

FEDERAL SPECIFICATION

CORD, FLEXIBLE, AND WIRE, FIXTURE,
 (ELECTRICAL, 0- TO 600-VOLT SERVICE)

This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers flexible cord and fixture wire, solid or stranded, for use at 600-volts or less, except armored cord.

1.2 Classification.

1.2.1 Types. Cord wire furnished under this specification shall be of the types specified in table 1.

1.2.2 Type designation. Cords and wires covered by this specification shall be identified by a type designation, formed as indicated below. This type designation is intended for cataloging and ordering purposes, and not for surface printing on the wire or cable.

| J-C-580B | SPT-2 | <u>3</u> | <u>C</u> | <u>F</u> | <u>3/16</u> | <u>T</u> | <u>TJ</u> | <u>G</u> | <u>9</u> |
|-----------|---------|-------------------------|--------------------|----------------------|---------------------------------|--------------------|----------------|-------------|--------------------------------|
| Spec. No. | UL type | Maximum working voltage | Conductor material | Type of conductor(s) | Number and size of conductor(s) | Type of insulation | Outer covering | Ground wire | Color code of single conductor |
| (1.2.3) | (1.2.4) | (1.2.5) | (1.2.6) | (1.2.7) | (1.2.8) | (1.2.9) | (1.2.10) | (1.2.11) | (1.2.12) |

1.2.3 Cord Specification No. J-C-580B.

1.2.4 UL type designation. The UL (Underwriter's Laboratories) type designation shall consist of the types specified in 1.2.1.

1.2.5 Maximum working voltage. The maximum working voltage shall be designated as follows (see tables I and II):

- 3 - for use at not more than 300 volts.
- 6 - for use at not more than 600 volts.

1.2.6 Conductor material. The conductor material shall be designated as follows:

- C - copper.
- S - copper with insulated steel strands (see 3.3).

1.2.7 Type of conductor(s). The type of conductor(s) shall be designated as follows:

- E - Solid conductor (fixture wire only).
- F - Concentric-lay-stranded conductor(s) of standard flexibility.
- K - Bunch-stranded conductor(s) of extreme flexibility.

1.2.8 Number and size of conductor(s). The number of individual conductors of the same wire shall be designated by that number followed by a slant line and followed by a number indicating the conductor AWG size. When cables are made up of different wire sizes, each different wire size with the number of conductors shall be individually represented, with a dash separating each different wire size.

1.2.9 Type of insulation. The type of insulation shall be designated as follows:

- R - rubber
- SR - synthetic rubber
- NE - neoprene
- T - thermoplastic
- XP - cross linked polyethylene
- CP - chlorosulphonated polyethylene
- A - asbestos
- AV - asbestos-varnished-cloth insulated
- V - varnished cloth

1.2.10 Outer jacket. The outer jacket shall be designated as follows:

- RJ - rubber jacket
- SJ - synthetic rubber jacket
- NJ - neoprene jacket
- TJ - thermoplastic jacket
- PJ - polyamide jacket
- XJ - cross linked polyethylene jacket
- CB - cotton braid
- GB - glass braid
- AB - asbestos covering
- FC - fibrous covering
- LS - lead sheath
- AL - aluminum sheath
- UJ - unjacketed

1.2.11 Ground wire. When a ground wire is required as part of a cable configuration, it shall be designated by the letter "G".

1.2.12 Color code.

1.2.12.1 The color code for single conductor fixture wires only shall be designated by the appropriate identifying number as shown in table III.

1.2.12.2 The color code for multi-conductor cords and wires shall be in accordance with tables IV and V except for parallel cords (see 3.2).

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

Federal Specifications:

- L-P-378 - Plastic Sheet and Strip, Thin Gauge, Polyolefin.
- PPP-B-601 - Boxes, Wood, Cleated-Plywood.
- PPP-B-621 - Boxes, Wood, Nailed and Lock-Corner.
- PPP-B-636 - Boxes, Shipping, Fiberboard.
- PPP-B-1055 - Barrier Material, Waterproofed, Flexible.

Federal Standards:

- Fed. Std. No. 123 - Marking for Domestic Shipment (Civil Agencies).

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

(Single copies of this specification and other Federal Specifications required by activities outside the Federal Government for bidding purposes are available without charge from Business Service Centers at the General Services Administration Regional Offices in Boston, New York, Washington, DC, Atlanta, Chicago, Kansas City, MO, Fort Worth, Denver, San Francisco, Los Angeles, and Seattle, WA.

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

Military Standards:

- MIL-STD-129 - Marking For Shipment And Storage.

(Copies of Military Specifications and Standards required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply:

Underwriters' Laboratories (UL) Inc. Standards:

- No. 62 - Standard for Flexible Cord and Fixture Wire.

(Application for copies should be addressed to the Underwriters' Laboratories, Inc., 207 East Ohio Street, Chicago, Illinois 60611; 1285 Walt Whitman Road, Melville, L.I., New York 11746; or 1655 Scott Blvd., Santa Clara, California 95050.)

National Motor Freight Traffic Association, Incorporated, Agent:

- National Motor Freight Classification.

(Application for copies should be addressed to the American Trucking Associations, Inc., Tariff Order Section, 1616 P Street, N.W., Washington, DC 20036.)

Uniform Classification Committee, Agent:

Uniform Freight Classification.

(Application for copies should be addressed to the Uniform Classification Committee, Room 1106, 222 South Riverside Plaza., Chicago, IL 60606.)

3. REQUIREMENTS

3.1 Fire, safety and casualty hazards.

3.1.1 Each contractor shall submit to the contracting agency proof that the cord and fixture wire he proposes to supply under this specification conforms to the requirements of the Underwriters' Laboratories, Inc., Standard No. 62, Flexible Cord and Fixture Wire. The label, or listing mark, of the UL, may be accepted as evidence that the flexible cord or fixture wire conforms to this requirement.

3.1.2 In lieu of the UL label, or listing mark, the contractor shall submit independent proof, satisfactory to the contracting agency, that the flexible cord or fixture wire conforms to the applicable requirements of the published standards including methods of tests of the UL No. 62.

3.1.3 Compliance with the above preliminary requirements in regard to fire, safety and casualty hazards does not absolve the contractor from complete compliance with the other requirements of this specification in order to secure acceptance of his material or equipment.

3.2 Color code.

3.2.1 Single conductor. The color of a single conductor fixture wire is usually arbitrarily selected for purposes of differentiating between circuits when a number of single conductor wires are to be used. Consequently, the number designated in the type designation (see 1.2.11) signifies the color of a single conductor cable or wire.

3.2.2 Cords listed in table I, not over 3-conductors, shall be color coded in accordance with table IV, except for SP-1, SP-2, SPT-1, SPT-2, SP-3, SPT-3, HPN, and PO.

3.2.3 Cords listed in table I from 4 to 10 conductors shall be color coded in accordance with table V, except E, EO, Et, and ETP.

3.3 Steel strands for mechanical strength may be employed in a type E, EO, ET, or ETP elevator cable; and, if so used, the steel strands shall be run straight as a fibrous covered or insulated central wire and shall not be cabled with the copper strands of any conductor.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.2 Acceptance. Cord and wire furnished under this specification shall conform to all the requirements of this specification. Except as otherwise specified herein, for acceptance purposes, evidence of compliance shall be the label or listing mark of the Underwriters' Laboratories, Inc. or other Government approved nationally recognized testing organization properly equipped and qualified for testing to the appropriate Underwriters' Laboratories, Inc. Standard. Non-conformance with the requirements of this specification shall be cause for rejection.

4.3 Inspection of preparation for delivery. The packaging, packing, and marking of the packages of cord and wire shall be examined to determine compliance with the requirements of section 5 of this specification.

5. PREPARATION FOR DELIVERY

5.1 Packaging. Packaging shall be level A, B or C as specified (see 6.1).

5.1.1 Level A.

5.1.1.1 Coils (AWG sizes 18 to 10). Cord and wire shall be uniformly coiled and packaged with 250 feet per coil in a fiberboard box conforming to PPP-B-636, class weather-resistant, and may be provided with the special knockout feature normally used in commercial practice for dispensing purposes.

5.1.1.2 Coils (AWG sizes 8 to 2). Cord and wire uniformly coiled with 250 feet per coil. The coil shall be spirally wrapped with waterproffed flexible barrier material conforming to PPP-B-1055, class E-2 and sealed.

5.1.1.3 Reels. Cord and wire shall be packaged on non-returnable wood or metal spools or reels designed with strong flanges of a diameter that will protect the cord or wire during shipment or storage. After the cord or wire has been wound on the reel it shall be covered with a full wrap of waterproofed flexible barrier conforming to PPP-B-1055, class E-2. The wrap shall extend between the flanges and be secured in place with a minimum of two metal or non-metallic straps.

5.1.2 Level B.

5.1.2.1 Coils (AWG sizes 18 to 10). Cord and wire shall be uniformly coiled and packaged with 250 feet per coil to a fiberboard box conforming to PPP-B-636, class domestic, provided with the special knockout feature normally used in commercial practice for dispensing purposes.

5.1.2.2 Coils (AWG sizes 8 to 2). Cord and wire shall be uniformly coiled and packaged with 250 feet per coil. The coil shall be wrapped in a bag fabricated from material conforming to L-P-378, minimum thickness 0.0006 inch (6 mil). Each bag shall be heat sealed.

5.1.2.3 Reels. Cord and wire packaged in non-returnable wood or metal spools or reels designed with strong flanges of a diameter that will protect the cord or wire during or storage. After the cord or wire has been wound on the reel, it shall be wrapped in a bag fabricated from material conforming to L-P-378, minimum thickness 0.006 inch (6 mil). Each bag shall be heat sealed.

5.1.3 Level C. Cord and wire shall be packaged in accordance with the suppliers standard practice.

5.2 Packaging. Packing shall be level A, B, or C as specified (see 6.1).

5.2.1 Level A.

5.2.1.1 Coils (AWG sizes 18 to 10). Cord and wire packaged, as specified in 5.1 shall be packed in nailed or wood cleated plywood boxes conforming to PPP-B-621 and PPP-B-601, respectively.

5.2.1.2 Coils (AWG sizes 8 to 2) and reels. Cord and wire packaged, as specified in 5.1.1.2 and 5.1.1.3 shall require no further over packing.

5.2.2 Level B coils and reels. The number of coils or reels, as specified (see 6.1) shall be packed in a snug-fitting fiberboard box conforming to PPP-B-636, class domestic. Where the contract or order indicates that the unit packages is one coil, packing shall be in accordance with 5.1.2.1.

5.2.3 Level C. Wire and cord in quantities, as specified, packaged as specified in 5.1.3 shall be packed in containers to assure carrier acceptance and safe arrival at destination in compliance with Uniform Freight Classification Rules or National Motor Freight Classification Rules.

5.3 Marking. In addition to the markings required by the procurement documents, shipping containers shall be marked in accordance with Fed. Std. No. 123 for civil agencies or MIL-STD-129 for military agencies, as applicable.

TABLE I. Flexible cord

| Type | AWG size | Number of Conductors | AWG size of individual strands | Voltage | Temperature |
|-------|----------|----------------------|--------------------------------|---------|--------------|
| AFC | 18-10 | 2 or 3 | 36-30 | 300 | 150°C(302°F) |
| AFPO | 18-10 | 2 | 36-30 | 300 | 150°C(302°F) |
| AFPD | 18-10 | 2 or 3 | 36-30 | 300 | 150°C(302°F) |
| AFSJ | 18-16 | 2 or 3 | 36-30 | 300 | 150°C(302°F) |
| C | 18-10 | 2 or more | 36-26 | 300 | 60°C(140°F) |
| CFC | 18-10 | 2 or 3 | 36-30 | 300 | 90°C(194°F) |
| CFPO | 18-10 | 2 | 36-30 | 300 | 90°C(194°F) |
| CFPD | 18-10 | 2 or 3 | 36-30 | 300 | 90°C(194°F) |
| E | 18-14 | 2 or more | 36-30 | 300 | 60°C(140°F) |
| EO | 18-14 | 2 or more | 36-30 | 300 | 60°C(140°F) |
| ET | 18-14 | 2 or more | 36-30 | 300 | 60°C(140°F) |
| ETP | 18-14 | 2 or more | 36-30 | 300 | 60°C(140°F) |
| HPD | 18-12 | 2, 3, or 4 | 36-34 | 300 | 90°C(194°F) |
| HPN | 18-12 | 2 (PARALLEL) | 36-34 | 300 | 90°C(194°F) |
| HS | 14-12 | 2, 3, or 4 | 36-34 | 300 | 60°C(140°F) |
| HSJ | 18-16 | 2, 3, or 4 | 36-34 | 300 | 60°C(140°F) |
| HSJO | 18-16 | 2, 3, or 4 | 36-34 | 300 | 60°C(140°F) |
| HSO | 14-12 | 2, 3, or 4 | 36-34 | 300 | 60°C(140°F) |
| P-2 | 18-16 | 2 or more | 36-26 | 300 | 60°C(140°F) |
| PO | 18-10 | 2 (PARALLEL) | 36-26 | 600 | 60°C(140°F) |
| PD | 18-10 | 2 or more | 36-26 | 300 | 60°C(140°F) |
| S | 18-2 | 2 or more | * | 600 | 60°C(140°F) |
| SO | 18-2 | 2 or more | * | 600 | 60°C(140°F) |
| ST | 18-2 | 2 or more | * | 600 | 60°C(140°F) |
| STO | 18-2 | 2 or more | * | 600 | 60°C(140°F) |
| SJ | 18-14 | 2, 3 or 4 | ** | 300 | 60°C(140°F) |
| SJO | 18-14 | 2, 3, or 4 | ** | 300 | 60°C(140°F) |
| SJT | 18-14 | 2, 3 or 4 | ** | 300 | 60°C(140°F) |
| SJTO | 18-14 | 2, 3, or 4 | ** | 300 | 60°C(140°F) |
| SP-1 | 18 | 2 (PARALLEL) | 36-34 | 300 | 60°C(140°F) |
| SP-2 | 18-16 | 2 (PARALLEL) | 36-34 | 300 | 60°C(140°F) |
| SPT-1 | 18 | 2 (PARALLEL) | 36-34 | 300 | 60°C(140°F) |
| SPT-2 | 18-16 | 2 (PARALLEL) | 36-34 | 300 | 60°C(140°F) |
| SP-3 | 18-12 | 2 (PARALLEL) | 36-30 | 300 | 60°C(140°F) |
| SPT-3 | 18-10 | 2 (PARALLEL) | 36-30 | 300 | 60°C(140°F) |
| SRD | 10-4 | 3 or 4 | 36-20 | 300 | 60°C(140°F) |
| SRDT | 10-4 | 3 or 4 | 36-20 | 300 | 60°C(140°F) |
| SV | 18 | 2 | 36-34 | 300 | 60°C(140°F) |
| SVO | 18 | 2 | 36-34 | 300 | 60°C(140°F) |
| SVT | 18-17 | 2 | 36-34 | 300 | 60°C(140°F) |
| SVHT | 18-17 | 2 | 36-34 | 300 | 90°C(194°F) |

* 18 AWG, 36-30; 16-2 AWG, 36-26

** 18 AWG, 36-30; 16-14 AWG, 36-26

TABLE II. Single conductor, fixture wire

| Type | AWG | AWG Stranding | Volts | Temperature |
|-------|-------|---------------------------------|-------|--------------|
| AF | 18-10 | Solid, 7 Strand or 36-30 AWG | 300 | 150°C(302°F) |
| CF | 18-10 | Solid, 7 Strand or 36-30 AWG | 300 | 90°C(194°F) |
| FFH-1 | 18 | 36-26 | 300 | 75°C(167°F) |
| FFH-2 | 18-16 | 36-26 | 600 | 75°C(167°F) |
| PF | 18-14 | Solid or 7 Strand | 600 | 200°C(392°F) |
| PFF | 18-14 | 36-26 | 600 | 150°C(302°F) |
| PGF | 18-14 | Solid or 7 Strand | 600 | 200°C(392°F) |
| PGFF | 18-14 | 36-26 | 600 | 150°C(302°F) |

TABLE II. Single conductor, fixture wire (con.)

| Type | AWG | AWG Stranding | Volts | Temperature |
|-------|-------|-------------------|-------|--------------|
| RF-2 | 18-16 | Solid or 7 Strand | 600 | 60°C(140°F) |
| RFH-1 | 18 | Solid or 7 Strand | 300 | 75°C(167°F) |
| RFH-2 | 18-16 | Solid or 7 Strand | 600 | 75°C(167°F) |
| SF-1 | 18 | Solid or 7 Strand | 300 | 200°C(392°F) |
| SF-2 | 18-14 | Solid or 7 Strand | 600 | 200°C(392°F) |
| SFF-1 | 18 | 36-26 | 300 | 150°C(302°F) |
| SFF-2 | 18-14 | 36-26 | 600 | 150°C(302°F) |
| TF | 18-16 | Solid or 7 Strand | 600 | 60°C(140°F) |
| TFF | 18-16 | 36-26 | 600 | 60°C(140°F) |
| TFN | 18-16 | Solid or 7 Strand | 600 | 90°C(194°F) |
| TFFN | 18-16 | 36-26 | 600 | 90°C(194°F) |

TABLE III. Color-code identification for single conductor fixture wire

| Number designator | Color | Number designator | Color |
|-------------------|--------|-------------------|-----------------|
| 0 | Black | 5 | Green |
| 1 | Brown | 6 | Blue |
| 2 | Red | 7 | Violet (purple) |
| 3 | Orange | 8 | Gray (slate) |
| 4 | Yellow | 9 | White |

NOTE: This Table is not intended to signify a color sequence but only a number-color identification reference.

TABLE IV. Color codes for cords with not over 3 conductors

| Conductor number | Insulation color |
|------------------|-----------------------------------|
| 1 | Black |
| 2 | White |
| 3 | Green or green with yellow stripe |

TABLE V. Color codes for cords of 4 to 10 conductors

| Conductor number | Insulation color |
|------------------|-----------------------------------|
| 1 | Black |
| 2 | White |
| 3 | Red |
| 4 | Green or green with yellow stripe |
| 5 | Orange |
| 6 | Blue |
| 7 | Brown |
| 8 | Gray |
| 9 | Yellow |
| 10 | Purple |

6. NOTES

6.1 Ordering data. Purchasers should select the preferred options permitted herein, and include the following information in procurements:

- (a) Title, symbol, and date of this specification.
- (b) Type designation No. (see 1.2.2).
- (c) Levels of packaging, packing, and marking requirements (see 5).

MILITARY INTEREST

Military Coordinating Activity:

Army - EL

CUSTODIANS:

Army - EL
Navy - YD
Air Force - 17

Review activities:

Army - AT, ME, ML
Navy - SH
Air Force - 80
NSA
DSA - LS

Users activity:

Army - AV

CIVIL AGENCY COORDINATING ACTIVITIES:

GSA-FSS, PCD
DC GOVT - DCG
DOT - ACO
INTERIOR - BPA
HEW - FDA

Preparing Activity:

GSA-FSS