$1.10

UNDERWRITERS LABORATORIES INC.®

TESTING FOR PUBLIC SAFETY

(NBK SRC COPY)

GENERAL INFORMATION FROM ELECTRICAL CONSTRUCTION MATERIALS AND HAZARDOUS LOCATION EQUIPMENT DIRECTORIES

May 1979

The Listing Mark of Underwriters Laboratories Inc. on the product is the only method provided by UL to identify products manufactured under its Listing and Follow-Up Service. The Listing Mark for these products includes the name and/or symbol of Underwriters Laboratories Inc. (as illustrated in the Introduction of this Directory) together with the word "Listed", a control number, and the following product name: "Nonmetallic Flexible Tubing".

UNDERGROUND FEEDER AND BRANCH CIRCUIT CABLE (YDUX)

Underground feeder and branch-circuit cable is rated for use at 60° C. 600 volts and is Listed in sizes Nos. 14 to 4/0 AWG incl., copper, and Nos. 12 to 4/0 AWG incl., aluminum or copper-clad aluminum, for single and multiple conductor cables. It is designated as Type UF cable and is intended for use in accordance with Article 339 of the National Electrical Code.

Submersible Water Pump Cable—Indicates a multi-conductor cable in which 2, 3, or 4 single-conductor Type UF cables are twisted together without an outer covering. The cable is Listed in sizes from 14 AWG to 2 AWG incl., copper, and from 12 AWG to 2 AWG incl., aluminum or copper-clad aluminum. The cable is tag marked "For use within the well casing for wiring deep-well water pumps where the cable is not subject to repetitive handling caused by frequent servicing of the pump units." The insulation may also be surface-marked "Pump Cable."

This cable may employ copper, or aluminum, or copper-clad aluminum conductors. Cables with copper-clad aluminum conductors are surface printed "AL (CU-CLAD)" or "Cu-Clad Al." Cables with aluminum conductors are surface printed "AL."

For termination information, see Guide AALZ information.

Cables suitable for exposure to direct rays of the sun are indicated by tag marking and marking on the surface of the cable with the designation "Sunlight Resistant."

This cable may be terminated by using nonmetallic sheathed cable connectors (See Nonmetallic Sheathed Cable Connectors).

If single conductor Type UF cable is terminated with a fitting not specifically recognized for use with single conductor cable, special care should be taken to assure it is properly secured and not subject to damage.

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UNIT SUBSTATIONS (YEFR)

This listing covers unit substations intended to be installed in accordance with the requirements of the National Electrical Code and in accordance with the installation instructions provided on the unit substation.

A unit substation consists of a transformer in combination with primary and/or secondary overcurrent protective devices or switching devices housed in a single enclosure.

Some unit substations are suitable for use as service equipment and are so marked. Such marking is part of the listing mark as noted below, or is an integral part of other required markings.

Listed unit substations are for use with copper conductors unless marked to indicate which terminals are suitable for use with aluminum conductors. Such marking shall be independent of any marking on terminal connectors and shall be on a wiring diagram or other readily visible location. If all terminals are suitable for use with aluminum conductors, the marking will indicate "Use copper or aluminum wire." A unit substation employing terminals for main or branch circuit units individually Marked Cu-Al will be marked "Use copper-Al wire" or "Use copper wire only." The latter statement indicates that wiring space or other factors make the unit substation unsuitable for aluminum conductors.

Unless the unit substation is marked with both the size and temperature rating of wire to be used, the termination provisions are based on the use of 60 C ampacities for wire sizes Nos. 14-1 Awg and 75 C ampacities for wire Nos. 1/0 Awg and larger.

Unit substations have the secondary neutral bonded to the enclosure and have provision on the neutral for connection of a grounding conductor. A terminal is also provided on the enclosure near the line terminals for use with an equipment grounding conductor between the unit substation and the enclosure of equipment on the line side of the unit substation for use when a metallic conduit system is not provided.

Unit substations are marked for outdoor use or for indoor use.

The suitability of unit substations for use on high capacity circuits has not been investigated.

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WIRES (ZGZX)

Insulated wire is intended for installation and use in accordance with the National Electrical Code. Unless indicated in the individual General Information sections under the various Wire Classifications, conductor sizes range from Nos. 14 Awg to 2000 MCM inclusive.

ASBESTOS-INSULATED (ZHNV)

Asbestos-Insulated wires are classified and rated as follows:

Type A—with asbestos insulation, 300 volts maximum, Sizes No. 14 through No. 8 Awg inclusive, copper.

Type AA—with an asbestos or glass braid and asbestos insulation, 300 volts maximum, Sizes No. 14 through No. 4/0 Awg inclusive, copper.

Type AI—with impregnated asbestos insulation, 300 volts maximum, Sizes No. 14 through No. 8 Awg inclusive, copper.

Type AIA—with an asbestos or glass braid and impregnated asbestos insulation, 600 volts maximum, Sizes No. 14 Awg through 1000MCM inclusive, copper.

The Listing Mark of Underwriters Laboratories Inc. on the attached tag, the reel, or the smallest unit container in which the product is packaged with or without the UL symbol on the product is the only method provided by UL to identify these products manufactured under its Listing and Follow-Up Service. The Listing Mark for these products includes the name and/or symbol of Underwriters Laboratories Inc. (as illustrated in the Introduction of this Directory) together with the word "Listed", a control number, and the following product name: "Asbestos-Insulated Wire".

ASBESTOS-VARNISHED-CLOTH (ZIBT)

Asbestos-varnished-cloth wires are classified as follows:

Type AVA—an asbestos or glass braid, and insulation consisting of varnished cloth and impregnated asbestos. Sizes No. 14 Awg through 2000MCM inclusive, copper.

Type AVB—a flame-retardant cotton braid, and insulation consisting of varnished cloth and impregnated asbestos. Sizes No. 18 Awg through 2000MCM inclusive, copper, and No. 12 Awg through 1000MCM inclusive, aluminum or copper-clad aluminum.

Type AVL—a lead covering, and insulation consisting of varnished cloth and impregnated asbestos. Sizes No. 14 Awg through 2000MCM inclusive, copper.

Wires for use at voltages above 600 are indicated by adding numerical suffixes to the type letters, as follows:

Numerical Designation	Maximum Working Voltage
10	1000
20	2000
30	3000
40	4000
50	5000

All manufacturers are listed for 600-volt wires. As stated in the individual listings, certain manufacturers are also listed for wires with voltage rating up to 5000 volts.

Type AVB wire may employ copper, or aluminum, or copper-clad aluminum conductors. Wires with copper-clad aluminum conductors are surface printed "AL (CU-CLAD)." Wires with aluminum conductors shall be surface printed "AL."

The ampacity of copper-clad aluminum conductors is the same as for aluminum conductors. The wire connectors used with copper-clad aluminum conductors shall be recognized for use with copper and aluminum conductors and shall be marked "AL-CU," except that 12-10 Awg solid copper-clad aluminum conductors may be used with wire binding screws and in pressure-plate and push-in spring-type connecting mechanisms that are recognized for use with copper conductors. Copper-clad aluminum conductors are suitable for intermixing with copper or aluminum conductors in terminals for splicing connections only when the wire connectors are specifically recognized for such use. Such intermixed connections are limited to use in dry locations.

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FIXTURE WIRE (ZIPR)

Fixture wires are rated 600 volts, or less, as shown, and comply with the Standard for Flexible Cord and Fixture Wire of Underwriters Laboratories Inc. (UL62).

All conductors are copper except fixture wire having a temperature rating higher than 90 C may employ nickel.

Thermoplastic compounds may stiffen at temperatures below minus 10 C (14 F) and care should be used in handling at such temperatures.

Gasoline resistant wire has been tested at 30 C when immersed in gasoline. It is considered inherently resistant to gasoline vapors within the limits of the temperature rating of the wire type.

Gasoline resistant TFN or TFFN—Indicates a TFN and TFFN conductor with a jacket of extruded nylon suitable for exposure to mineral oil, and to liquid gasoline and gasoline vapors at ordinary ambient temperature. It is identified by tag marking and by printing on the insulation or nylon jacket with the designation "Type TFN (TFFN) Gasoline and Oil Resistant I" if suitable for exposure to mineral oil at 60 C or "Type TFN (TFFN) Gasoline and Oil Resistant II" if the compound is suitable for exposure to mineral oil at 75 C.

Wires which comply with a special vertical flame test are marked "FR-1" or "VW-1."

Type FXT in sizes 20 and 18 AWG which comply with an artificial weathering test are marked "W-A." Type FXT in sizes 24-22 shall comply with the weathering test and may use the "W-A" marking.

Fixture wires are classified as follows:

60 C maximum operating temperature.

Thermoplastic-insulated wires.

600 v, 18-16 AWG sizes: Types TF, TFF.

Christmas-tree wires.

125 v, 24-18 AWG size: Type FXT*.

***The maximum voltage is 300, provided that the nominal thickness of the insulation on the conductor is 2/64 in.**