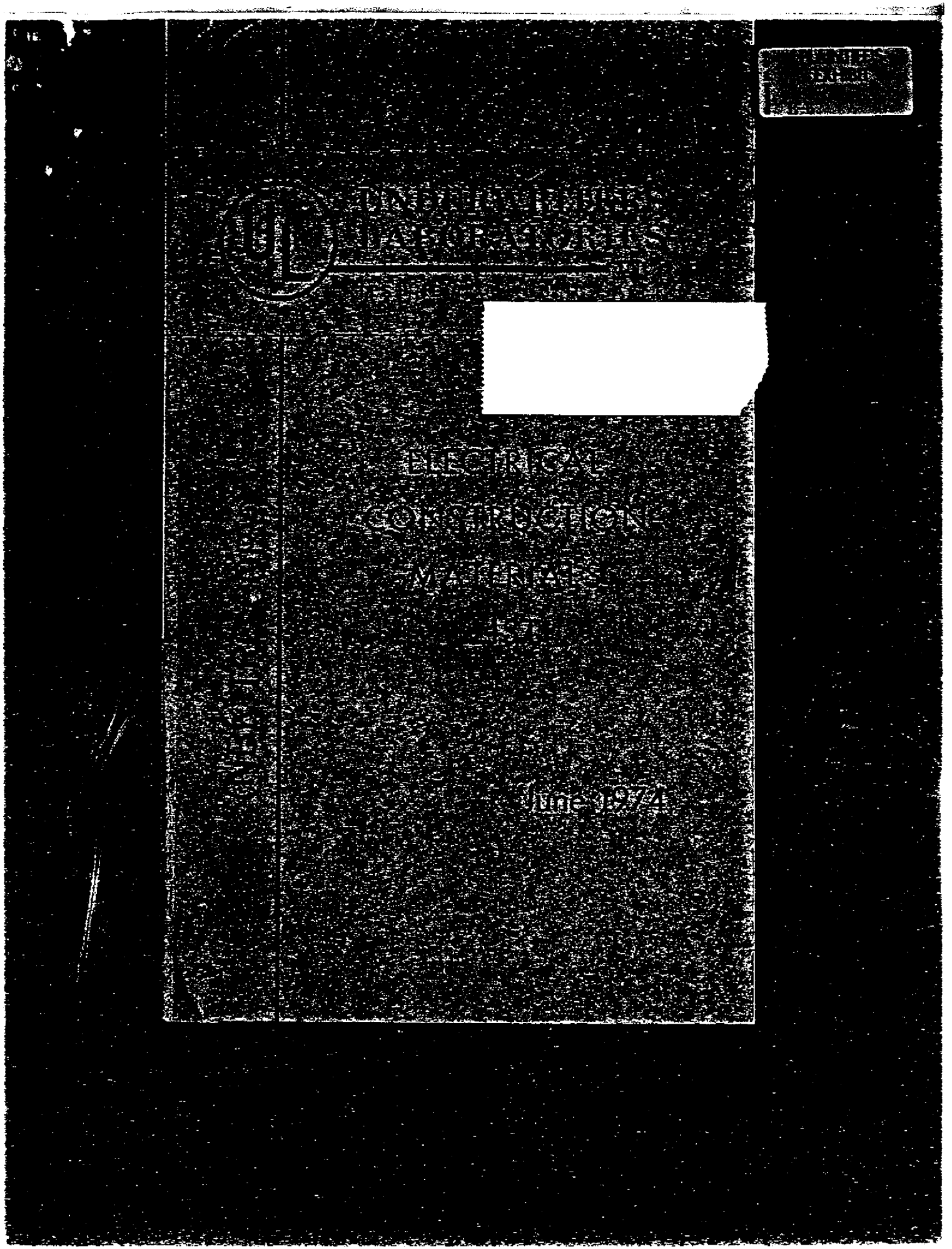

ELECTRICAL
CONSTRUCTION
MATERIALS
June 1974

Plastoid Corp., Hamburg, N. J.

Radix Wire Co., Cleveland 23, Ohio.

Reynolds Metals Co., Chester, Pa.

Rhode Island Insulated Wire Co., Inc., Cranston, R. I. 02910

Southwire Co., Carrollton, Ga. 30117

Systems Wire & Cable, Inc., Phoenix, Ariz. 85040

TRW Crescent Wire & Cable, A Div. of TRW Inc., Trenton, N. J. 08605

Techbestos, Inc., Moonachie, N. J.

Triangle Conduit & Cable Co., Inc., New Brunswick, N. J.

Victor Electric Wire & Cable Corp., West Warwick, R. I. 02893

UNIT SUBSTATION (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 indicated that wiring space or other factors make the unit substation unsuitable for aluminum conductors.

Unless the unit substation is marked otherwise, the wiring space and current-carrying capacity are based on the use of 60 C wire in circuits rated 100 amps or less, and the use of 75 C wire for higher ampere rated circuits.

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.

»→ LOOK FOR THE LISTING MARK ←«

The Listing Mark of Underwriters Laboratories Inc. (illustrated below) on the product is the only method provided by Underwriters Laboratories Inc. to identify Unit Substations which have been produced under its Listing and Follow-up Service.

Underwriters Laboratories Inc.®
LISTED
UNIT SUBSTATION

Sorgel Electric Corp., Subsidiary of Square D Co., Milwaukee, Wis. 53204

Unicorn Industries, Anaheim, Calif. 92806

Westinghouse Electric Corp., Greenville, Pa. 16125

Zinsco Electrical Products, Los Angeles, Calif. 90012

WIRES (460 I0) 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.

WIRES, ASBESTOS-INSULATED (460 I2) 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.

Asbestos-Insulated—*Continued*

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 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.

»→ LOOK FOR THE LISTING MARK ←«

American Insulated Wire Corp., Pawtucket, R. I.

Belden Corp., Geneva, Ill. 60134

Carol Cable Co., Pawtucket, R. I. 02862

Cerro Wire & Cable Co., Division of Cerro Corporation, New Haven, Conn. 06504

Cleveland Insulated Wire Co., Cleveland 11, Ohio.

Coleman Cable & Wire Co., River Grove, Ill. 60171

Collyer Insulated Wire Co., Inc., Lincoln, R. I.

Continental Wire & Cable Corp., Subsidiary of Nytronics, Inc., York, Pa. 17405

Dixie Wire Corp., Nashville, Tenn.

Electrical Cable Div., United States Steel Corp., Worcester, Mass. 01607

General Electric Co., Bridgeport 2, Conn.

Jemco Insulated Wire Co., Joliet, Ill. 60434

Radix Wire Co., The, Cleveland 32, Ohio.

Techbestos, Inc., Moonachie, N. J.

Teledyne Western Wire & Cable, Los Angeles, Calif. 90058

Triangle Conduit & Cable Co., Inc., New Brunswick, N. J.

Waterbury Products Corp., Doylestown, Pa. 18901

Westlake Insulated Wire Co., Westlake, Ohio.

WIRES, ASBESTOS-VARNISHED-CLOTH (460 I3) 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.

»→ LOOK FOR THE LISTING MARK ←«

American Insulated Wire Corp., Pawtucket, R. I.

Wires, Asbestos-Varnished-Cloth—*Continued*

Cerro Wire & Cable Co., Division of Cerro Corporation, New Haven, Conn. 06504

Cleveland Insulated Wire Co., Inc., Cleveland 11, Ohio.

Coleman Cable & Wire Co., River Grove, Ill. 60171

Collyer Insulated Wire Co., Inc., Lincoln, R. I.

Continental Wire & Cable Corp., Subsidiary of Nytronics, Inc., York, Pa. 17405

Electrical Cable Div., United States Steel Corp., Worcester, Mass. 01607

General Electric Co., Bridgeport 2, Conn.

Radix Wire Co., The, Cleveland 32, Ohio.

Techbestos, Inc., Moonachie, N. J.

Teledyne Western Wire & Cable, Los Angeles, Calif. 90058

Triangle Conduit & Cable Co., Inc., New Brunswick, N. J.

Westlake Insulated Wire Co., Westlake, Ohio 44145

FIXTURE WIRE (460 I6) 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.

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, 20-18 AWG size: Type FXT*.
*The maximum voltage is 300, provided that the nominal thickness of the insulation on the conductor is 2/64 in.

75 C maximum operating temperature.
Rubber-insulated, heat-resistant wires.
300 v, 18 AWG size: Types RFH-1, FFH-1.
600 v, 18-16 AWG sizes: Types RFH-2, FFH-2.

90 C maximum operating temperature.
Cotton-insulated wire.
300 v, 18-10 AWG sizes: Type CF.
Thermoplastic-insulated wires.
600 v, 18-16 AWG sizes: Types TFN, TFFN.

150 C maximum operating temperature.
Asbestos-insulated wire.
300 v, 18-10 AWG sizes: Type AF.
Silicone-rubber-insulated wire.
300 v, 18 AWG size: Type SFF-1.
600 v, 18-14 AWG sizes: Type SFF-2.
Fluorinated ethylene propylene-insulated wire.
600 v, 18-14 AWG sizes: Types PFF, PGFF.
Polytetrafluoroethylene-insulated wire.
600 v, 18-14 AWG sizes: Type PTFF.

200 C maximum operating temperature.
Silicone-rubber-insulated wire.
300 v, 18 AWG size: Type SF-1.
600 v, 18-14 AWG sizes: Type SF-2.
Fluorinated ethylene propylene-insulated wire.
600 v, 18-14 AWG sizes: Types PF, PGF.

250 C maximum operating temperature.
Polytetrafluoroethylene-insulated wire.
600 v, 18-14 AWG sizes: Type PTF.

»→ LOOK FOR THE LISTING MARK ←«

The Listing Mark of Underwriters Laboratories Inc., (illustrated below) on the product

TEMPERATURE-INDICATING AND REGULATING EQUIPMENT (400 E0) XAPX

→ LOOK FOR THE LISTING MARK ←

Dynatrol National Corp., Sun Valley, Calif. 91352

Martin Industries, Inc., Huntsville, Ala. 35807

Thermon Mfg. Co., San Marcos, Texas 78666

Vulcan Radiator Co., The, Hartford, Conn. 06101

TRANSFORMERS (400 R0) XNWX

TRANSFORMERS—CLASS 2 (400 R3) XOKV

→ LOOK FOR THE LISTING MARK ←

Ault Inc., Minneapolis, Minn. 55429

Dormeyer Industries, A Div. of A. F. Dormeyer Mfg. Co., Inc., Chicago, Ill. 60641

Change of name. Formerly Dormeyer Industries.

TRANSFORMERS—TOY (400 R20) XRBV

→ LOOK FOR THE LISTING MARK ←

Tyco Industries, Woodbury Heights, N. J. 08097, Moorestown, N. J. 08057

Adds Moorestown, N. J. address.

WIRES (460 I0) ZGZX

WIRES, ASBESTOS-INSULATED (460 I2) ZHNV

→ LOOK FOR THE LISTING MARK ←

Continental Wire & Cable Corp., Subsidiary of The Anaconda Co., York, Pa. 17405

Change of name. Formerly Continental Wire & Cable Corp., Subsidiary of Nytronics, Inc.

WIRES, ASBESTOS-VARNISHED-CLOTH (460 I3) ZIBT

→ LOOK FOR THE LISTING MARK ←

Continental Wire & Cable Corp., Subsidiary of The Anaconda Co., York, Pa. 17405

Change of name. Formerly Continental Wire & Cable Corp., Subsidiary of Nytronics, Inc.

FIXTURE WIRE (460 I6) ZIPR

→ LOOK FOR THE LISTING MARK ←

Continental Wire & Cable Corp., Subsidiary of The Anaconda Co., York, Pa. 17405

Change of name. Formerly Continental Wire & Cable Corp., Subsidiary of Nytronics, Inc.

Teledyne Thermatics, Elm City, N. C. 27822

Thermoplastic-covered wires: Types TFN, TFFN.

Narragansett Wire Co., Pawtucket, R. I. 02860
Okonite Co., The, Passaic, N. J.
Parmite Wire & Cable, Essex International, Inc., Fort Wayne, Ind. 46804
Phelps Dodge Cable & Wire Co., A Div. of Phelps Dodge Copper Products Corp., Yonkers, N. Y. 10702
Plastic Wire & Cable Corp., The, Jewett City, Conn.
Plastoid Corp., Hamburg, N. J.
Radix Wire Co., Cleveland 22, Ohio.
Reynolds Metals Co., Chester, Pa.
Rhode Island Insulated Wire Co., Inc., Cranston, R. I. 02910
Rome Cable, Div. of Cyprus Mines Corp., Rome, N. Y. 13441
Simplex Wire & Cable Co., Cambridge, Mass.
Southwire Co., Carrollton, Ga. 30117
Techbestos, Inc., Moonachie, N. J.
Triangle Conduit & Cable Co., Inc., New Brunswick, N. J.
Victor Electric Wire & Cable Corp., West Warwick, R. I. 02893

WIRES (460 10) 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 No. 14 AWG to 2000 MCM inclusive.

WIRES, ASBESTOS-INSULATED (460 12) ZHNV

Asbestos-insulated wires are classified and rated as follows:
Type A—with asbestos insulation, 300 volts maximum.
Type AA—with an asbestos or glass braid and asbestos insulation, 300 volts maximum.
Type AI—with impregnated asbestos insulation, 300 volts maximum.
Type AIA—with an asbestos or glass braid and impregnated asbestos insulation, 300 volts maximum.

→ LOOK FOR THE LISTING MARK ←

American Insulated Wire Corp., Pawtucket, R. I.
Belden Corp., Chicago, Ill. 60680
Carol Cable Co., Pawtucket, R. I. 02862
Cerro Wire & Cable Co., Division of Cerro Corporation, New Haven, Conn. 06504
Cleveland Insulated Wire Co., Cleveland 11, Ohio.
Coleman Cable & Wire Co., River Grove, Ill. 60171
Collyer Insulated Wire Co., Inc., Lincoln, R. I.
Continental Wire & Cable, Div. of Gulton Industries, Inc., York, Pa. 17405
Dixie Wire Corp., Nashville, Tenn.
General Cable Corp., New York 17, N. Y.
General Electric Co., Bridgeport 2, Conn.
Jemco Insulated Wire Co., Joliet, Ill. 60434
Miller Electric Co., Div. of Avnet, Inc., Woonsocket, R. I. 02895
Radix Wire Co., The, Cleveland 22, Ohio.
Techbestos, Inc., Moonachie, N. J.
Teledyne Western Wire & Cable, Los Angeles, Calif. 90058
Triangle Conduit & Cable Co., Inc., New Brunswick, N. J.
United States Steel Corp., Worcester, Mass. 01607
Waterbury Products Corp., Doylestown, Pa. 13501
Westlake Insulated Wire Co., Westlake, Ohio.