

1.0 **SCOPE**

This standard covers the minimum requirements for insulated copper conductors used in metering and control system applications related to electrical distribution systems, 600 V maximum.

2.0 **PRODUCT REQUIREMENTS**

2.1. **Single-Conductor, Thermoplastic, Heat, and Water Resistant (THW) Conductor with PVC Jacket**

2.1.1. Purpose

THW conductors are suitable for various commercial and industrial applications. These conductors may be installed in wet or dry locations, indoors or outdoors, in raceways, underground ducts, aerial or direct buried.

2.1.2. Product Description

Conductor shall be Class B, soft drawn, copper per ASTM B3 and ASTM B8. The insulation shall be heat and moisture resistant polyvinyl chloride (PVC) meeting the requirements of the standards in Section 2.1.3 for THW type wires. The insulation shall be suitable for use in wet or dry locations at a conductor temperature not exceeding 75° C for normal operation. The insulation jacket shall be a premium quality abrasion, flame retardant, moisture and oil resistant.

2.1.3. Applicable Codes and Standards

The conductor in this specification shall meet and/or exceed all requirements of the latest editions of the standards listed below. The conductor shall further meet and/or exceed those applicable standards not stated herein but referenced by the below standards.

- a) ASTM B3 – Standard Specification for Soft or Annealed Copper Wire
- b) ASTM B8 – Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
- c) ANSI/NEMA WC 70 – Standard for Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy
- d) UL 83 – Standard for Thermoplastic-Insulated Wires and Cables

2.1.4. Standard Conductor Sizes

Conductor supplied under this category shall be sized per the table below:

Size (AWG)	Strands	Insulation Color	Spool Diameter (in.)	Spool Width (in.)	Division ID
12	7	Gray	6.5	5.5	20069
12	7	Purple	6.5	5.5	20070
12	7	Yellow	6.5	5.5	20071
12	7	Green	6.5	5.5	20072
12	7	Orange	6.5	5.5	20073
12	7	Brown	6.5	5.5	20074
12	7	White	6.5	5.5	20075
12	7	Black	6.5	5.5	20076
12	7	Blue	6.5	5.5	20077
12	7	Red	6.5	5.5	20078
10	7	Black	11.5	7.625	20079
10	7	White	11.5	7.625	20080
10	7	Green	11.5	7.625	78649
4	7	White	11.5	7.625	20089
4	7	Black	11.5	7.625	20090

2.1.5. Packaging

Conductor shall be packaged on individual 500-foot spools in accordance with the spool dimensions listed in Section 2.1.4.

2.2. **Single-Conductor, Copper SIS Cable (Switchboard Wire) with Cross-Linked Polyethylene (XLPE) Insulation**

2.2.1. Purpose

SIS cables are predominantly used in utility substation switchboard applications. The cross-linked polyethylene (XLPE) insulation is flame-retardant, heat, moisture, and radiation resistant.

2.2.2. Product Description

Conductor shall be soft annealed uncoated copper with Class K stranding, or unilay compressed per ASTM B8. The insulation shall be cross-linked polyethylene (XLPE), providing a low smoke, low-corrosivity and flame retardant product.

2.2.3. Applicable Codes and Standards

The conductor in this specification shall meet and/or exceed all requirements of the latest editions of the standards listed below. The conductor shall further meet and/or exceed those applicable standards not stated herein but referenced by the below standards.

- a) ASTM B3 – Standard Specification for Soft or Annealed Copper Wire

Specification

- b) ASTM B8 – Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
- c) ANSI/NEMA WC 70 – Standard for Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy
- d) UL 44 – Standard for Thermoset-Insulated Wires and Cables (Type SIS)
- e) UL 1581 – Reference Standard for Electrical Wires, Cables, and Flexible Cords

2.2.4. Standard Conductor Sizes

Conductor supplied under this category shall be sized per the table below:

Size (AWG)	Strands	Insulation Color	Division ID
12	65	Black	19991
12	65	Red	78862
12	65	Blue	78860
12	65	Green	78861
12	65	White	78863
10	105	Black	78855
10	105	Red	78858
10	105	Blue	78856
10	105	Green	78857
10	105	White	78859
8	133	Black	20199

2.2.5. Packaging

Conductor shall be packaged on individual 1,000-foot reels or spools.

2.3. **Type TC Shielded Control Cable with Cross-Linked Polyethylene (XLPE) XHHW-2 Insulation and Polyvinyl Chloride (PVC) Jacket**

2.3.1. Purpose

TC control cables shall be suited for use in wet and dry areas, conduits, ducts, troughs, trays, direct burial, aerial supported by a messenger, and where superior electrical properties are desired.

2.3.2. Product Description

The cables shall be capable of operating continuously at the conductor temperature not in excess of 90°C for normal operation in wet and dry locations, 130°C for emergency overload, and 250°C for short circuit conditions. Individual conductors shall be annealed, tinned copper with a fire-retardant crosslinked polyethylene (XLPE) insulation.

Conductors shall be colored in accordance with ICEA S-73-532 Method 1, Table E-1. Cable shall be protected by a black polyvinyl chloride (PVC) jacket.

2.3.3. Applicable Codes and Standards

The conductor in this specification shall meet and/or exceed all requirements of the latest editions of the standards listed below. The conductor shall further meet and/or exceed those applicable standards not stated herein but referenced by the below standards.

- a) ASTM B3 – Standard Specification for Soft or Annealed Copper Wire
- b) ASTM B8 – Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
- c) ANSI/NEMA WC 70 – Standard for Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy
- d) UL 44 – Standard for Thermoset-Insulated Wires and Cables (Type TC)
- e) UL 1277 – Standard for Electrical Power and Control Tray Cables with Optional Optical-Fiber Members, VW-1
- f) UL 1581 – Reference Standard for Electrical Wires, Cables, and Flexible Cords
- g) UL 1685 – Standard for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables
- h) ICEA S-58-679 – Control, Instrumentation, and Thermocouple Extension Conductor Identification
- i) ICEA S-73-532 – Standard for Control, Thermocouple Extension, and Instrument Cable
- j) ICEA T-29-520 – Conducting Vertical Cable Tray Flame Tests with Theoretical Heat Input Rate of 210,000 B.T.U./Hour

2.3.4. Standard Conductor Sizes

Conductor supplied under this category shall be sized per the table below:

Size (AWG)	Strands	Number of Conductors	Division ID
12	7	4	20201
12	7	12	20204
10	7	4	20202
8	7	4	20203

2.3.5. Packaging

Cable shall be packaged on individual 1,000-foot reels or spools.

2.4. **Type SOOW Flexible Cord**

2.4.1. **Purpose**

Type SOOW cable is for use in heavy-duty industrial applications where flexibility and durability is required. SOOW is designed for extra hard usage on industrial equipment, heavy tools, motor and welding leads, and power extensions.

2.4.2. **Product Description**

Individual conductors shall be Class K stranded bare annealed copper per ASTM B174. Cord shall be constructed of color-coded synthetic oil, ozone and water resistant rubber (EPDM) insulation and an oil resistant thermoset chlorinated polyethylene (CPE) jacket. Cord shall be rated for indoor and outdoor use. Cord shall be rated -40°C to 90°C and be water, oil, and weather resistant.

2.4.3. **Applicable Codes and Standards**

The conductor in this specification shall meet and/or exceed all requirements of the latest editions of the standards listed below. The conductor shall further meet and/or exceed those applicable standards not stated herein but referenced by the below standards.

- a) ASTM B3 – Standard Specification for Soft or Annealed Copper Wire
- b) ASTM B174 – Standard Specification for Bunch-Stranded Copper Conductors for Electrical Conductors
- c) UL 62 – Standard for Flexible Cords and Cables

2.4.4. **Standard Conductor Sizes**

Conductor supplied under this category shall be sized per the table below:

Size (AWG)	Strands	Number of Conductors	Division ID
12	65/30	3	78852
10	104/30	3	78851

2.4.5. **Packaging**

Cable shall be packaged on individual 1,000-foot reels or spools.