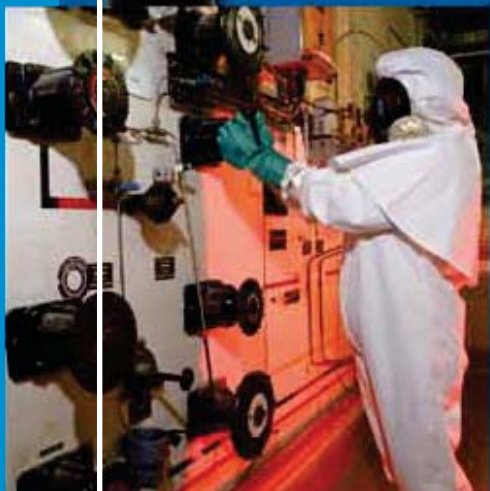
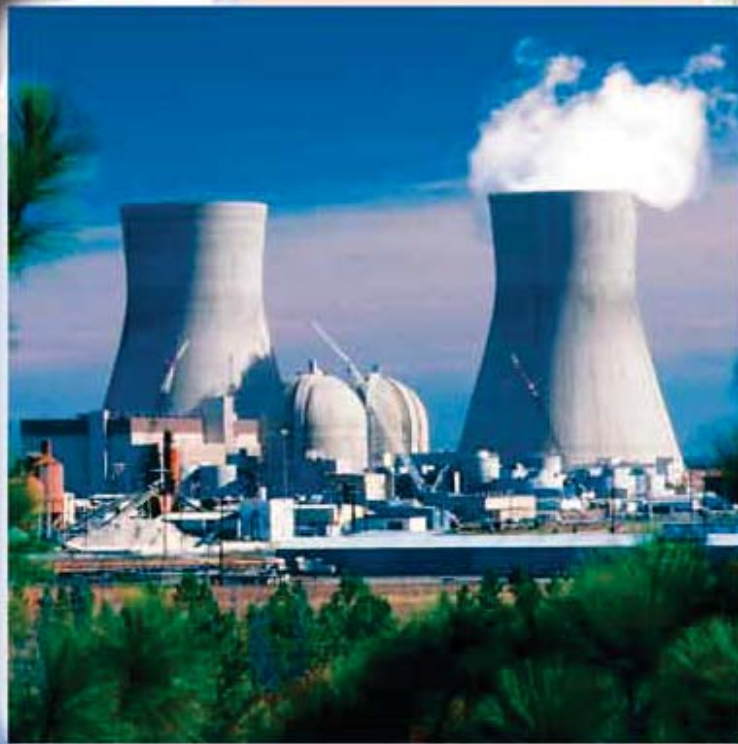




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## WELCOME

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- Click the “General Cable” logo on the left side of the menu bar to go to General Cable’s Web site.
- The “Table of Contents” button in the center of the menu bar takes you to a fully interactive page. Click on any product category or listing to take you to the appropriate page. (All other page references throughout the catalog are also fully interactive.)
- The entire catalog’s contents can be searched using the Search button located in the upper right of the menu bar.
- Turn catalog pages by clicking your mouse on the top or bottom corner of the page or by using the forward or back arrows on the side of the page or on the bottom bar.
- Zoom to details on each page by clicking when the magnifying glass pointer is active. Click again to return to full view.
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# ULTROL®

Nuclear power plants require higher-quality cables that meet stringent Nuclear Regulatory Commission Standards. For more than three decades, General Cable has answered the needs of the nuclear power market with cables for power generation, transmission and distribution worldwide. All General Cable's products meet strict quality-assurance standards to provide nuclear power plants with the maximum level of performance, reliability and safety.

## Ultrol® Comprehensive Product Line

General Cable's Brand Rex Brand Ultrol insulated cables include a full line of products recommended for all types of generating plants. From its inception, the Ultrol product line has grown from control cables to a comprehensive line of generating station cables, all of which are qualified for 40-year service life capability. From power distribution and control circuits to monitoring equipment, security systems and plant operation, Ultrol meets every application need of the nuclear power market.

- Power and Control Cable
- Instrumentation and Thermocouple Cable
- Communications Cable
- Switchboard Wire
- Coaxial and Triaxial Cable

## The Ultimate in Class 1E

General Cable's Ultrol Class 1E product line reliability has been validated to perform its intended safety-related function during Design Basis Events (DBE) by being environmentally qualified through simulated Steam Line Break (SLB) and Loss-of-Coolant Accident (LOCA) environments. Compliance Standards and Franklin Qualification Reports for the Ultrol product line are as follows:

### Compliance Standards

- ANSI
- ICEA
- IEEE

### Franklin Qualification Reports

- F-C5120-1
- F-C5120-2
- F-C5120-3
- F-C5120-4

## Backed by Quality Assurance

Every Ultrol cable is manufactured in conformance with the documented General Cable Quality Assurance program for Nuclear Facilities and Quality Control procedures, all under our ISO 9001:2008, ASME NQA-1:1994 and ASME NQA-1:2008 (and 2009 Supplemental) commitment-to-quality organization. General Cable's facility has maintained its nuclear status through regular audits by industry committees such as the Nuclear Procurement Issues Committee and several other quality assurance organizations.

- International Standards Organization – ISO 9001:2008
- American National Standards Institute – ANSI N45.2
- American Society of Mechanical Engineers – ASME NQA-1:1994 and ASME NQA-1:2008 (and 2009 Supplemental)
- Nuclear Regulatory Commission – NRC 10 CFR 50 Appendix B
- Nuclear Procurement Issues Committee (NUPIC)
- Nuclear Industry Assessment Committee (NIAC)

## Reliability & Safety Ahead of Its Time

Ultrol is considered a leading name in the nuclear power generating industry due to its demonstrated reliability and safety. As a proprietary formulation, Ultrol has a balance of properties such as maximum flame retardancy, long-term moisture stability, long-term thermal endurance and superior electricals that successfully sustain long-term qualification testing. The Ultrol radiation- and moisture-resistant line of wire and cable is ideal for safety and non-safety related nuclear facilities, including both indoor and outdoor applications in wet or dry conditions. General Cable's manufacturing capabilities, experience and high-quality standards provide the platform for Ultrol's reliability and safety, ahead of its time in the nuclear industry.

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# ULTROL® Nuclear Cables Catalog

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##### Ultrol® Class 1E Nuclear Single Conductor Switchboard and Power Cable

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- **SPEC 125** — Ultrol SIS, Switchboard Wire, Class 1E Nuclear, 600V, 90°C, VW-1, Class K & H, UL Type SIS and Type SIS/XHHW-2
- **SPEC 150** — Ultrol Heavy Wall, Single Conductor, Power Cable, Class 1E Nuclear, 600V, 90°C, VW-1, UL Type RHH/RHW-2
- **SPEC 175** — Ultrol Dual Wall, Single Conductor, Power Cable, Class 1E Nuclear, 600V, 90°C, VW-1, UL Type RHH/RHW-2

##### Ultrol® Class 1E Nuclear Instrumentation Cable

- **SPEC 200** — Ultrol Instrumentation Cable, Multi-Conductor, Class 1E Nuclear, 600V, 90°C, VW-1
- **SPEC 225** — Ultrol Instrumentation Cable, Multi-Conductor, Overall Shield, Class 1E Nuclear, 600V, 90°C, VW-1
- **SPEC 250** — Ultrol Instrumentation Cable, Individually Shielded Pairs or Triads, Overall Shield, Class 1E Nuclear, 600V, 90°C, VW-1

##### Ultrol® Class 1E Nuclear Multi Conductor Control and Power Cable

- **SPEC 275** — Ultrol Control Cable, Multi-Conductor, Class 1E Nuclear, 600V, 90°C, VW-1, UL Type TC
- **SPEC 300** — Ultrol Control Cable, Multi-Conductor, Overall Shield, Class 1E Nuclear, 600V, 90°C, VW-1, UL Type TC
- **SPEC 325** — Ultrol Power Cable, 3 or 4 Conductors with Ground, Class 1E Nuclear, 600V, 90°C, VW-1, UL Type TC

##### Ultrol® Class 1E Nuclear Coaxial and Triaxial Cables

- **SPEC 350** — 50 Ohm Coax, RG-174/U Equivalent, CS50060
- **SPEC 375** — 50 Ohm Coax, RG-58C/U Equivalent, CS50116
- **SPEC 400** — 50 Ohm Coax, RG-213/U Equivalent, CS50285
- **SPEC 425** — 75 Ohm Coax, RG-59B/U Equivalent, CS75146
- **SPEC 450** — 75 Ohm Coax, RG-11A/U Equivalent, CS75285
- **SPEC 475** — 89 Ohm Coax, RG-22B/U Equivalent, TCD95285
- **SPEC 500** — 95 Ohm Coax, RG-62B/U Equivalent, CS95146
- **SPEC 525** — 95 Ohm Coax, RG-71B/U Equivalent, CD95146
- **SPEC 550** — 75 Ohm Coax, RG-11A/U Equivalent, TS75285

# ULTROL® Nuclear Cables Catalog

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**Sections:** (cont'd)

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# ULTROL® Nuclear Cables Catalog

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### 1. Ultrol® Nuclear Cable Line Card



## ULTROL® ... Still ahead of its time after 35 years

### Class 1E nuclear rated cables

For more than three decades, General Cable has answered the needs of the nuclear power market with our Brand Rex Brand Ultrol® insulated cables. Ultrol, a leading name in the nuclear power generating industry, is a flame-retardant, radiation- and moisture-resistant line of wire and cable qualified for a 40-year service life. Recommended for power plant generation, original equipment manufacturers (OEMs), and storage and waste management facilities worldwide – these cables are suitable for indoor and outdoor installations, and in wet or dry locations. General Cable's broad manufacturing capability, proven experience and high quality standards provide the platform for leadership in this industry.

**Our exclusive Ultrol system provides proven reliability in a full line of cables recognized for use in Class 1E nuclear rated environments — from 600 V single conductor switchboard and power cables to multi-conductor instrumentation, control, power and coaxial/triaxial cables.**

#### Ultrol® Class 1E Nuclear Single Conductor Switchboard and Power Cable

##### **Ultrol® SIS, Switchboard Wire, Class 1E Nuclear, 600V, 90°C, VW-1, Class B, K & H, UL Type SIS and Type SIS/XHHW-2 — SPECS 100 & 125**

- **Conductor:** 18 AWG thru 1000 kcmil tinned, annealed copper, Class B, Flexible Class K or Class H
- **Insulation:** Flame-retardant, heat-, moisture- and radiation-resistant, thermoset Ultrol Cross-Linked Polyethylene (FR-XLPE) - Gray
- **Options:** Conductor stranding • Bare copper • Full-colored insulation • UL Listed SIS/XHHW-2 for sizes 14 AWG thru 4/0 AWG and XHHW-2 for kcmil sizes
- **Industry & Quality Assurance Compliances:** ICEA S-95-658 • ICEA T-29-520 • IEEE 323-1974 • IEEE 383-1974 • VW-1 • NRC 10CFR50 • ASME NQA-1 • ANSI N45.2 • NIAC • NUPIC • UL 44 SIS/XHHW-2

##### **Ultrol® Heavy Wall, Single Conductor, Power Cable, Class 1E Nuclear, 600V, 90°C, VW-1, UL Type RHH/RHW-2 — SPEC 150**

- **Conductor:** 14 AWG thru 1000 kcmil tinned, annealed copper, Class B stranding
- **Insulation:** Flame-retardant, heat-, moisture- and radiation-resistant, thermoset Ultrol Cross-Linked Polyethylene (FR-XLPE) - Black
- **Options:** Conductor stranding • Full-colored insulation • UL Listed RHH/RHW-2 for sizes 14 AWG thru 1000 kcmil • CT USE and SUNLIGHT RESISTANT for 1/0 AWG and larger
- **Industry & Quality Assurance Compliances:** ICEA S-95-658 • ICEA T-29-520 • IEEE 323-1974 • IEEE 383-1974 • VW-1 • NRC 10CFR50 • ASME NQA-1 • ANSI N45.2 • NIAC • NUPIC • UL 44 RHH/RHW-2

##### **Ultrol® Dual Wall, Single Conductor, Power Cable, Class 1E Nuclear, 600V, 90°C, VW-1, UL Type RHH/RHW-2 — SPEC 175**

- **Conductor:** 14 AWG thru 1000 kcmil tinned, annealed copper, Class B stranding
- **Insulation:** Flame-retardant, heat-, moisture- and radiation-resistant, thermoset Ultrol Cross-Linked Polyethylene (FR-XLPE) - Black
- **Jacket:** Heavy-duty Chlorosulphonated Polyethylene (CSPE) - Black
- **Options:** Conductor stranding • Full-colored insulation • UL Listed RHH or RHW-2 or USE for sizes 14 AWG thru 1000 kcmil • CT USE and SUNLIGHT RESISTANT for 1/0 AWG and larger
- **Industry & Quality Assurance Compliances:** ICEA S-95-658 • ICEA T-29-520 • IEEE 323-1974 • IEEE 383-1974 • VW-1 • NRC 10CFR50 • ASME NQA-1 • ANSI N45.2 • NIAC • NUPIC • UL 44 RHH/RHW-2

## ULTROL® ... Still ahead of its time after 35 years

### Class 1E nuclear rated cables

#### Ultrol® Class 1E Nuclear Instrumentation Cable

##### Ultrol® Instrumentation Cable, Multi-Conductor, Class 1E Nuclear, 600V, 90°C, VW-1 — SPEC 200

- **Conductor:** 18 AWG and 16 AWG tinned, annealed copper, Class B stranding
- **Insulation:** Flame-retardant, heat-, moisture- and radiation-resistant, thermoset Ultrol Cross-Linked Polyethylene (FR-XLPE)
- **Identification:** Color coded per ICEA Method 1, Table E-1
- **Jacket:** Heavy-duty Chlorosulphonated Polyethylene (CSPE) - Black
- **Options:** Conductor stranding • 300 V & 1000 V • Overall galvanized steel or aluminum interlocked armor sheath
- **Industry & Quality Assurance Compliances:** ICEA S-73-532 • ICEA T-29-520 • IEEE 323-1974 • IEEE 383-1974 • IEEE 1202 • VW-1 • NRC 10CFR50 • ASME NQA-1 • ANSI N45.2 • NIAC • NUPIC

##### Ultrol® Instrumentation Cable, Multi-Conductor, Overall Shield, Class 1E Nuclear, 600V, 90°C, VW-1 — SPEC 225

- **Conductor:** 18 AWG and 16 AWG tinned, annealed copper, Class B stranding
- **Insulation:** Flame-retardant, heat-, moisture- and radiation-resistant, thermoset Ultrol Cross-Linked Polyethylene (FR-XLPE)
- **Identification:** Color coded per ICEA Method 1, Table E-1
- **Overall Shield:** Aluminum/polyester tape in contact with a stranded tinned copper drain wire
- **Jacket:** Heavy-duty Chlorosulphonated Polyethylene (CSPE) - Black
- **Options:** Conductor stranding • 300 V & 1000 V • Copper/mylar tape shield • Tinned copper braid shield • Overall galvanized steel or aluminum interlocked armor sheath
- **Industry & Quality Assurance Compliances:** ICEA S-73-532 • ICEA T-29-520 • IEEE 323-1974 • IEEE 383-1974 • IEEE 1202 • VW-1 • NRC 10CFR50 • ASME NQA-1 • ANSI N45.2 • NIAC • NUPIC

##### Ultrol® Instrumentation Cable, Individually Shielded Pairs or Triads, Overall Shield, Class 1E Nuclear, 600V, 90°C, VW-1 — SPEC 250

- **Conductor:** 18 AWG and 16 AWG tinned, annealed copper, Class B stranding
- **Insulation:** Flame-retardant, heat-, moisture- and radiation-resistant, thermoset Ultrol Cross-Linked Polyethylene (FR-XLPE)
- **Identification:** Color-coded per ICEA Method 1; Pairs – black and white, Triads – black, white and red. One conductor in each pair/triad is printed alpha-numerically for easy identification.
- **Individually Shielded:** Pairs or triads are 100% shielded with an aluminum/polyester tape in contact with a stranded tinned copper drain wire
- **Overall Shield:** Aluminum/polyester tape in contact with a stranded tinned copper drain wire
- **Jacket:** Heavy-duty Chlorosulphonated Polyethylene (CSPE) - Black
- **Options:** Conductor stranding • 300 V & 1000 V • Copper/mylar tape shield with drain wire • Tinned copper braid shield • Overall galvanized steel or aluminum interlocked armor sheath
- **Industry & Quality Assurance Compliances:** ICEA S-73-532 • ICEA T-29-520 • IEEE 323-1974 • IEEE 383-1974 • IEEE 1202 • VW-1 • NRC 10CFR50 • ASME NQA-1 • ANSI N45.2 • NIAC • NUPIC

## ULTROL® ... Still ahead of its time after 35 years

### Class 1E nuclear rated cables

#### Ultrol® Class 1E Nuclear Multi-Conductor Control and Power Cable

##### Ultrol® Control Cable, Multi-Conductor, Class 1E Nuclear, 600V, 90°C, VW-1, UL Type TC — SPEC 275

- **Conductor:** 14 AWG thru 10 AWG tinned, annealed copper, Class B stranding, 2 thru 37 conductors
- **Insulation:** Flame-retardant, heat-, moisture- and radiation-resistant, thermoset Ultrol Cross-Linked Polyethylene (FR-XLPE)
- **Identification:** Color coded per ICEA Method 1, Table E-1
- **Jacket:** Heavy-duty Chlorosulphonated Polyethylene (CSPE) - Black
- **Options:** Conductor stranding • 1 kV & 2 kV • E-2 color code • Overall galvanized steel or aluminum interlocked armor sheath
- **Industry & Quality Assurance Compliances:** ICEA S-73-532 • ICEA T-29-520 • IEEE 323-1974 • IEEE 383-1974 • IEEE 1202 • VW-1 • NRC 10CFR50 • ASME NQA-1 • ANSI N45.2 • NIAC • NUPIC • UL 1277 Type TC • UL 44 XHHW-2

##### Ultrol® Control Cable, Multi-Conductor, Overall Shield, Class 1E Nuclear, 600V, 90°C, VW-1, UL Type TC — SPEC 300

- **Conductor:** 14 AWG thru 10 AWG, tinned, annealed copper, Class B stranding - 2 thru 37 conductors
- **Insulation:** Flame-retardant, heat-, moisture- and radiation-resistant, thermoset Ultrol Cross-Linked Polyethylene (FR-XLPE)
- **Identification:** Color coded per ICEA Method 1, Table E-1
- **Overall Shield:** Aluminum/polyester tape in contact with a stranded tinned copper drain wire
- **Jacket:** Heavy-duty Chlorosulphonated Polyethylene (CSPE) - Black
- **Options:** Conductor stranding • 1 kV & 2 kV • E-2 color code • Helical tinned copper tape shield • Longitudinal corrugated tinned copper tape shield • Overall galvanized steel or aluminum interlocked armor sheath
- **Industry & Quality Assurance Compliances:** ICEA S-73-532 • ICEA T-29-520 • IEEE 323-1974 • IEEE 383-1974 • IEEE 1202 • VW-1 • NRC 10CFR50 • ASME NQA-1 • ANSI N45.2 • NIAC • NUPIC • UL 1277 Type TC • UL 44 XHHW-2

##### Ultrol® Power Cable, 3 or 4 Conductors with Ground, Class 1E Nuclear, 600V, 90°C, VW-1, UL Type TC — SPEC 325

- **Conductor:** 14 AWG thru 750 kcmil tinned, annealed copper, Class B stranding
- **Insulation:** Flame-retardant, heat-, moisture- and radiation-resistant, thermoset Ultrol Cross-Linked Polyethylene (FR-XLPE)
- **Identification:** Color coded per ICEA Method 4; black with printed numbers
- **Grounding Conductor(s):** Annealed tinned copper, Class B stranding, sized according to NEC® requirements
- **Jacket:** Heavy-duty Chlorosulphonated Polyethylene (CSPE) - Black
- **Options:** Conductor stranding • 1 kV & 2 kV • Full-colored insulation • Helical tinned copper tape shield • Longitudinal corrugated tinned copper tape shield • Overall galvanized steel or aluminum interlocked armor sheath
- **Industry & Quality Assurance Compliances:** ICEA S-95-658 • ICEA T-29-520 • IEEE 323-1974 • IEEE 383-1974 • IEEE 1202 • VW-1 • NRC 10CFR50 • ASME NQA-1 • ANSI N45.2 • NIAC • NUPIC • UL 1277 Type TC • UL 44 XHHW-2



## ULTROL® ... Still ahead of its time after 35 years Class 1E nuclear rated cables

### Ultrol® Class 1E Nuclear Coaxial and Triaxial Cables

|                                       |                     |                                         |                     |
|---------------------------------------|---------------------|-----------------------------------------|---------------------|
| <b>SPEC 350 CS50060</b> – 50 Ohm Coax | RG-174/U Equivalent | <b>SPEC 475 TCD95285</b> – 89 Ohm Coax  | RG-22B/U Equivalent |
| <b>SPEC 375 CS50116</b> – 50 Ohm Coax | RG-58C/U Equivalent | <b>SPEC 500 CS95146</b> – 95 Ohm Coax   | RG-62B/U Equivalent |
| <b>SPEC 400 CS50285</b> – 50 Ohm Coax | RG-213/U Equivalent | <b>SPEC 525 CD95146</b> – 95 Ohm Coax   | RG-71B/U Equivalent |
| <b>SPEC 425 CS75146</b> – 75 Ohm Coax | RG-59B/U Equivalent | <b>SPEC 550 TS752855</b> – 75 Ohm Triax | RG-11A/U Equivalent |
| <b>SPEC 450 CS75285</b> – 75 Ohm Coax | RG-11A/U Equivalent |                                         |                     |

**Industry & Quality Assurance Compliances:** ICEA S-73-532 • IEEE 323-1974 • IEEE 383-1974 • VW-1 • NRC 10CFR50 • ASME NQA-1 • ANSI N45.2 • NIAC • NUPIC • MIL-C-17 EQUIVALENT

General Cable's Ultrol Class 1E product line reliability has been validated to perform its intended safety-related function during Design Basis Events (DBE) by being environmentally qualified through simulated Steam Line Break (SLB) and Loss-of-Coolant Accident (LOCA) environments. Compliance Standards and Franklin Qualification Reports for the Ultrol product line are as follows:

| Compliance Standards                                                                 | Franklin Qualification Reports                                                                                                                                                                                                                                       |
|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• ANSI</li><li>• ICEA</li><li>• IEEE</li></ul> | <ul style="list-style-type: none"><li>• F-C5120-1 – 300 V &amp; 600 V Constructions</li><li>• F-C5120-2 – Coaxial / Triaxial Constructions</li><li>• F-C5120-3 – All Constructions, 150 Day Total Testing Period</li><li>• F-C5120-4 – 300 V Constructions</li></ul> |

Every Ultrol cable is manufactured in conformance with the documented General Cable Quality Assurance program for Nuclear Facilities and Quality Control procedures, all under our ISO 9001:2008, ASME NQA-1:1994 and ASME NQA-1:2008 (and 2009 Supplemental) commitment-to-quality organization. General Cable's facility has maintained its nuclear status through regular audits by industry committees such as the Nuclear Procurement Issues Committee and several other quality assurance organizations.

| Quality Assurance                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• International Standards Organization – ISO 9001:2008</li><li>• American National Standards Institute – ANSI N45.2</li><li>• American Society of Mechanical Engineers – ASME NQA-1:1994 and ASME NQA-1:2008 (and 2009 Supplemental)</li></ul> | <ul style="list-style-type: none"><li>• Nuclear Regulatory Commission – NRC 10 CFR 50 Appendix B</li><li>• Nuclear Procurement Issues Committee (NUPIC)</li><li>• Nuclear Industry Assessment Committee (NIAC)</li></ul> |

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# ULTROL® Nuclear Cables Catalog

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### 2. Ultrol® Class 1E Nuclear Wire and Cable

#### Ultrol® Class 1E Nuclear Single Conductor Switchboard and Power Cable

- **SPEC 100** — Ultrol SIS, Switchboard Wire, Class 1E Nuclear, 600V, 90°C, VW-1, Class B, UL Type SIS and Type SIS/XHHW-2
- **SPEC 125** — Ultrol SIS, Switchboard Wire, Class 1E Nuclear, 600V, 90°C, VW-1, Class K & H, UL Type SIS and Type SIS/XHHW-2
- **SPEC 150** — Ultrol Heavy Wall, Single Conductor, Power Cable, Class 1E Nuclear, 600V, 90°C, VW-1, UL Type RHH/RHW-2
- **SPEC 175** — Ultrol Dual Wall, Single Conductor, Power Cable, Class 1E Nuclear, 600V, 90°C, VW-1, UL Type RHH/RHW-2

#### Ultrol® Class 1E Nuclear Instrumentation Cable

- **SPEC 200** — Ultrol Instrumentation Cable, Multi-Conductor, Class 1E Nuclear, 600V, 90°C, VW-1
- **SPEC 225** — Ultrol Instrumentation Cable, Multi-Conductor, Overall Shield, Class 1E Nuclear, 600V, 90°C, VW-1
- **SPEC 250** — Ultrol Instrumentation Cable, Individually Shielded Pairs or Triads, Overall Shield, Class 1E Nuclear, 600V, 90°C, VW-1

#### Ultrol® Class 1E Nuclear Multi Conductor Control and Power Cable

- **SPEC 275** — Ultrol Control Cable, Multi-Conductor, Class 1E Nuclear, 600V, 90°C, VW-1, UL Type TC
- **SPEC 300** — Ultrol Control Cable, Multi-Conductor, Overall Shield, Class 1E Nuclear, 600V, 90°C, VW-1, UL Type TC
- **SPEC 325** — Ultrol Power Cable, 3 or 4 Conductors with Ground, Class 1E Nuclear, 600V, 90°C, VW-1, UL Type TC

#### Ultrol® Class 1E Nuclear Coaxial and Triaxial Cables

- **SPEC 350** — 50 Ohm Coax, RG-174/U Equivalent, CS50060
- **SPEC 375** — 50 Ohm Coax, RG-58C/U Equivalent, CS50116
- **SPEC 400** — 50 Ohm Coax, RG-213/U Equivalent, CS50285
- **SPEC 425** — 75 Ohm Coax, RG-59B/U Equivalent, CS75146
- **SPEC 450** — 75 Ohm Coax, RG-11A/U Equivalent, CS75285
- **SPEC 475** — 89 Ohm Coax, RG-22B/U Equivalent, TCD95285
- **SPEC 500** — 95 Ohm Coax, RG-62B/U Equivalent, CS95146
- **SPEC 525** — 95 Ohm Coax, RG-71B/U Equivalent, CD95146
- **SPEC 550** — 75 Ohm Coax, RG-11A/U Equivalent, TS75285

## Ultrol® SIS Switchboard Wire, Class 1E Nuclear

600 V, 90°C, VW-1, Class B, UL Type SIS and Type SIS/XHHW-2



### Product Construction:

#### Conductor:

- 18 AWG thru 1000 kcmil tinned, annealed copper per ASTM B33; Class B stranding per ASTM B8

#### Insulation:

- Flame-retardant, heat-, moisture- and radiation-resistant, thermoset Ultrol® Cross-Linked Polyethylene (FR-XLPE)
- Color code: Gray

#### Print:

- For 18 AWG & 16 AWG:  
GENERAL CABLE BRAND REX  
BRAND (WC) ULTROL FR-XLPE (UL)  
TYPE SIS 600V 90°C VW-1 NUCLEAR  
YEAR OF MFG
- For 14 AWG thru 4/0 AWG:  
GENERAL CABLE BRAND REX  
BRAND (WC) ULTROL 1/C XXAWG  
COPPER FR-XLPE (UL) TYPE  
SIS/XHHW-2 600V 90°C VW-1  
NUCLEAR YEAR OF MFG  
Note: Sizes 1/0 AWG & larger include:  
TRACEABILITY NUMBER &  
SEQUENTIAL FOOTAGE MARK
- For 250 kcmil thru 1000 kcmil:  
GENERAL CABLE BRAND REX  
BRAND (WC) ULTROL 1/C XXXKCMIL  
COPPER FR-XLPE (UL) TYPE XHHW-2  
600V 90°C VW-1 NUCLEAR YEAR OF  
MFG TRACEABILITY NUMBER  
SEQUENTIAL FOOTAGE MARK

#### Options:

- Conductor stranding
- Bare copper
- Full-colored insulation
- UL Listed SIS/XHHW-2 for sizes 14 AWG thru 4/0 AWG
- UL Listed XHHW-2 for kcmil sizes

#### Applications:

- Ultrol SIS is a 600 V single conductor, insulated, Class 1E rated switchboard wire
- For use in Class 1E low voltage applications in operation and interconnection of protective devices where optimum performance is required

#### Features:

- Rated at 90°C wet or dry
- Fully traceable
- Qualified for 40-year service life
- Radiation resistant (up to 200 megarads)
- Long-term thermal endurance and superior electricals
- Excellent mechanical cut through properties
- Long-term moisture and radiation stability
- Free stripping for ease of termination
- Meets cold bend test at -40°C

#### Industry Compliances:

- Class 1E Qualified in accordance with IEEE 323-1974 and IEEE 383-1974
- ICEA S-95-658 (formerly ICEA S-66-524 & S-19-81)
- UL 44 SIS/XHHW-2

#### Flame Test Compliances:

- IEEE 383 (70,000 BTU/hr)
- ICEA T-29-520 (210,000 BTU/hr)
- UL VW-1

#### Other:

- Quality assurance program in accordance with NRC 10CFR50 Appendix B
- ANSI N45.2
- ASME NQA-1
- NIAC
- NUPIC

#### Packaging:

- Material to be shipped on non-returnable wooden reels

## Ultrol® SIS Switchboard Wire, Class 1E Nuclear

600 V, 90°C, VW-1, Class B, UL Type SIS and Type SIS/XHHW-2

### ULTROL® SIS SWITCHBOARD WIRE, CLASS 1E NUCLEAR, 600 V, 90°C, VW-1, CLASS B, UL TYPE SIS AND TYPE SIS/XHHW-2

| Catalog Number | Cond. Size (AWG) | Cond. Strand | Min. Avg. Insulation Thickness |      | Min. Avg. Nom. Cable Diameter |      | Copper Weight |        | Net Weight    |        |
|----------------|------------------|--------------|--------------------------------|------|-------------------------------|------|---------------|--------|---------------|--------|
|                |                  |              | Inches                         | mm   | Inches                        | mm   | lbs/ 1000 ft. | kg/ km | lbs/ 1000 ft. | kg/ km |
| 326960.08      | 18               | 7/.0152      | 0.030                          | 0.76 | 0.108                         | 2.69 | 5             | 8      | 9             | 14     |
| 326970.08      | 16               | 7/.0192      | 0.030                          | 0.76 | 0.118                         | 2.95 | 8             | 12     | 13            | 19     |
| 326980.08      | 14               | 7/.0242      | 0.030                          | 0.76 | 0.133                         | 3.33 | 13            | 19     | 19            | 28     |
| 326990.08      | 12               | 7/.0305      | 0.030                          | 0.76 | 0.152                         | 3.81 | 20            | 30     | 27            | 41     |
| 327000.08      | 10               | 7/.0385      | 0.030                          | 0.76 | 0.175                         | 4.39 | 32            | 48     | 41            | 60     |
| 327010.08      | 8                | 7/.0486      | 0.045                          | 1.14 | 0.236                         | 5.92 | 51            | 76     | 68            | 100    |
| 327020.08      | 6                | 7/.0612      | 0.045                          | 1.14 | 0.273                         | 6.86 | 81            | 121    | 101           | 151    |
| 327030.08      | 4                | 7/.0772      | 0.045                          | 1.14 | 0.320                         | 8.05 | 129           | 192    | 154           | 229    |
| 327040.08      | 2                | 7/.0974      | 0.045                          | 1.14 | 0.379                         | 9.55 | 205           | 305    | 237           | 353    |
| 327050.08      | 1                | 19/.0664     | 0.055                          | 1.40 | 0.437                         | 11.0 | 258           | 384    | 298           | 444    |
| 327060.08      | 1/0              | 19/.0745     | 0.055                          | 1.40 | 0.476                         | 12.0 | 326           | 485    | 371           | 552    |
| 327070.08      | 2/0              | 19/.0837     | 0.055                          | 1.40 | 0.521                         | 13.2 | 411           | 612    | 462           | 687    |
| 327080.08      | 3/0              | 19/.0940     | 0.055                          | 1.40 | 0.571                         | 14.4 | 518           | 771    | 575           | 856    |
| 327090.08      | 4/0              | 19/.1055     | 0.055                          | 1.40 | 0.627                         | 15.9 | 653           | 972    | 717           | 1067   |
| 327100.08      | 250              | 37/.0822     | 0.065                          | 1.65 | 0.695                         | 17.6 | 772           | 1149   | 852           | 1268   |
| 327110.08      | 350              | 37/.0973     | 0.065                          | 1.65 | 0.798                         | 20.2 | 1081          | 1609   | 1176          | 1750   |
| 327120.08      | 500              | 37/.1162     | 0.065                          | 1.65 | 0.927                         | 23.4 | 1544          | 2297   | 1659          | 2468   |
| 379360.08      | 750              | 61/.1109     | 0.080                          | 2.03 | 1.137                         | 28.8 | 2316          | 3446   | 2480          | 3691   |
| 379370.08      | 1000             | 61/.1280     | 0.080                          | 2.03 | 1.287                         | 32.6 | 3088          | 4595   | 3279          | 4879   |

Dimensions and weights are subject to industry tolerance.

## Ultrol® SIS Switchboard Wire, Class 1E Nuclear

600 V, 90°C, VW-1, Flexible Class K & H, UL Type SIS and Type SIS/XHHW-2



### Product Construction:

#### Conductor:

- 18 AWG thru 10 AWG tinned, annealed copper per ASTM B33; Class K stranding per ASTM B174
- 8 AWG thru 1000 kcmil tinned, annealed copper per ASTM B33; Class H stranding per ASTM B173

#### Insulation:

- Flame-retardant, heat-, moisture- and radiation-resistant, thermoset Ultrol® Cross-Linked Polyethylene (FR-XLPE)
- Color code: Gray

#### Print:

- For 18 AWG & 16 AWG:  
GENERAL CABLE BRAND REX  
BRAND (WC) ULTROL 1/C XXAWG  
COPPER FR-XLPE TYPE SIS 600V 90°C  
VW-1 NUCLEAR YEAR OF MFG
- For 14 AWG thru 4/0 AWG:  
GENERAL CABLE BRAND REX  
BRAND (WC) ULTROL 1/C XXAWG  
COPPER FR-XLPE (UL) TYPE  
SIS/XHHW-2 600V 90°C VW-1  
NUCLEAR YEAR OF MFG  
Note: Sizes 1/0 AWG & larger include:  
TRACEABILITY NUMBER &  
SEQUENTIAL FOOTAGE MARK
- For 250 kcmil thru 1000 kcmil:  
GENERAL CABLE BRAND REX  
BRAND (WC) ULTROL 1/C XXXKCMIL  
COPPER FR-XLPE (UL) TYPE XHHW-2  
600V 90°C VW-1 NUCLEAR YEAR OF  
MFG TRACEABILITY NUMBER  
SEQUENTIAL FOOTAGE MARK

#### Options:

- Conductor stranding
- Bare copper
- Full-colored insulation
- UL Listed SIS/XHHW-2 for sizes 14 AWG thru 4/0 AWG
- UL Listed XHHW-2 for kcmil sizes

#### Applications:

- Ultrol SIS is a 600 V flexible single conductor, insulated, Class 1E rated switchboard wire
- For use in Class 1E low voltage applications in operation and interconnection of protective devices where optimum performance is required.

#### Features:

- Rated at 90°C wet or dry
- Fully traceable
- Qualified for 40-year service life
- Radiation resistant (up to 200 megarads)
- Long-term thermal endurance and superior electricals
- Excellent mechanical cut through properties.
- Long-term moisture and radiation stability
- Free stripping for ease of termination
- Meets cold bend test at -40°C

#### Industry Compliances:

- Class 1E Qualified in accordance with IEEE 323-1974 and IEEE 383-1974
- ICEA S-95-658 (formerly ICEA S-66-524 & S-19-81)
- UL 44 SIS/XHHW-2

#### Flame Test Compliances:

- IEEE 383 (70,000 BTU/hr)
- ICEA T-29-520 (210,000 BTU/hr)
- UL VW-1

#### Other:

- Quality assurance program in accordance with NRC 10CFR50 Appendix B
- ANSI N45.2
- ASME NQA-1
- NIAC
- NUPIC

#### Packaging:

- Material to be shipped on non-returnable wooden reels

## Ultrol® SIS Switchboard Wire, Class 1E Nuclear

600 V, 90°C, VW-1, Flexible Class K & H, UL Type SIS and Type SIS/XHHW-2

### ULTROL® SIS SWITCHBOARD WIRE, CLASS 1E NUCLEAR, 600 V, 90°C, VW-1, FLEXIBLE CLASS K & H, UL TYPE SIS AND TYPE SIS/XHHW-2

| Catalog Number | Cond. Size (AWG) | Cond. Strand | Min. Avg. Insulation Thickness |      | Min. Avg. Nom. Cable Diameter |      | Copper Weight |        | Net Weight    |        |
|----------------|------------------|--------------|--------------------------------|------|-------------------------------|------|---------------|--------|---------------|--------|
|                |                  |              | Inches                         | mm   | Inches                        | mm   | lbs/ 1000 ft. | kg/ km | lbs/ 1000 ft. | kg/ km |
| 327130.08      | 18               | 16/.010      | 0.030                          | 0.76 | 0.108                         | 2.69 | 5             | 7      | 9             | 14     |
| 327140.08      | 16               | 26/.010      | 0.030                          | 0.76 | 0.119                         | 2.97 | 8             | 12     | 13            | 19     |
| 327150.08      | 14               | 41/.010      | 0.030                          | 0.76 | 0.133                         | 3.33 | 13            | 19     | 18            | 27     |
| 327160.08      | 12               | 65/.010      | 0.030                          | 0.76 | 0.150                         | 3.76 | 20            | 30     | 27            | 40     |
| 327170.08      | 10               | 105/.010     | 0.030                          | 0.76 | 0.174                         | 4.37 | 33            | 50     | 41            | 61     |
| 327180.08      | 8                | 133/.0111    | 0.045                          | 1.14 | 0.257                         | 6.45 | 52            | 77     | 70            | 105    |
| 327190.08      | 6                | 133/.0140    | 0.045                          | 1.14 | 0.299                         | 7.52 | 82            | 122    | 105           | 156    |
| 327200.08      | 4                | 133/.0177    | 0.045                          | 1.14 | 0.353                         | 8.89 | 132           | 196    | 160           | 239    |
| 327210.08      | 2                | 133/.0223    | 0.045                          | 1.14 | 0.420                         | 10.6 | 208           | 310    | 244           | 363    |
| 327220.08      | 1                | 259/.0180    | 0.055                          | 1.40 | 0.476                         | 12.0 | 266           | 396    | 312           | 465    |
| 327230.08      | 1/0              | 259/.0202    | 0.055                          | 1.40 | 0.520                         | 13.1 | 344           | 512    | 386           | 574    |
| 327240.08      | 2/0              | 259/.0227    | 0.055                          | 1.40 | 0.571                         | 14.4 | 422           | 628    | 481           | 715    |
| 327250.08      | 3/0              | 259/.0255    | 0.055                          | 1.40 | 0.628                         | 15.9 | 533           | 793    | 600           | 892    |
| 327260.08      | 4/0              | 259/.0286    | 0.055                          | 1.40 | 0.714                         | 18.1 | 670           | 997    | 746           | 1110   |
| 379310.08      | 250              | 427/.0242    | 0.065                          | 1.65 | 0.761                         | 19.2 | 795           | 1183   | 888           | 1321   |
| 379320.08      | 350              | 427/.0286    | 0.065                          | 1.65 | 0.874                         | 22.1 | 1110          | 1652   | 1221          | 1817   |
| 379330.08      | 500              | 427/.0342    | 0.065                          | 1.65 | 1.034                         | 26.2 | 1590          | 2366   | 1728          | 2572   |
| 379340.08      | 750              | 703/.0327    | 0.080                          | 2.03 | 1.286                         | 32.6 | 2410          | 3586   | 2611          | 3886   |
| 379350.08      | 1000             | 703/.0377    | 0.080                          | 2.03 | 1.458                         | 36.9 | 3205          | 4769   | 3441          | 5120   |

Dimensions and weights are subject to industry tolerance.

## **Ultrol® Heavy Wall, Single Conductor, Power Cable, Class 1E Nuclear**

600 V, 90°C, VW-1, UL Type RHH/RHW-2



### **Product Construction:**

#### **Conductor:**

- 14 AWG thru 1000 kcmil tinned, annealed copper per ASTM B33; Class B stranding per ASTM B8

#### **Insulation:**

- Flame-retardant, heat-, moisture- and Radiation-resistant, thermoset Ultrol® Cross-Linked Polyethylene (FR-XLPE) - Black

#### **Print:**

- For 14 AWG thru 4/ 0 AWG:  
GENERAL CABLE BRAND REX  
BRAND (WC) ULTROL 1/C XXAWG  
COPPER FR-XLPE (UL) TYPE  
RHH/RHW-2 600V 90°C VW-1  
NUCLEAR YEAR OF MFG  
Note: Sizes 1/0 AWG & larger include:  
TRACEABILITY NUMBER &  
SEQUENTIAL FOOTAGE MARK
- For 250 kcmil thru 1000 kcmil:  
GENERAL CABLE BRAND REX  
BRAND (WC) ULTROL 1/C XXXKCMIL  
COPPER FR-XLPE (UL) TYPE  
RHH/RHW-2 600V 90°C VW-1  
NUCLEAR YEAR OF MFG  
TRACEABILITY NUMBER  
SEQUENTIAL FOOTAGE MARK

#### **Options:**

- Conductor stranding
- Full-colored insulation
- UL Listed RHH/RHW-2 for sizes 14 AWG thru 1000 kcmil
- CT USE and SUNLIGHT RESISTANT for 1/0 AWG and larger

#### **Applications:**

- Ultrol Power cable is a 600 V, insulated heavy wall, single conductor Class 1E rated wire for use in demanding applications without additional jacketing protection in nuclear generating stations and where flame retardancy is critical.
- For use in Class 1E low voltage power and lighting functions where optimum performance is required
- May be installed in trays, conduit, ducts, or direct buried.

#### **Features:**

- Rated at 90°C wet or dry
- Fully traceable
- Qualified for 40-year service life
- Radiation resistant (up to 200 megarads)
- Long-term thermal endurance and superior electricals
- Excellent mechanical cut through properties.
- Long-term moisture and radiation stability
- Free stripping for ease of termination
- Meets cold bend test at -40°C

#### **Industry Compliances:**

- Class 1E Qualified in accordance with IEEE 323-1974 and IEEE 383-1974
- ICEA S-95-658 (formerly ICEA S-66-524 & S-19-81)
- UL 44 RHH/RHW-2

#### **Flame Test Compliances:**

- IEEE 383 (70,000 BTU/hr)
- ICEA T-29-520 (210,000 BTU/hr)
- UL VW-1

#### **Other:**

- Quality assurance program in accordance with NRC 10CFR50 Appendix B
- ANSI N45.2
- ASME NQA-1
- NIAC
- NUPIC

#### **Packaging:**

- Material to be shipped on non-returnable wooden reels

# Ultrol® Heavy Wall, Single Conductor, Power Cable, Class 1E Nuclear

600 V, 90°C, VW-1, UL Type RHH/RHW-2

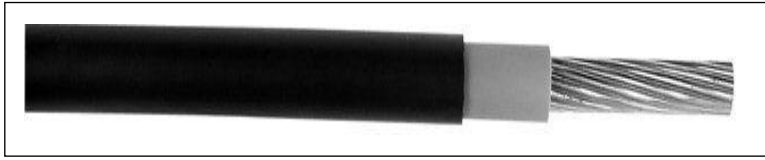
## ULTROL® HEAVY WALL, SINGLE CONDUCTOR, POWER CABLE, CLASS 1E NUCLEAR, 600 V, 90°C, VW-1, UL TYPE RHH/RHW-2

| Catalog Number | Cond. Size (AWG) | Cond. Strand | Min. Avg. Insulation Thickness |      | Min. Avg. Nom. Cable Diameter |      | Copper Weight |       | Net Weight   |       |
|----------------|------------------|--------------|--------------------------------|------|-------------------------------|------|---------------|-------|--------------|-------|
|                |                  |              | Inches                         | mm   | Inches                        | mm   | lbs/1000 ft.  | kg/km | lbs/1000 ft. | kg/km |
| 379380         | 14               | 7/.0242      | 0.045                          | 1.14 | 0.163                         | 4.14 | 13            | 19    | 22           | 33    |
| 379390         | 12               | 7/.0305      | 0.045                          | 1.14 | 0.182                         | 4.62 | 20            | 30    | 32           | 47    |
| 379400         | 10               | 7/.0385      | 0.045                          | 1.14 | 0.205                         | 5.21 | 32            | 48    | 46           | 68    |
| 379410         | 8                | 7/.0486      | 0.060                          | 1.52 | 0.266                         | 6.76 | 51            | 76    | 74           | 110   |
| 379420         | 6                | 7/.0612      | 0.060                          | 1.52 | 0.303                         | 7.70 | 81            | 121   | 109          | 162   |
| 384540         | 4                | 7/.0772      | 0.060                          | 1.52 | 0.350                         | 8.89 | 129           | 192   | 163          | 242   |
| 379440         | 2                | 7/.0974      | 0.060                          | 1.52 | 0.409                         | 10.4 | 205           | 305   | 247          | 368   |
| 379450         | 1                | 19/.0664     | 0.080                          | 2.03 | 0.488                         | 12.4 | 258           | 384   | 319          | 474   |
| 379460         | 1/0              | 19/.0745     | 0.080                          | 2.03 | 0.527                         | 13.4 | 326           | 485   | 393          | 585   |
| 379470         | 2/0              | 19/.0837     | 0.080                          | 2.03 | 0.572                         | 14.5 | 411           | 612   | 486          | 723   |
| 379480         | 3/0              | 19/.0940     | 0.080                          | 2.03 | 0.622                         | 15.8 | 518           | 771   | 601          | 894   |
| 379490         | 4/0              | 19/.1055     | 0.080                          | 2.03 | 0.678                         | 17.2 | 653           | 972   | 746          | 1110  |
| 379500         | 250              | 37/.0822     | 0.095                          | 2.41 | 0.754                         | 19.2 | 772           | 1149  | 889          | 1323  |
| 379510         | 350              | 37/.0973     | 0.095                          | 2.41 | 0.857                         | 21.8 | 1081          | 1609  | 1218         | 1813  |
| 379520         | 500              | 37/.1162     | 0.095                          | 2.41 | 0.986                         | 25.0 | 1544          | 2297  | 1707         | 2540  |
| 379530         | 750              | 61/.1109     | 0.110                          | 2.79 | 1.199                         | 30.5 | 2316          | 3446  | 2543         | 3783  |
| 379540         | 1000             | 61/.1280     | 0.110                          | 2.79 | 1.349                         | 34.3 | 3088          | 4595  | 3349         | 4983  |

Dimensions and weights are subject to industry tolerance.

## Ultrol® Dual Wall, Single Conductor, Power Cable, Class 1E Nuclear

600 V, 90°C, VW-1, UL Type RHH/RHW-2



### Product Construction:

#### Conductor:

- 14 AWG thru 1000 kcmil tinned, annealed copper per ASTM B33; Class B stranding per ASTM B8

#### Insulation:

- Flame-retardant, heat-, moisture- and radiation-resistant, thermoset Ultrol® Cross-Linked Polyethylene (FR-XLPE) - Black

#### Jacket:

- Heavy-duty Chlorosulphonated Polyethylene (CSPE) - Black

#### Print:

- For 14 AWG thru 4/ 0 AWG:  
GENERAL CABLE BRAND REX  
BRAND (WC) ULTROL 1/C XXAWG  
COPPER FR-XLPE (UL) TYPE  
RHH/RHW-2 600V 90°C VW-1  
NUCLEAR YEAR OF MFG  
Note: Sizes 1/ 0 AWG & larger include:  
TRACEABILITY NUMBER &  
SEQUENTIAL FOOTAGE MARK
- For 250 kcmil thru 1000 kcmil:  
GENERAL CABLE BRAND REX  
BRAND (WC) ULTROL 1/C XXXKCMIL  
COPPER FR-XLPE (UL) TYPE  
RHH/RHW-2 600V 90°C VW-1  
NUCLEAR YEAR OF MFG  
TRACEABILITY NUMBER  
SEQUENTIAL FOOTAGE MARK

#### Options:

- Conductor stranding
- Full-colored insulation
- CT USE and SUNLIGHT RESISTANT for 1/0 AWG and larger

#### Applications:

- Ultrol Power cable is a 600 V, insulated dual wall, single conductor Class 1E rated wire construction specifically designed for applications in nuclear generating stations and where additional jacketing protection is required.
- For use in Class 1E low voltage power and lighting functions where optimum performance is required
- May be installed in trays, conduit, ducts, or direct buried.

#### Features:

- Rated at 90°C wet or dry
- Fully traceable
- Qualified for 40-year service life
- Radiation resistant (up to 200 megarads)
- Long-term thermal endurance and superior electricals
- Excellent mechanical cut through properties
- Long-term moisture and radiation stability
- Free stripping for ease of termination
- Meets the cold bend test at -40°C

#### Industry Compliances:

- Class 1E Qualified in accordance with IEEE 323-1974 and IEEE 383-1974
- ICEA S-95-658 (formerly ICEA S-66-524 & S-19-81)
- UL 44 RHH/RHW-2

#### Flame Test Compliances:

- IEEE 383 (70,000 BTU/hr)
- ICEA T-29-520 (210,000 BTU/hr)
- UL VW-1

#### Other:

- Quality assurance program in accordance with NRC 10CFR50 Appendix B
- ANSI N45.2
- ASME NQA-1
- NIAC
- NUPIC

#### Packaging:

- Material to be shipped on non-returnable wooden reels

# Ultrol® Dual Wall, Single Conductor, Power Cable, Class 1E Nuclear

600 V, 90°C, VW-1, UL Type RHH/RHW-2

## ULTROL® DUAL WALL, SINGLE CONDUCTOR, POWER CABLE, CLASS 1E NUCLEAR, 600 V, 90°C, VW-1, UL TYPE RHH/RHW-2

| Catalog Number | Cond. Size (AWG) | Cond. Strand | Min. Avg. Insulation Thickness |      | Min. Avg. Jacket Thickness |      | Nom. Cable Diameter |      | Copper Weight |       | Net Weight   |       |
|----------------|------------------|--------------|--------------------------------|------|----------------------------|------|---------------------|------|---------------|-------|--------------|-------|
|                |                  |              | Inches                         | mm   | Inches                     | mm   | Inches              | mm   | lbs/1000 ft.  | kg/km | lbs/1000 ft. | kg/km |
| 379550         | 14               | 7/.0242      | 0.030                          | 0.76 | 0.015                      | 0.38 | 0.165               | 4.19 | 13            | 19    | 23           | 34    |
| 379560         | 12               | 7/.0305      | 0.030                          | 0.76 | 0.015                      | 0.38 | 0.184               | 4.67 | 20            | 30    | 32           | 48    |
| 397150         | 10               | 7/.0385      | 0.030                          | 0.76 | 0.015                      | 0.38 | 0.207               | 5.26 | 32            | 48    | 46           | 69    |
| 379580         | 8                | 7/.0486      | 0.045                          | 1.14 | 0.015                      | 0.38 | 0.268               | 6.81 | 51            | 76    | 75           | 112   |
| 379590         | 6                | 7/.0612      | 0.045                          | 1.14 | 0.030                      | 0.76 | 0.336               | 8.53 | 81            | 121   | 119          | 177   |
| 379600         | 4                | 7/.0772      | 0.045                          | 1.14 | 0.030                      | 0.76 | 0.383               | 9.73 | 129           | 192   | 175          | 260   |
| 379610         | 2                | 7/.0974      | 0.045                          | 1.14 | 0.030                      | 0.76 | 0.442               | 11.2 | 205           | 305   | 261          | 388   |
| 379620         | 1                | 19/.0664     | 0.055                          | 1.40 | 0.045                      | 1.14 | 0.530               | 13.5 | 258           | 384   | 340          | 506   |
| 379630         | 1/0              | 19/.0745     | 0.055                          | 1.40 | 0.045                      | 1.14 | 0.569               | 14.5 | 326           | 485   | 416          | 620   |
| 379640         | 2/0              | 19/.0837     | 0.055                          | 1.40 | 0.045                      | 1.14 | 0.614               | 15.6 | 411           | 612   | 511          | 760   |
| 379650         | 3/0              | 19/.0940     | 0.055                          | 1.40 | 0.045                      | 1.14 | 0.664               | 16.9 | 518           | 771   | 629          | 935   |
| 379660         | 4/0              | 19/.1055     | 0.055                          | 1.40 | 0.045                      | 1.14 | 0.720               | 18.3 | 653           | 972   | 776          | 1154  |
| 379670         | 250              | 37/.0822     | 0.065                          | 1.65 | 0.065                      | 1.65 | 0.829               | 21.1 | 772           | 1149  | 947          | 1410  |
| 379680         | 350              | 37/.0973     | 0.065                          | 1.65 | 0.065                      | 1.65 | 0.932               | 23.7 | 1081          | 1609  | 1284         | 1911  |
| 379690         | 500              | 37/.1162     | 0.065                          | 1.65 | 0.065                      | 1.65 | 1.061               | 27.0 | 1544          | 2297  | 1783         | 2653  |
| 378700         | 750              | 61/.1109     | 0.080                          | 2.03 | 0.065                      | 1.65 | 1.271               | 32.3 | 2316          | 3446  | 2631         | 3915  |
| 379710         | 1000             | 61/.1280     | 0.080                          | 2.03 | 0.065                      | 1.65 | 1.421               | 36.1 | 3088          | 4595  | 3448         | 5131  |

Dimensions and weights are subject to industry tolerance.

## Ultrol® Instrumentation Cable, Multi-Conductor, Class 1E Nuclear

600 V, 90°C, VW-1



### Product Construction:

#### Conductor:

- 18 AWG and 16 AWG tinned, annealed copper per ASTM B33; Class B stranding per ASTM B8

#### Insulation:

- Flame-retardant, heat-, moisture- and radiation-resistant, thermoset Ultrol® Cross-Linked Polyethylene (FR-XLPE)
- Color code: Per ICEA Method 1, Table E-1

#### Jacket:

- Heavy-duty Chlorosulphonated Polyethylene (CSPE) - Black

#### Print:

- GENERAL CABLE BRAND REX BRAND (WC) ULTROL XX/C XXAWG COPPER FR-XLPE CSPE 600V 90°C YEAR OF MFG TRACEABILITY NUMBER SEQUENTIAL FOOTAGE MARK

#### Options:

- Conductor stranding
- 300 V & 1000 V
- Overall galvanized steel or aluminum interlocked armor sheath

#### Applications:

- Ultrol Instrumentation cable is a 600 V multi-conductor, thermoset, Class 1E rated construction specifically designed for applications in nuclear generating stations and where flame retardancy is critical.
- For use in Class 1E monitoring data recording and transmitting information on low energy circuits where shielding from external electrostatic interference is not required.
- Can be installed in trays, conduit, ducts, or in direct burial applications.

#### Features:

- Rated at 90°C wet or dry
- Fully traceable
- Qualified for 40-year service life
- Radiation resistant (up to 200 megarads)
- Maximum flame-retardancy
- Long-term moisture and radiation stability
- Long-term thermal endurance and superior electricals
- Excellent mechanical cut through properties.
- Free stripping for ease of termination
- Meets cold bend test at -40°C

#### Industry Compliances:

- Class 1E Qualified in accordance with IEEE 323-1974 and IEEE 383-1974
- ICEA S-73-532

#### Flame Test Compliances:

- IEEE 383 (70,000 BTU/hr) as modified by NRC Reg. Guide 1.131
- IEEE 1202 (70,000 BTU/hr)
- ICEA T-29-520 (210,000 BTU/hr)
- VW-1

#### Other:

- Quality assurance program in accordance with NRC 10CFR50 Appendix B
- ANSI N45.2
- ASME NQA-1
- NUPIC
- NIAC

#### Packaging:

- Material to be shipped on non-returnable wooden reels

## Ultrol® Instrumentation Cable, Multi-Conductor, Class 1E Nuclear

600 V, 90°C, VW-1

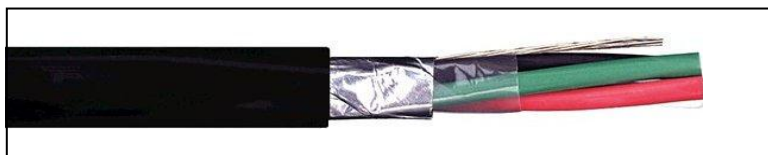
### ULTROL® INSTRUMENTATION CABLE, MULTI-CONDUCTOR, CLASS 1E NUCLEAR, 600V, 90°C, VW-1

| Catalog Number | No. of Cond. | Cond. Size (AWG) | Cond. Strand | Min. Avg. Insulation Thickness |      | Min. Avg. Jacket Thickness |      | Nom. Cable Diameter |             | Copper Weight |       | Net Weight   |       |
|----------------|--------------|------------------|--------------|--------------------------------|------|----------------------------|------|---------------------|-------------|---------------|-------|--------------|-------|
|                |              |                  |              | Inches                         | mm   | Inches                     | mm   | Inches              | mm          | lbs/1000 ft.  | kg/km | lbs/1000 ft. | kg/km |
| 377550         | 2/C Flat     | 18               | 7/.0152      | 0.025                          | 0.64 | 0.045                      | 1.14 | 0.200 x 0.305       | 5.08 x 7.77 | 10            | 15    | 46           | 68    |
| 377560         | 2/C          | 18               | 7/.0152      | 0.025                          | 0.64 | 0.045                      | 1.14 | 0.305               | 7.75        | 10            | 15    | 51           | 76    |
| 377570         | 3/C          | 18               | 7/.0152      | 0.025                          | 0.64 | 0.045                      | 1.14 | 0.315               | 8.00        | 15            | 23    | 57           | 85    |
| 377580         | 4/C          | 18               | 7/.0152      | 0.025                          | 0.64 | 0.045                      | 1.14 | 0.340               | 8.64        | 20            | 30    | 71           | 106   |
| 377590         | 5/C          | 18               | 7/.0152      | 0.025                          | 0.64 | 0.045                      | 1.14 | 0.370               | 9.40        | 25            | 38    | 79           | 118   |
| 377600         | 7/C          | 18               | 7/.0152      | 0.025                          | 0.64 | 0.045                      | 1.14 | 0.400               | 10.16       | 35            | 53    | 98           | 146   |
| 377610         | 9/C          | 18               | 7/.0152      | 0.025                          | 0.64 | 0.045                      | 1.14 | 0.460               | 11.68       | 46            | 68    | 122          | 182   |
| 377620         | 12/C         | 18               | 7/.0152      | 0.025                          | 0.64 | 0.045                      | 1.14 | 0.515               | 13.08       | 51            | 76    | 154          | 229   |
| 377630         | 19/C         | 18               | 7/.0152      | 0.025                          | 0.64 | 0.060                      | 1.52 | 0.630               | 16.0        | 96            | 143   | 241          | 359   |
| 377640         | 25/C         | 18               | 7/.0152      | 0.025                          | 0.64 | 0.060                      | 1.52 | 0.730               | 18.54       | 127           | 189   | 308          | 458   |
| 377650         | 30/C         | 18               | 7/.0152      | 0.025                          | 0.64 | 0.060                      | 1.52 | 0.765               | 19.43       | 151           | 225   | 351          | 522   |
| 377660         | 37/C         | 18               | 7/.0152      | 0.025                          | 0.64 | 0.060                      | 1.52 | 0.830               | 21.05       | 188           | 280   | 425          | 632   |
| 377670         | 2/C Flat     | 16               | 7/.0192      | 0.025                          | 0.64 | 0.045                      | 1.14 | 0.210 x 0.320       | 5.33 x 8.13 | 16            | 24    | 54           | 80    |
| 377680         | 2/C          | 16               | 7/.0192      | 0.025                          | 0.64 | 0.045                      | 1.14 | 0.320               | 8.13        | 16            | 24    | 56           | 83    |
| 377690         | 3/C          | 16               | 7/.0192      | 0.025                          | 0.64 | 0.045                      | 1.14 | 0.335               | 8.51        | 24            | 36    | 69           | 103   |
| 377700         | 4/C          | 16               | 7/.0192      | 0.025                          | 0.64 | 0.045                      | 1.14 | 0.365               | 9.27        | 32            | 48    | 85           | 127   |
| 377710         | 5/C          | 16               | 7/.0192      | 0.025                          | 0.64 | 0.045                      | 1.14 | 0.395               | 10.03       | 40            | 60    | 99           | 147   |
| 377720         | 7/C          | 16               | 7/.0192      | 0.025                          | 0.64 | 0.045                      | 1.14 | 0.430               | 10.92       | 57            | 84    | 128          | 190   |
| 377730         | 9/C          | 16               | 7/.0192      | 0.025                          | 0.64 | 0.045                      | 1.14 | 0.500               | 12.7        | 73            | 108   | 160          | 238   |
| 377740         | 12/C         | 16               | 7/.0192      | 0.025                          | 0.64 | 0.060                      | 1.52 | 0.590               | 15.0        | 97            | 145   | 221          | 329   |
| 377750         | 19/C         | 16               | 7/.0192      | 0.025                          | 0.64 | 0.060                      | 1.52 | 0.680               | 17.27       | 154           | 229   | 318          | 473   |
| 377760         | 25/C         | 16               | 7/.0192      | 0.025                          | 0.64 | 0.060                      | 1.52 | 0.790               | 20.07       | 203           | 302   | 406          | 604   |
| 377770         | 30/C         | 16               | 7/.0192      | 0.025                          | 0.64 | 0.060                      | 1.52 | 0.880               | 22.35       | 244           | 363   | 512          | 762   |
| 377780         | 37/C         | 16               | 7/.0192      | 0.025                          | 0.64 | 0.080                      | 2.03 | 0.945               | 24.0        | 300           | 447   | 615          | 915   |

Insulated Conductor Diameter (Inches) 18 AWG (.10) and 16 AWG (.11).  
Dimensions and weights are subject to industry tolerance.

## Ultrol® Instrumentation Cable, Multi-Conductor, Overall Shield, Class 1E Nuclear

600 V, 90°C, VW-1



### Product Construction:

#### Conductor:

- 18 AWG and 16 AWG tinned, annealed copper per ASTM B33; Class B stranding per ASTM B8

#### Insulation:

- Flame-retardant, heat-, moisture- and radiation-resistant, thermoset Ultrol® Cross-Linked Polyethylene (FR-XLPE)
- Color code: Per ICEA Method 1, Table E-1

#### Overall Shield:

- Aluminum/polyester tape in contact with a stranded tinned copper drain wire

#### Jacket:

- Heavy-duty Chlorosulphonated Polyethylene (CSPE) - Black

#### Print:

- GENERAL CABLE BRAND REX  
BRAND (WC) ULTROL XX/C XXAWG  
COPPER FR-XLPE (SHIELDED) CSPE  
600V 90°C YEAR OF MFG  
TRACEABILITY NUMBER  
SEQUENTIAL FOOTAGE MARK

#### Options:

- Conductor stranding
- 300 V & 1000 V
- Copper/mylar tape shield with drain wire
- Tinned copper braid shield
- Overall galvanized steel or aluminum interlocked armor sheath

#### Applications:

- Ultrol Instrumentation cable is a 600 V overall shielded multi-conductor, thermoset, Class 1E rated construction specifically designed for applications in nuclear generating stations and where flame retardancy is critical.
- Designed for use on circuits where overall shielding is required to protect from external electrostatic interference, but not shielding between conductors.
- Can be installed in trays, conduit, ducts, or in direct burial applications.

#### Features:

- Rated at 90°C wet or dry
- Fully traceable
- Qualified for 40-year service life
- Radiation resistant (up to 200 megarads)
- Maximum flame-retardancy
- Long-term moisture and radiation stability

#### Features: (con't)

- Long-term thermal endurance and superior electricals
- Excellent mechanical cut through properties.
- Free stripping for ease of termination
- Meets cold bend test at -40°C

#### Industry Compliances:

- Class 1E Qualified in accordance with IEEE 323-1974 and IEEE 383-1974
- ICEA S-73-532

#### Flame Test Compliances:

- IEEE 383 (70,000 BTU/hr) as modified by NRC Reg. Guide 1.131
- IEEE 1202 (70,000 BTU/hr)
- ICEA T-29-520 (210,000 BTU/hr)
- VW-1

#### Other:

- Quality assurance program in accordance with NRC 10CFR50 Appendix B
- ANSI N45.2
- ASME NQA-1
- NUPIC
- NIAC

#### Packaging:

- Material to be shipped on non-returnable wooden reels

# Ultrol® Instrumentation Cable, Multi-Conductor, Overall Shield, Class 1E Nuclear

600 V, 90°C, VW-1

## ULTROL® INSTRUMENTATION CABLE, MULTI-CONDUCTOR, OVERALL SHIELD, CLASS 1E NUCLEAR 600 V, 90°C, VW-1

| Catalog Number | No. of Cond. | Cond. Size (AWG) | Cond. Strand | Min. Avg. Insulation Thickness |      | Drain Wire (AWG) | Min. Avg. Jacket Thickness |      | Nom. Cable Diameter |      | Copper Weight |       | Net Weight   |       |
|----------------|--------------|------------------|--------------|--------------------------------|------|------------------|----------------------------|------|---------------------|------|---------------|-------|--------------|-------|
|                |              |                  |              | Inches                         | mm   |                  | Inches                     | mm   | Inches              | mm   | lbs/1000 ft.  | kg/km | lbs/1000 ft. | kg/km |
| 377800         | 2/C          | 18               | 7/.0152      | 0.025                          | 0.64 | 20               | 0.045                      | 1.14 | 0.291               | 7.39 | 13            | 20    | 53           | 79    |
| 377810         | 3/C          | 18               | 7/.0152      | 0.025                          | 0.64 | 20               | 0.045                      | 1.14 | 0.306               | 7.77 | 18            | 27    | 57           | 85    |
| 377820         | 4/C          | 18               | 7/.0152      | 0.025                          | 0.64 | 20               | 0.045                      | 1.14 | 0.332               | 8.43 | 23            | 35    | 74           | 110   |
| 377830         | 5/C          | 18               | 7/.0152      | 0.025                          | 0.64 | 20               | 0.045                      | 1.14 | 0.399               | 10.1 | 29            | 42    | 81           | 121   |
| 377840         | 7/C          | 18               | 7/.0152      | 0.025                          | 0.64 | 20               | 0.045                      | 1.14 | 0.428               | 10.9 | 39            | 57    | 101          | 150   |
| 377850         | 9/C          | 18               | 7/.0152      | 0.025                          | 0.64 | 20               | 0.045                      | 1.14 | 0.488               | 12.4 | 49            | 73    | 125          | 186   |
| 377860         | 12/C         | 18               | 7/.0152      | 0.025                          | 0.64 | 20               | 0.060                      | 1.52 | 0.571               | 14.5 | 64            | 96    | 157          | 234   |
| 377870         | 19/C         | 18               | 7/.0152      | 0.025                          | 0.64 | 20               | 0.060                      | 1.52 | 0.654               | 16.6 | 99            | 148   | 243          | 362   |
| 377880         | 25/C         | 18               | 7/.0152      | 0.025                          | 0.64 | 20               | 0.060                      | 1.52 | 0.747               | 19.0 | 130           | 194   | 309          | 460   |
| 377890         | 30/C         | 18               | 7/.0152      | 0.025                          | 0.64 | 20               | 0.060                      | 1.52 | 0.793               | 20.1 | 155           | 231   | 356          | 530   |
| 377900         | 37/C         | 18               | 7/.0152      | 0.025                          | 0.64 | 20               | 0.080                      | 2.03 | 0.890               | 22.6 | 191           | 284   | 428          | 637   |
|                |              |                  |              |                                |      |                  |                            |      |                     |      |               |       |              |       |
| 377910         | 2/C          | 16               | 7/.0192      | 0.025                          | 0.64 | 18               | 0.045                      | 1.14 | 0.309               | 7.85 | 21            | 32    | 61           | 91    |
| 377920         | 3/C          | 16               | 7/.0192      | 0.025                          | 0.64 | 18               | 0.045                      | 1.14 | 0.325               | 8.26 | 29            | 44    | 73           | 109   |
| 377930         | 4/C          | 16               | 7/.0192      | 0.025                          | 0.64 | 18               | 0.045                      | 1.14 | 0.353               | 8.97 | 37            | 56    | 88           | 131   |
| 377940         | 5/C          | 16               | 7/.0192      | 0.025                          | 0.64 | 18               | 0.045                      | 1.14 | 0.433               | 11.0 | 46            | 68    | 104          | 155   |
| 377950         | 7/C          | 16               | 7/.0192      | 0.025                          | 0.64 | 18               | 0.045                      | 1.14 | 0.465               | 11.8 | 62            | 92    | 131          | 195   |
| 377960         | 9/C          | 16               | 7/.0192      | 0.025                          | 0.64 | 18               | 0.060                      | 1.52 | 0.561               | 14.3 | 78            | 116   | 164          | 244   |
| 377970         | 12/C         | 16               | 7/.0192      | 0.025                          | 0.64 | 18               | 0.060                      | 1.52 | 0.620               | 15.8 | 103           | 153   | 224          | 333   |
| 377980         | 19/C         | 16               | 7/.0192      | 0.025                          | 0.64 | 18               | 0.060                      | 1.52 | 0.711               | 18.1 | 159           | 237   | 321          | 478   |
| 377990         | 25/C         | 16               | 7/.0192      | 0.025                          | 0.64 | 18               | 0.060                      | 1.52 | 0.814               | 20.7 | 208           | 310   | 409          | 609   |
| 378000         | 30/C         | 16               | 7/.0192      | 0.025                          | 0.64 | 18               | 0.080                      | 2.03 | 0.904               | 23.0 | 249           | 371   | 516          | 768   |
| 378010         | 37/C         | 16               | 7/.0192      | 0.025                          | 0.64 | 18               | 0.080                      | 2.03 | 0.967               | 24.6 | 305           | 454   | 612          | 911   |

Insulated Conductor Diameter (Inches) 18 AWG (.10) and 16 AWG (.11).  
Dimensions and weights are subject to industry tolerance.

## Ultrol® Instrumentation Cable, Individually Shielded Pairs or Triads, Overall Shield, Class 1E Nuclear

600 V, 90°C, VW-1



### Product Construction:

#### Conductor:

- 18 AWG and 16 AWG tinned, annealed copper per ASTM B33; Class B stranding per ASTM B8

#### Insulation:

- Flame-retardant, heat-, moisture- and radiation-resistant, thermoset Ultrol® Cross-Linked Polyethylene (FR-XLPE)
- Color code: Per ICEA Method 1 — Pairs: black and white; Triads: black, white and red. One conductor in each pair/triad is printed alpha-numerically for easy identification

#### Shields:

- Individually shielded: pairs or triads are 100% shielded with an aluminum/polyester tape in contact with a stranded tinned copper drain wire
- Overall shield: aluminum/polyester tape in contact with a stranded tinned copper drain wire

#### Jacket:

- Heavy-duty Chlorosulphonated Polyethylene (CSPE) - Black

#### Print:

- GENERAL CABLE BRAND REX BRAND (WC) ULTROL XX/PR OR TRIADS XXAWG COPPER FR-XLPE (SHIELDED) CSPE 600V 90°C YEAR OF MFG TRACEABILITY NUMBER SEQUENTIAL FOOTAGE MARK

#### Options:

- Conductor stranding
- 300V & 1000V
- Copper/ mylar tape shield with drain wire
- Tinned copper braid shield
- Overall galvanized steel or aluminum interlocked armor sheath

#### Applications:

- Ultrol Instrumentation cable is 600 V individual shielded pairs or triads with overall shield, thermoset, Class 1E rated constructions specifically designed for applications in nuclear generating stations and where flame retardancy is critical.
- Designed for use on critical circuits where total isolation is required between pairs/triads and from external interference.
- Can be installed in trays, conduit, ducts, or in direct burial applications.

#### Features:

- Rated at 90°C wet or dry
- Fully traceable
- Qualified for 40-year service life
- Radiation resistant (up to 200 megarads)
- Maximum flame-retardancy
- Long-term moisture and radiation stability

#### Features: (con't)

- Long-term thermal endurance and superior electricals
- Excellent mechanical cut through properties.
- Free stripping for ease of termination
- Meets cold bend test at -40°C

#### Industry Compliances:

- Class 1E Qualified in accordance with IEEE 323-1974 and IEEE 383-1974
- ICEA S-73-532

#### Flame Test Compliances:

- IEEE 383 (70,000 BTU/hr) as modified by NRC Reg. Guide 1.131
- IEEE 1202 (70,000 BTU/hr)
- ICEA T-29-520 (210,000 BTU/hr)
- VW-1

#### Other:

- Quality assurance program in accordance with NRC 10CFR50 Appendix B
- ANSI N45.2
- ASME NQA-1
- NUPIC
- NIAC

#### Packaging:

- Material to be shipped on non-returnable wooden reels

# **Ultrol® Instrumentation Cable, Individually Shielded Pairs or Triads, Overall Shield, Class 1E Nuclear** 600 V, 90°C, VW-1

## **ULTROL® INSTRUMENTATION CABLE, INDIVIDUALLY SHIELDED PAIRS OR TRIADS, OVERALL SHIELD, CLASS 1E NUCLEAR, 600 V, 90°C, VW-1**

| Catalog Number | No. of Pairs/Triads | Cond. Size (AWG) | Cond. Strand | Min. Avg. Insulation Thickness |      | Drain Wire Size | Min. Avg. Jacket Thickness |      | Nom. Cable Diameter |      | Copper Weight |       | Net Weight   |       |
|----------------|---------------------|------------------|--------------|--------------------------------|------|-----------------|----------------------------|------|---------------------|------|---------------|-------|--------------|-------|
|                |                     |                  |              | Inches                         | mm   |                 | Inches                     | mm   | Inches              | mm   | lbs/1000 ft.  | kg/km | lbs/1000 ft. | kg/km |
| 378040         | 2 SPS               | 18               | 7/.0152      | 0.025                          | 0.64 | 20              | 0.045                      | 1.14 | 0.462               | 11.7 | 30            | 45    | 129          | 192   |
| 378050         | 3 SPS               | 18               | 7/.0152      | 0.025                          | 0.64 | 20              | 0.045                      | 1.14 | 0.490               | 12.5 | 43            | 65    | 159          | 237   |
| 378060         | 4 SPS               | 18               | 7/.0152      | 0.025                          | 0.64 | 20              | 0.060                      | 1.52 | 0.567               | 14.4 | 57            | 85    | 226          | 336   |
| 378070         | 5 SPS               | 18               | 7/.0152      | 0.025                          | 0.64 | 20              | 0.060                      | 1.52 | 0.619               | 15.7 | 70            | 105   | 267          | 397   |
| 378080         | 7 SPS               | 18               | 7/.0152      | 0.025                          | 0.64 | 20              | 0.060                      | 1.52 | 0.673               | 17.1 | 97            | 145   | 291          | 433   |
| 378090         | 9 SPS               | 18               | 7/.0152      | 0.025                          | 0.64 | 20              | 0.060                      | 1.52 | 0.784               | 19.9 | 125           | 186   | 362          | 539   |
| 378100         | 12 SPS              | 18               | 7/.0152      | 0.025                          | 0.64 | 20              | 0.080                      | 2.03 | 0.923               | 23.4 | 165           | 246   | 500          | 744   |
| 378110         | 19 SPS              | 18               | 7/.0152      | 0.025                          | 0.64 | 20              | 0.080                      | 2.03 | 1.077               | 27.4 | 259           | 385   | 664          | 988   |
|                |                     |                  |              |                                |      |                 |                            |      |                     |      |               |       |              |       |
| 378120         | 2 SPS               | 16               | 7/.0192      | 0.025                          | 0.64 | 18              | 0.045                      | 1.14 | 0.495               | 12.6 | 48            | 71    | 166          | 247   |
| 378130         | 3 SPS               | 16               | 7/.0192      | 0.025                          | 0.64 | 18              | 0.060                      | 1.52 | 0.556               | 14.1 | 69            | 103   | 222          | 330   |
| 378140         | 4 SPS               | 16               | 7/.0192      | 0.025                          | 0.64 | 18              | 0.060                      | 1.52 | 0.608               | 15.4 | 91            | 135   | 284          | 423   |
| 378150         | 5 SPS               | 16               | 7/.0192      | 0.025                          | 0.64 | 18              | 0.060                      | 1.52 | 0.665               | 16.9 | 113           | 168   | 342          | 509   |
| 378160         | 7 SPS               | 16               | 7/.0192      | 0.025                          | 0.64 | 18              | 0.060                      | 1.52 | 0.725               | 18.4 | 156           | 232   | 376          | 560   |
| 378170         | 9 SPS               | 16               | 7/.0192      | 0.025                          | 0.64 | 18              | 0.080                      | 2.03 | 0.887               | 22.5 | 199           | 296   | 517          | 769   |
| 378180         | 12 SPS              | 16               | 7/.0192      | 0.025                          | 0.64 | 18              | 0.080                      | 2.03 | 0.996               | 25.3 | 264           | 393   | 651          | 969   |
| 378190         | 19 SPS              | 16               | 7/.0192      | 0.025                          | 0.64 | 18              | 0.080                      | 2.03 | 1.164               | 29.6 | 414           | 616   | 882          | 1313  |
|                |                     |                  |              |                                |      |                 |                            |      |                     |      |               |       |              |       |
| 378200         | 2 STS               | 18               | 7/.0152      | 0.025                          | 0.64 | 20              | 0.045                      | 1.14 | 0.489               | 12.4 | 40            | 60    | 172          | 256   |
| 378210         | 3 STS               | 18               | 7/.0152      | 0.025                          | 0.64 | 20              | 0.045                      | 1.14 | 0.519               | 13.2 | 59            | 87    | 215          | 320   |
| 378220         | 4 STS               | 18               | 7/.0152      | 0.025                          | 0.64 | 20              | 0.060                      | 1.52 | 0.599               | 15.2 | 77            | 115   | 308          | 458   |
| 378230         | 5 STS               | 18               | 7/.0152      | 0.025                          | 0.64 | 20              | 0.060                      | 1.52 | 0.655               | 16.6 | 96            | 143   | 364          | 542   |
| 378240         | 7 STS               | 18               | 7/.0152      | 0.025                          | 0.64 | 20              | 0.060                      | 1.52 | 0.714               | 18.1 | 133           | 198   | 400          | 595   |
| 378250         | 9 STS               | 18               | 7/.0152      | 0.025                          | 0.64 | 20              | 0.060                      | 1.52 | 0.833               | 21.2 | 170           | 253   | 493          | 734   |
| 378260         | 12 STS              | 18               | 7/.0152      | 0.025                          | 0.64 | 20              | 0.080                      | 2.03 | 0.979               | 24.9 | 226           | 336   | 685          | 1019  |
| 378270         | 19 STS              | 18               | 7/.0152      | 0.025                          | 0.64 | 20              | 0.080                      | 2.03 | 1.145               | 29.1 | 356           | 530   | 910          | 1354  |
|                |                     |                  |              |                                |      |                 |                            |      |                     |      |               |       |              |       |
| 378280         | 2 STS               | 16               | 7/.0192      | 0.025                          | 0.64 | 18              | 0.060                      | 1.52 | 0.554               | 14.1 | 64            | 96    | 223          | 332   |
| 378290         | 3 STS               | 16               | 7/.0192      | 0.025                          | 0.64 | 18              | 0.060                      | 1.52 | 0.587               | 14.9 | 94            | 139   | 300          | 447   |
| 378300         | 4 STS               | 16               | 7/.0192      | 0.025                          | 0.64 | 18              | 0.060                      | 1.52 | 0.642               | 16.3 | 124           | 185   | 389          | 579   |
| 378310         | 5 STS               | 16               | 7/.0192      | 0.025                          | 0.64 | 18              | 0.060                      | 1.52 | 0.704               | 17.9 | 154           | 229   | 465          | 692   |
| 378320         | 7 STS               | 16               | 7/.0192      | 0.025                          | 0.64 | 18              | 0.060                      | 1.52 | 0.768               | 19.5 | 213           | 317   | 515          | 766   |
| 378330         | 9 STS               | 16               | 7/.0192      | 0.025                          | 0.64 | 18              | 0.080                      | 2.03 | 0.939               | 23.9 | 272           | 405   | 709          | 1055  |
| 378340         | 12 STS              | 16               | 7/.0192      | 0.025                          | 0.64 | 18              | 0.080                      | 2.03 | 1.055               | 26.8 | 361           | 537   | 892          | 1328  |
| 378350         | 19 STS              | 16               | 7/.0192      | 0.025                          | 0.64 | 18              | 0.080                      | 2.03 | 1.236               | 31.4 | 569           | 847   | 1208         | 1798  |

Insulated Conductor Diameter (Inches) 18 AWG (.10) and 16 AWG (.11).  
Dimensions and weights are subject to industry tolerance.

## Ultrol® Control Cable, Multi-Conductor, Class 1E Nuclear

600 V, 90°C, VW-1, UL Type TC



### Product Construction:

#### Conductor:

- 14 AWG thru 10 AWG tinned, annealed copper; Class B stranding; 2 thru 37 conductors

#### Insulation:

- Flame-retardant, heat-, moisture- and radiation-resistant, thermoset Ultrol® Cross-Linked Polyethylene (FR-XLPE)
- Color code: Per ICEA Method 1, Table E-1

#### Jacket:

- Heavy-duty Chlorosulphonated Polyethylene (CSPE) - Black

#### Print:

- GENERAL CABLE BRAND REX BRAND (WC) ULTROL XX/C XXAWG COPPER FR-XLPE CSPE 600V 90°C (UL) TYPE TC XHHW-2 YEAR OF MFG TRACEABILITY NUMBER SEQUENTIAL FOOTAGE MARK

#### Options:

- Conductor stranding
- 1 kV & 2 kV
- E-2 color code
- Overall galvanized steel or aluminum interlocked armor sheath

#### Applications:

- Ultrol Control cable is a 600 V multi-conductor, thermoset, Class 1E rated construction specifically designed for applications in nuclear generating stations and where flame retardancy is critical.
- For use in Class 1E power distribution and control circuits for power lighting, control and signal circuits.
- Can be installed in trays, conduit, ducts, or in direct burial applications.

#### Features:

- Rated at 90°C wet or dry
- Fully traceable
- Qualified for 40-year service life
- Radiation resistant (up to 200 megarads)
- Long-term thermal endurance and superior electricals
- Excellent mechanical cut through properties.
- Long term moisture and radiation stability
- Free stripping for ease of termination
- Meets cold bend test at -40°C

#### Industry Compliances:

- Class 1E Qualified in accordance with IEEE 323-1974 and IEEE 383-1974
- ICEA S-73-532 (formerly ICEA S-66-524 & S-19-81)
- UL 1277 Type TC
- UL 44 XHHW-2

#### Flame Test Compliances:

- IEEE 383 (70,000 BTU/hr) as modified by NRC Reg. Guide 1.131
- IEEE 1202 (70,000 BTU/hr)
- ICEA T-29-520 (210,000 BTU/hr)
- UL VW-1

#### Other:

- Quality assurance program in accordance with NRC 10CFR50 Appendix B
- ANSI N45.2
- ASME NQA-1
- NIAC
- NUPIC

#### Packaging:

- Material to be shipped on non-returnable wooden reels

## Ultrol® Control Cable, Multi-Conductor, Class 1E Nuclear

600 V, 90°C, VW-1, UL Type TC

### ULTROL® CONTROL CABLE, MULTI-CONDUCTOR, CLASS 1E NUCLEAR, 600 V, 90°C, VW-1, UL TYPE TC

| Catalog Number | No. of Cond. | Cond. Size (AWG) | Cond. Strand | Min. Avg. Insulation Thickness |      | Min. Avg. Jacket Thickness |      | Nom. Cable Diameter |              | Copper Weight |       | Net Weight   |       |
|----------------|--------------|------------------|--------------|--------------------------------|------|----------------------------|------|---------------------|--------------|---------------|-------|--------------|-------|
|                |              |                  |              | Inches                         | mm   | Inches                     | mm   | Inches              | mm           | lbs/1000 ft.  | kg/km | lbs/1000 ft. | kg/km |
| 378360         | 2/C Flat     | 14               | 7/.0242      | 0.030                          | 0.76 | 0.045                      | 1.14 | 0.223 x 0.356       | 5.66 x 9.04  | 25            | 38    | 78           | 116   |
| 378370         | 2/C          | 14               | 7/.0242      | 0.030                          | 0.76 | 0.045                      | 1.14 | 0.359               | 9.12         | 26            | 38    | 82           | 121   |
| 378380         | 3/C          | 14               | 7/.0242      | 0.030                          | 0.76 | 0.045                      | 1.14 | 0.379               | 9.63         | 38            | 57    | 93           | 138   |
| 378390         | 4/C          | 14               | 7/.0242      | 0.030                          | 0.76 | 0.045                      | 1.14 | 0.414               | 10.5         | 51            | 76    | 116          | 173   |
| 378400         | 5/C          | 14               | 7/.0242      | 0.030                          | 0.76 | 0.045                      | 1.14 | 0.452               | 11.5         | 64            | 95    | 135          | 201   |
| 378410         | 7/C          | 14               | 7/.0242      | 0.030                          | 0.76 | 0.045                      | 1.14 | 0.492               | 12.5         | 90            | 134   | 190          | 283   |
| 378420         | 9/C          | 14               | 7/.0242      | 0.030                          | 0.76 | 0.060                      | 1.52 | 0.603               | 15.3         | 116           | 173   | 262          | 390   |
| 378430         | 12/C         | 14               | 7/.0242      | 0.030                          | 0.76 | 0.060                      | 1.52 | 0.675               | 17.2         | 155           | 231   | 322          | 479   |
| 378440         | 19/C         | 14               | 7/.0242      | 0.030                          | 0.76 | 0.060                      | 1.52 | 0.785               | 19.9         | 245           | 365   | 505          | 752   |
| 378450         | 25/C         | 14               | 7/.0242      | 0.030                          | 0.76 | 0.080                      | 2.03 | 0.951               | 24.2         | 321           | 478   | 630          | 938   |
| 378460         | 30/C         | 14               | 7/.0242      | 0.030                          | 0.76 | 0.080                      | 2.03 | 1.013               | 25.7         | 385           | 573   | 790          | 1176  |
| 378470         | 37/C         | 14               | 7/.0242      | 0.030                          | 0.76 | 0.080                      | 2.03 | 1.091               | 27.7         | 476           | 708   | 880          | 1310  |
| 378500         | 2/C Flat     | 12               | 7/.0305      | 0.030                          | 0.76 | 0.045                      | 1.14 | 0.242 x 0.394       | 6.15 x 10.01 | 41            | 60    | 95           | 141   |
| 378510         | 2/C          | 12               | 7/.0305      | 0.030                          | 0.76 | 0.045                      | 1.14 | 0.397               | 10.1         | 41            | 61    | 106          | 158   |
| 378520         | 3/C          | 12               | 7/.0305      | 0.030                          | 0.76 | 0.045                      | 1.14 | 0.420               | 10.7         | 61            | 91    | 123          | 183   |
| 378530         | 4/C          | 12               | 7/.0305      | 0.030                          | 0.76 | 0.045                      | 1.14 | 0.460               | 11.7         | 81            | 121   | 172          | 256   |
| 378540         | 5/C          | 12               | 7/.0305      | 0.030                          | 0.76 | 0.045                      | 1.14 | 0.503               | 12.8         | 102           | 152   | 205          | 305   |
| 378550         | 7/C          | 12               | 7/.0305      | 0.030                          | 0.76 | 0.060                      | 1.52 | 0.579               | 14.7         | 143           | 213   | 276          | 411   |
| 378560         | 9/C          | 12               | 7/.0305      | 0.030                          | 0.76 | 0.060                      | 1.52 | 0.671               | 17.1         | 184           | 274   | 360          | 536   |
| 362030         | 12/C         | 12               | 7/.0305      | 0.030                          | 0.76 | 0.060                      | 1.52 | 0.754               | 19.2         | 245           | 365   | 456          | 679   |
| 378580         | 19/C         | 12               | 7/.0305      | 0.030                          | 0.76 | 0.080                      | 2.03 | 0.923               | 23.4         | 389           | 579   | 705          | 1049  |
| 378590         | 25/C         | 12               | 7/.0305      | 0.030                          | 0.76 | 0.080                      | 2.03 | 1.067               | 27.1         | 512           | 762   | 875          | 1302  |
| 378600         | 30/C         | 12               | 7/.0305      | 0.030                          | 0.76 | 0.080                      | 2.03 | 1.138               | 28.9         | 613           | 912   | 1015         | 1511  |
| 378610         | 37/C         | 12               | 7/.0305      | 0.030                          | 0.76 | 0.080                      | 2.03 | 1.227               | 31.2         | 756           | 1125  | 1223         | 1820  |
| 378640         | 2/C Flat     | 10               | 7/.0385      | 0.030                          | 0.76 | 0.045                      | 1.14 | 0.265 x 0.440       | 6.73 x 11.18 | 64            | 96    | 132          | 196   |
| 378650         | 2/C          | 10               | 7/.0385      | 0.030                          | 0.76 | 0.045                      | 1.14 | 0.443               | 11.3         | 65            | 96    | 140          | 208   |
| 378660         | 3/C          | 10               | 7/.0385      | 0.030                          | 0.76 | 0.045                      | 1.14 | 0.470               | 11.9         | 97            | 144   | 170          | 253   |
| 378670         | 4/C          | 10               | 7/.0385      | 0.030                          | 0.76 | 0.045                      | 1.14 | 0.515               | 13.1         | 130           | 194   | 251          | 374   |
| 378680         | 5/C          | 10               | 7/.0385      | 0.030                          | 0.76 | 0.060                      | 1.52 | 0.595               | 15.1         | 162           | 241   | 309          | 460   |
| 378690         | 7/C          | 10               | 7/.0385      | 0.030                          | 0.76 | 0.060                      | 1.52 | 0.648               | 16.5         | 227           | 338   | 374          | 557   |
| 378700         | 9/C          | 10               | 7/.0385      | 0.030                          | 0.76 | 0.060                      | 1.52 | 0.754               | 19.2         | 292           | 435   | 523          | 778   |
| 378710         | 12/C         | 10               | 7/.0385      | 0.030                          | 0.76 | 0.080                      | 2.03 | 0.890               | 22.6         | 390           | 580   | 658          | 979   |
| 378720         | 19/C         | 10               | 7/.0385      | 0.030                          | 0.76 | 0.080                      | 2.03 | 1.038               | 26.4         | 614           | 918   | 976          | 1453  |

Insulated Conductor Diameter (Inches) 14 AWG (.14), 12 AWG (.16) and 10 AWG (.18).

Dimensions and weights are subject to industry tolerance.



# Ultrol® Control Cable, Multi-Conductor, Overall Shield, Class 1E Nuclear

600 V, 90°C, VW-1, UL Type TC



## Product Construction:

### Conductor:

- 14 AWG thru 10 AWG, tinned, annealed, copper; Class B stranding; 2 thru 37 conductors.

### Insulation:

- Flame-retardant, heat-, moisture- and radiation-resistant, thermoset Ultrol® Cross-Linked Polyethylene (FR-XLPE)
- Color code: per ICEA Method 1, Table E-1

### Overall Shield:

- Aluminum/polyester tape in contact with a stranded tinned copper drain wire

### Jacket:

- Heavy-duty Chlorosulphonated Polyethylene (CSPE) — Black

### Print:

- GENERAL CABLE BRAND REX BRAND (WC) ULTROL XX/C XXAWG COPPER FR-XLPE (SHIELDED) CSPE 600V 90°C (UL) TYPE TC XHHW-2 YEAR OF MFG TRACEABILITY NUMBER SEQUENTIAL FOOTAGE MARK

### Options:

- Conductor stranding
- 1 kV & 2 kV
- E-2 color code
- Helical copper tape shield
- Longitudinal corrugated tinned copper tape shield
- Overall galvanized steel or aluminum interlocked armor sheath

### Applications:

- Ultrol Control cable is a 600 V overall shielded multi-conductor, thermoset, Class 1E rated construction specifically designed for applications in nuclear generating stations and where flame retardancy is critical.
- Where optimum performance is required for use on Class 1E circuits when shielding from external electrostatic interference is required.
- Can be installed in trays, conduit, ducts, or in direct burial applications.

### Features:

- Rated at 90°C wet or dry
- Fully traceable
- Qualified for 40-year service life
- Radiation resistant (up to 200 megarads)
- Maximum flame-retardancy
- Long-term moisture and radiation stability
- Long-term thermal endurance and superior electricals

### Features: (con't)

- Excellent mechanical cut through properties.
- Free stripping for ease of termination
- Meets cold bend text at -40°C

### Industry Compliances:

- Class 1E Qualified in accordance with IEEE 323-1974 and IEEE 383-1974
- ICEA S-73-532 (formerly ICEA S-66-524 & S-19-81)
- UL 1277 Type TC
- UL 44 XHHW-2

### Flame Test Compliances:

- IEEE 383 (70,000 BTU/hr) as modified by NRC Reg. Guide 1.131
- IEEE 1202 (70,000 BTU/hr)
- ICEA T-29-520 (210,000 BTU/hr)
- UL VW-1

### Other:

- Quality assurance program in accordance with NRC 10CFR50 Appendix B
- ANSI N45.2
- ASME NQA-1
- NIAC
- NUPIC

### Packaging:

- Material to be shipped on non-returnable wooden reels

## Ultrol® Control Cable, Multi-Conductor, Overall Shield, Class 1E Nuclear

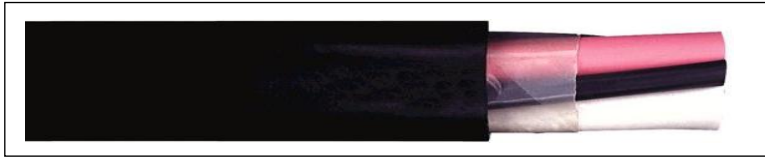
600 V, 90°C, VW-1, UL Type TC

### ULTROL® CONTROL CABLE, MULTI-CONDUCTOR, OVERALL SHIELD, CLASS 1E NUCLEAR, 600 V, 90°C, VW-1, UL TYPE TC

| Catalog Number | No. of Cond. | Cond. Size (AWG) | Cond. Strand | Min. Avg. Insulation Thickness |      | Drain Wire Size (AWG) | Min. Avg. Jacket Thickness |      | Nom. Cable Diameter |      | Copper Weight |       | Net Weight   |       |
|----------------|--------------|------------------|--------------|--------------------------------|------|-----------------------|----------------------------|------|---------------------|------|---------------|-------|--------------|-------|
|                |              |                  |              | Inches                         | mm   |                       | Inches                     | mm   | Inches              | mm   | lbs/1000 ft.  | kg/km | lbs/1000 ft. | kg/km |
| 363640         | 2/C          | 14               | 7/.0242      | 0.030                          | 0.76 | 16                    | 0.045                      | 1.14 | 0.359               | 9.12 | 34            | 50    | 92           | 137   |
| 378760         | 3/C          | 14               | 7/.0242      | 0.030                          | 0.76 | 16                    | 0.045                      | 1.14 | 0.379               | 9.63 | 47            | 69    | 103          | 153   |
| 378770         | 4/C          | 14               | 7/.0242      | 0.030                          | 0.76 | 16                    | 0.045                      | 1.14 | 0.414               | 10.5 | 59            | 88    | 127          | 189   |
| 378780         | 5/C          | 14               | 7/.0242      | 0.030                          | 0.76 | 16                    | 0.045                      | 1.14 | 0.512               | 13.0 | 72            | 108   | 146          | 217   |
| 378790         | 7/C          | 14               | 7/.0242      | 0.030                          | 0.76 | 16                    | 0.060                      | 1.52 | 0.582               | 14.8 | 98            | 146   | 202          | 301   |
| 378800         | 9/C          | 14               | 7/.0242      | 0.030                          | 0.76 | 16                    | 0.060                      | 1.52 | 0.663               | 16.8 | 124           | 185   | 274          | 408   |
| 378810         | 12/C         | 14               | 7/.0242      | 0.030                          | 0.76 | 16                    | 0.060                      | 1.52 | 0.736               | 18.7 | 163           | 243   | 335          | 499   |
| 378820         | 19/C         | 14               | 7/.0242      | 0.030                          | 0.76 | 16                    | 0.080                      | 2.03 | 0.888               | 22.6 | 251           | 374   | 519          | 772   |
| 378830         | 25/C         | 14               | 7/.0242      | 0.030                          | 0.76 | 16                    | 0.080                      | 2.03 | 1.014               | 25.8 | 330           | 491   | 644          | 958   |
| 378840         | 30/C         | 14               | 7/.0242      | 0.030                          | 0.76 | 16                    | 0.080                      | 2.03 | 1.076               | 27.3 | 394           | 586   | 806          | 1200  |
| 378850         | 37/C         | 14               | 7/.0242      | 0.030                          | 0.76 | 16                    | 0.080                      | 2.03 | 1.154               | 29.3 | 484           | 720   | 994          | 1479  |
|                |              |                  |              |                                |      |                       |                            |      |                     |      |               |       |              |       |
| 378860         | 2/C          | 12               | 7/.0305      | 0.030                          | 0.76 | 14                    | 0.045                      | 1.14 | 0.397               | 10.0 | 54            | 80    | 122          | 182   |
| 378870         | 3/C          | 12               | 7/.0305      | 0.030                          | 0.76 | 14                    | 0.045                      | 1.14 | 0.420               | 10.7 | 74            | 110   | 139          | 207   |
| 378880         | 4/C          | 12               | 7/.0305      | 0.030                          | 0.76 | 14                    | 0.045                      | 1.14 | 0.460               | 11.7 | 94            | 140   | 188          | 280   |
| 378890         | 5/C          | 12               | 7/.0305      | 0.030                          | 0.76 | 14                    | 0.060                      | 1.52 | 0.607               | 15.4 | 115           | 171   | 221          | 329   |
| 378900         | 7/C          | 12               | 7/.0305      | 0.030                          | 0.76 | 14                    | 0.060                      | 1.52 | 0.653               | 16.6 | 156           | 232   | 292          | 435   |
| 378910         | 9/C          | 12               | 7/.0305      | 0.030                          | 0.76 | 14                    | 0.060                      | 1.52 | 0.745               | 18.9 | 197           | 293   | 376          | 560   |
| 378920         | 12/C         | 12               | 7/.0305      | 0.030                          | 0.76 | 14                    | 0.060                      | 1.52 | 0.828               | 21.0 | 258           | 384   | 472          | 702   |
| 378930         | 19/C         | 12               | 7/.0305      | 0.030                          | 0.76 | 14                    | 0.080                      | 2.03 | 0.997               | 25.3 | 401           | 597   | 721          | 1073  |
| 378940         | 25/C         | 12               | 7/.0305      | 0.030                          | 0.76 | 14                    | 0.080                      | 2.03 | 1.141               | 29.0 | 525           | 781   | 892          | 1328  |
| 378950         | 30/C         | 12               | 7/.0305      | 0.030                          | 0.76 | 14                    | 0.080                      | 2.03 | 1.211               | 30.8 | 626           | 932   | 1032         | 1536  |
| 378960         | 37/C         | 12               | 7/.0305      | 0.030                          | 0.76 | 14                    | 0.080                      | 2.03 | 1.301               | 33.1 | 769           | 1144  | 1240         | 1845  |
|                |              |                  |              |                                |      |                       |                            |      |                     |      |               |       |              |       |
| 378970         | 2/C          | 10               | 7/.0385      | 0.030                          | 0.76 | 12                    | 0.045                      | 1.14 | 0.443               | 11.3 | 85            | 127   | 165          | 246   |
| 378980         | 3/C          | 10               | 7/.0385      | 0.030                          | 0.76 | 12                    | 0.045                      | 1.14 | 0.470               | 11.9 | 118           | 176   | 195          | 290   |
| 378990         | 4/C          | 10               | 7/.0385      | 0.030                          | 0.76 | 12                    | 0.045                      | 1.14 | 0.515               | 13.1 | 150           | 223   | 276          | 411   |
| 379000         | 5/C          | 10               | 7/.0385      | 0.030                          | 0.76 | 12                    | 0.060                      | 1.52 | 0.688               | 17.5 | 183           | 272   | 334          | 497   |
| 379010         | 7/C          | 10               | 7/.0385      | 0.030                          | 0.76 | 12                    | 0.060                      | 1.52 | 0.740               | 18.8 | 248           | 369   | 401          | 597   |
| 379020         | 9/C          | 10               | 7/.0385      | 0.030                          | 0.76 | 12                    | 0.080                      | 2.03 | 0.887               | 22.5 | 313           | 466   | 549          | 817   |
| 379030         | 12/C         | 10               | 7/.0385      | 0.030                          | 0.76 | 12                    | 0.080                      | 2.03 | 0.982               | 24.9 | 411           | 612   | 684          | 1018  |
| 379040         | 19/C         | 10               | 7/.0385      | 0.030                          | 0.76 | 12                    | 0.080                      | 2.03 | 1.130               | 28.7 | 638           | 950   | 1001         | 1490  |

Insulated Conductor Diameter (Inches) 14 AWG (.14), 12 AWG (.16) and 10 AWG (.18).  
Dimensions and weights are subject to industry tolerance.

## Ultrol® Power Cable, 3 or 4 Conductors with Ground, Class 1E Nuclear 600 V, 90°C, VW-1, UL Type TC



### Product Construction:

#### Conductor:

- 14 AWG thru 750 kcmil tinned, annealed copper per ASTM B33; Class B stranding per ASTM B8

#### Insulation:

- Flame-retardant, heat-, moisture- and radiation-resistant, thermoset Ultrol® Cross-Linked Polyethylene (FR-XLPE)
- Color code: Per ICEA Method 4; black with printed numbers

#### Grounding Conductor(s):

- Tinned, annealed copper, Class B stranding, sized according to NEC® requirements

#### Jacket:

- Heavy-duty Chlorosulphonated Polyethylene (CSPE)—Black

#### Print:

- GENERAL CABLE BRAND REX Brand (WC) ULTROL XX/C XXAWG COPPER FR-XLPE CSPE 600V 90°C (UL) TYPE TC XHHW-2 YEAR OF MFG TRACEABILITY NUMBER SEQUENTIAL FOOTAGE MARK

#### Options:

- Conductor stranding
- 1 kV & 2 kV
- Full-colored insulation
- Helical tinned copper tape shield
- Longitudinal corrugated tinned copper tape shield
- Overall galvanized steel or aluminum interlocked armor sheath

#### Applications:

- Ultrol Power cable is a 600 V multi-conductor, thermoset, Class 1E rated construction specifically designed for applications in nuclear generating stations and where flame retardancy is critical.
- For use in Class 1E power distribution and control circuits for power lighting, control and signal circuits.
- Can be installed in trays, conduit, ducts, or in direct burial applications.

#### Features:

- Rated at 90°C wet or dry
- Fully traceable
- Qualified for 40-year service life
- Radiation resistant (up to 200 megarads)
- Long-term thermal endurance and superior electricals
- Excellent mechanical cut through properties
- Long-term moisture and radiation stability
- Free stripping for ease of termination
- Meets cold bend test at -40°C

#### Industry Compliances:

- Class 1E Qualified in accordance with IEEE 323-1974 and IEEE 383-1974
- ICEA S-95-658 (formerly ICEA S-66-524 & S-19-81)
- UL 1277 Type TC
- UL 44 XHHW-2

#### Flame Test Compliances:

- IEEE 383 (70,000 BTU/hr) as modified by NRC Reg. Guide 1.131
- IEEE 383 (70,000 BTU/hr)
- IEEE 1202 (70,000 BTU/hr)
- ICEA T-29-520 (210,000 BTU/hr)
- UL VW-1

#### Other:

- Quality assurance program in accordance with NRC 10CFR50 Appendix B
- ANSI N45.2
- ASME NQA-1
- NIAC
- NUPIC

#### Packaging:

- Material to be shipped on spools on non-returnable wooden reels

# **Ultrol® Power Cable, 3 or 4 Conductors with Ground, Class 1E Nuclear** 600 V, 90°C, VW-1, UL Type TC

## **ULTROL® POWER CABLE, 3 OR 4 CONDUCTORS WITH GROUND, CLASS 1E NUCLEAR, 600 V, 90°C, VW-1, UL TYPE TC**

| Catalog Number | No. of Cond. | Cond. Size (AWG) | Cond. Strand | Min. Avg. Insulation Thickness |      | Drain Wire Size (AWG) | Min. Avg. Jacket Thickness |      | Nom. Cable Diameter |      | Copper Weight |       | Net Weight   |       |
|----------------|--------------|------------------|--------------|--------------------------------|------|-----------------------|----------------------------|------|---------------------|------|---------------|-------|--------------|-------|
|                |              |                  |              | Inches                         | mm   |                       | Inches                     | mm   | Inches              | mm   | lbs/1000 ft.  | kg/km | lbs/1000 ft. | kg/km |
| 379050         | 3/C          | 8                | 7/.0486      | 0.045                          | 1.14 | 10                    | 0.060                      | 1.52 | 0.629               | 16.0 | 187           | 278   | 316          | 470   |
| 379060         | 4/C          | 8                | 7/.0486      | 0.045                          | 1.14 | 10                    | 0.060                      | 1.52 | 0.690               | 17.5 | 238           | 354   | 391          | 582   |
|                |              |                  |              |                                |      |                       |                            |      |                     |      |               |       |              |       |
| 379070         | 3/C          | 6                | 7/.0612      | 0.045                          | 1.14 | 8                     | 0.060                      | 1.52 | 0.708               | 18.0 | 297           | 442   | 461          | 686   |
| 379080         | 4/C          | 6                | 7/.0612      | 0.045                          | 1.14 | 8                     | 0.060                      | 1.52 | 0.779               | 19.8 | 379           | 564   | 573          | 853   |
|                |              |                  |              |                                |      |                       |                            |      |                     |      |               |       |              |       |
| 379090         | 3/C          | 4                | 7/.0772      | 0.045                          | 1.14 | 8                     | 0.060                      | 1.52 | 0.810               | 20.6 | 442           | 658   | 680          | 1012  |
| 379100         | 4/C          | 4                | 7/.0772      | 0.045                          | 1.14 | 8                     | 0.080                      | 2.03 | 0.932               | 23.7 | 572           | 851   | 851          | 1267  |
|                |              |                  |              |                                |      |                       |                            |      |                     |      |               |       |              |       |
| 379110         | 3/C          | 2                | 7/.0974      | 0.045                          | 1.14 | 6                     | 0.080                      | 2.03 | 0.977               | 24.8 | 701           | 1043  | 988          | 1470  |
| 379120         | 4/C          | 2                | 7/.0974      | 0.045                          | 1.14 | 6                     | 0.080                      | 2.03 | 1.075               | 27.3 | 908           | 1351  | 1246         | 1854  |
|                |              |                  |              |                                |      |                       |                            |      |                     |      |               |       |              |       |
| 379130         | 3/C          | 1                | 19/.0664     | 0.055                          | 1.14 | 6                     | 0.080                      | 2.03 | 1.115               | 28.3 | 861           | 1281  | 1242         | 1848  |
| 379140         | 4/C          | 1                | 19/.0664     | 0.055                          | 1.14 | 6                     | 0.080                      | 2.03 | 1.225               | 31.1 | 1122          | 1670  | 1670         | 2485  |
|                |              |                  |              |                                |      |                       |                            |      |                     |      |               |       |              |       |
| 379150         | 3/C          | 1/0              | 19/.0745     | 0.055                          | 1.40 | 6                     | 0.080                      | 2.03 | 1.186               | 30.1 | 1081          | 1609  | 1446         | 2152  |
| 379160         | 4/C          | 1/0              | 19/.0745     | 0.055                          | 1.40 | 6                     | 0.080                      | 2.03 | 1.309               | 33.3 | 1395          | 2076  | 1847         | 2749  |
|                |              |                  |              |                                |      |                       |                            |      |                     |      |               |       |              |       |
| 379170         | 3/C          | 2/0              | 19/.0837     | 0.055                          | 1.40 | 6                     | 0.080                      | 2.03 | 1.283               | 32.6 | 1323          | 1969  | 1749         | 2603  |
| 379180         | 4/C          | 2/0              | 19/.0837     | 0.055                          | 1.40 | 6                     | 0.080                      | 2.03 | 1.418               | 36.0 | 1737          | 2585  | 2246         | 3343  |
|                |              |                  |              |                                |      |                       |                            |      |                     |      |               |       |              |       |
| 379190         | 3/C          | 3/0              | 19/.0940     | 0.055                          | 1.40 | 4                     | 0.080                      | 2.03 | 1.391               | 35.3 | 1694          | 2521  | 2163         | 3219  |
| 379200         | 4/C          | 3/0              | 19/.0940     | 0.055                          | 1.40 | 4                     | 0.080                      | 2.03 | 1.538               | 39.1 | 2217          | 3299  | 2778         | 4134  |
|                |              |                  |              |                                |      |                       |                            |      |                     |      |               |       |              |       |
| 379210         | 3/C          | 4/0              | 19/.1055     | 0.055                          | 1.40 | 4                     | 0.080                      | 2.03 | 1.511               | 38.4 | 2102          | 3128  | 2638         | 3926  |
| 379220         | 4/C          | 4/0              | 19/.1055     | 0.055                          | 1.40 | 4                     | 0.110                      | 2.79 | 1.734               | 44.0 | 2760          | 4107  | 3512         | 5227  |
|                |              |                  |              |                                |      |                       |                            |      |                     |      |               |       |              |       |
| 379230         | 3/C          | 250              | 37/.0822     | 0.065                          | 1.65 | 4                     | 0.080                      | 2.03 | 1.658               | 42.1 | 2460          | 3661  | 3194         | 4753  |
| 379240         | 4/C          | 250              | 37/.0822     | 0.065                          | 1.65 | 4                     | 0.110                      | 2.79 | 1.898               | 48.2 | 3239          | 4820  | 4101         | 6103  |
|                |              |                  |              |                                |      |                       |                            |      |                     |      |               |       |              |       |
| 379250         | 3/C          | 350              | 37/.0973     | 0.065                          | 1.65 | 3                     | 0.110                      | 2.79 | 2.146               | 54.5 | 3437          | 5115  | 4320         | 6429  |
| 379260         | 4/C          | 350              | 37/.0973     | 0.065                          | 1.65 | 3                     | 0.110                      | 2.79 | 1.940               | 49.3 | 4517          | 6722  | 5585         | 8312  |
|                |              |                  |              |                                |      |                       |                            |      |                     |      |               |       |              |       |
| 379270         | 3/C          | 500              | 37/.1162     | 0.065                          | 1.65 | 2                     | 0.110                      | 2.79 | 2.218               | 56.3 | 4866          | 7242  | 5903         | 8785  |
| 379280         | 4/C          | 500              | 37/.1162     | 0.065                          | 1.65 | 2                     | 0.110                      | 2.79 | 2.458               | 62.4 | 6424          | 9560  | 7646         | 11379 |
|                |              |                  |              |                                |      |                       |                            |      |                     |      |               |       |              |       |
| 379290         | 3/C          | 750              | 61/.1109     | 0.080                          | 2.03 | 1                     | 0.110                      | 2.79 | 2.670               | 67.8 | 7249          | 10788 | 8831         | 13142 |
| 379300         | 4/C          | 750              | 61/.1109     | 0.080                          | 2.03 | 1                     | 0.140                      | 3.56 | 3.025               | 76.8 | 9585          | 14264 | 11463        | 17059 |

Dimensions and weights are subject to industry tolerance.

# ULTROL® Coaxial and Triaxial, Class 1E Nuclear Cables

| Catalog No.<br>(Brand Rex<br>/General<br>Cable) | Equivalent | Imped.<br>( $\Omega$ ) | Spec.<br>No. | Cond. /<br>Strand/O.D.           | Insulation<br>O.D.<br>(in.) | Inner<br>Shield                   | Intershield<br>Insulation | Outer<br>Shield                   | Cable<br>O.D.<br>(in.) | Bend<br>Radius<br>(Training/<br>Pulling) | Weight<br>(lbs/1000ft.) | Capac.<br>(pF/ft) | Insulation<br>Resistance<br>(M $\Omega$ -1000 ft.) | Max.<br>Operating<br>Voltage<br>(volts, RMS) | Dielectric<br>Strength<br>(volts,<br>RMS) |
|-------------------------------------------------|------------|------------------------|--------------|----------------------------------|-----------------------------|-----------------------------------|---------------------------|-----------------------------------|------------------------|------------------------------------------|-------------------------|-------------------|----------------------------------------------------|----------------------------------------------|-------------------------------------------|
| CS50060 /<br>204330                             | RG-174/U   | 50                     | 350          | 26 AWG /<br>7/34 BC /<br>.019"   | .060<br>Nom.                | -                                 | -                         | 38 AWG<br>TC Braid<br>95%<br>Min. | .100<br>Nom            | 0.8" / 1.2"                              | 8                       | 31.8              | 25,000                                             | 1100                                         | 4500                                      |
| CS50116 /<br>204220                             | RG-58C/U   | 50                     | 375          | 20 AWG /<br>10/30 TC<br>/ .036"  | .119<br>Nom.                | -                                 | -                         | 36 AWG<br>TC Braid<br>95%<br>Min. | .195<br>Nom.           | 1.56" /<br>2.34"                         | 27                      | 31.8              | 26,000                                             | 1400                                         | 5000                                      |
| CS50285 /<br>204310                             | RG-213/U   | 50                     | 400          | 12 AWG /<br>7/0284<br>TC / .085  | .285<br>Nom.                | -                                 | -                         | 33 AWG<br>TC Braid<br>95%<br>Min. | .405<br>Nom.           | 3.24" /<br>4.86"                         | 113.5                   | 31.8              | 26,000                                             | 3700                                         | 10000                                     |
| CS75146 /<br>204200                             | RG-59B/U   | 75                     | 425          | 24 AWG /<br>16/36 TC<br>/ .023   | .148<br>Nom.                | -                                 | -                         | 34 AWG<br>TC Braid<br>95%<br>Min. | .242<br>Nom.           | 1.94" /<br>2.90"                         | 38.2                    | 21.2              | 40,000                                             | 2200                                         | 7000                                      |
| CS75285 /<br>204190                             | RG-11A/U   | 75                     | 450          | 19 AWG /<br>7/27 TC /<br>.043    | .285<br>Nom.                | -                                 | -                         | 33 AWG<br>TC Braid<br>95%<br>Min. | .405<br>Nom.           | 3.24" /<br>4.86"                         | 95.2                    | 21.2              | 40,000                                             | 4000                                         | 10000                                     |
| TCD95285<br>/<br>203250                         | RG-22B/U   | 89                     | 475          | 18 AWG /<br>16/30 TC<br>/ .046   | .092<br>Nom.                | 34 AWG<br>TC Braid<br>95%<br>Min. | -                         | 34 AWG<br>TC Braid<br>95%<br>Min. | .420<br>Nom.           | 3.36" /<br>5.04"                         | 124.7                   | 17.8              | 15,000                                             | 2000                                         | 2000                                      |
|                                                 |            |                        |              |                                  | .285<br>Nom.                |                                   |                           |                                   |                        |                                          |                         |                   |                                                    |                                              |                                           |
| CS95146 /<br>204210                             | RG-62B/U   | 95                     | 500          | 28 AWG /<br>Solid CCS<br>/ .0126 | .140<br>Nom.                | -                                 | -                         | 34 AWG<br>TC Braid<br>95%<br>Min. | .242<br>Nom.           | 1.94" /<br>2.90"                         | 38.8                    | 16.7              | 52,000                                             | 2000                                         | 7500                                      |
| CD95146 /<br>204300                             | RG-71B/U   | 95                     | 525          | 28 AWG /<br>Solid CCS<br>/ .0126 | .140<br>Nom.                | 34 AWG<br>TC Braid<br>95%<br>Min. | -                         | 34 AWG<br>TC Braid<br>95%<br>Min. | .250<br>Nom.           | 2.0" / 3.0"                              | 53.4                    | 16.7              | 52,000                                             | 2000                                         | 7500                                      |
| TS75285 /<br>204250                             | RG-11A/U   | 75                     | 550          | 19 AWG /<br>7/27 TC /<br>.043    | .285<br>Nom.                | 33 AWG<br>TC Braid<br>95%<br>Min. | .365<br>Nom.              | 33 AWG<br>TC Braid<br>95%<br>Min. | .465<br>Nom.           | 3.72" /<br>5.58"                         | 164.5                   | 21.2              | 40,000                                             | 4000                                         | 10000                                     |

# Ultrol® 50 Ohm Coax, Class 1E Nuclear

RG-174/U Equivalent, CS50060



## Product Construction:

### Conductor:

- 26 AWG (7/34) bare copperweld 40% conductivity
- O.D.: .019" nom.

### Insulation:

- Flame retardant, heat, moisture and radiation resistant, thermoset Ultrol® Cross-linked Polyethylene
- Wall: .021" nom.
- O.D.: .060" nom.

### Shield:

- 38 AWG tinned copper braid, 95% min. coverage.

### Jacket:

- Flame retardant, heat, moisture and radiation resistant, thermoset Ultrol® Cross-linked Polyethylene
- Wall: .011" nom.
- O.D.: .100" ± .005"

### Print:

- GENERAL CABLE® BRAND REX BRAND (WC) CS50060 COAXIAL RG-174/U TYPE PLUS DAY/MONTH/YEAR OF MANUFACTURE UNIQUE SERIAL NUMBER SEQUENTIAL FOOTAGE MARK

### Feature:

- Meets cold bend test at -40°C

### Cable Weight:

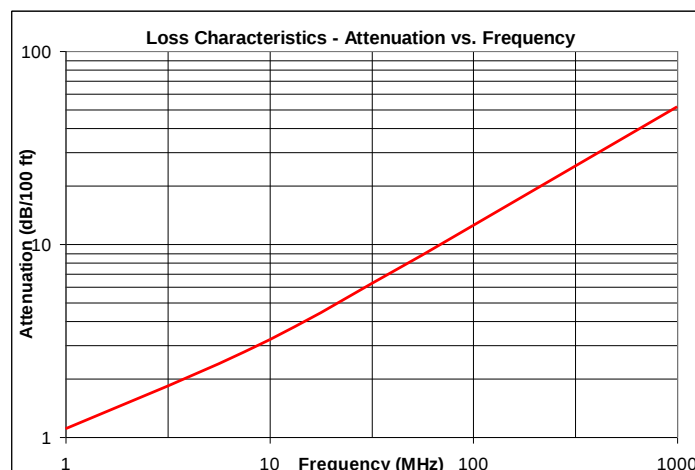
- 8 lbs/1000 ft nom.

### Catalog Number:

- Brand-Rex CS50060
- General Cable 204330

### Options:

- Armor – braid or interlocked armor



## Mechanical Data:

- Bend Radius:
  - 0.8" (Training)
  - 1.2" (Pulling)
- Cable Area: .0079 in<sup>2</sup>
- Braid Strength: 18.4 lbs

## Electrical Characteristics:

- Impedance: 50 ohms
- Capacitance: 31.8 pF/ft
- Velocity of Propagation: 64%
- DC Loop Resistance: 110.99 ohms/1000 ft
- Insulation Resistance: 25,000 megohms-1000ft
- Maximum Operating Voltage: 1100 volts, RMS
- Dielectric Strength: 4500 volts, RMS

## Industry Compliances:

- Class 1E Qualified in accordance with IEEE 323-1974 and IEEE 383-1974
- ICEA S-73-532

## Other:

- Quality Assurance program in accordance with NRC 10CFR50 Appendix B
- ANSI 45.2
- ASME NQA-1
- NIAC
- NUPIC

## Ultrol® 50 Ohm Coax, Class 1E Nuclear RG-58C/U Equivalent, CS50116



### Product Construction:

#### Conductor:

- 20 AWG (10/30) tinned copper
- O.D.: .036" nom.

#### Insulation:

- Flame retardant, heat, moisture and radiation resistant, thermoset Ultrol® Cross-linked Polyethylene
- Wall: .041" nom.
- O.D.: .119" nom.

#### Shield:

- 36 AWG tinned copper braid, 95% min. coverage.

#### Jacket:

- Heavy-duty Chlorosulphonated Polyethylene (CSPE) – Black
- Wall: .027" nom.
- O.D.: .195" ± .005"

#### Print:

- GENERAL CABLE® BRAND REX BRAND (WC) CS50116  
COAXIAL RG-58C/U TYPE PLUS DAY/MONTH/YEAR  
OF MANUFACTURE UNIQUE SERIAL NUMBER  
SEQUENTIAL FOOTAGE MARK

#### Feature:

- Meets cold bend test at -40°C

#### Cable Weight:

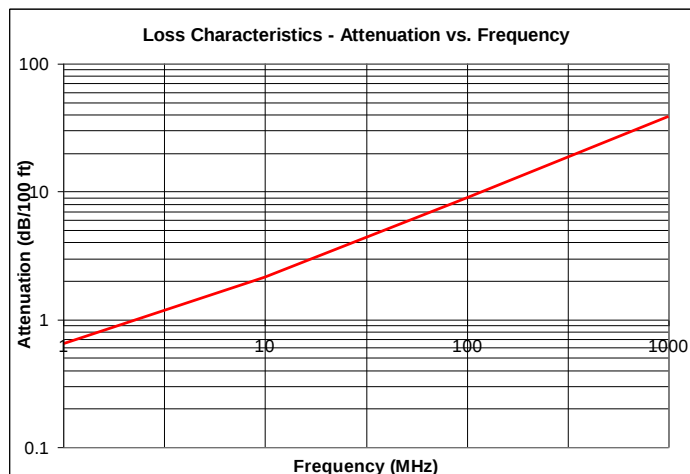
- 27 lbs/1000 ft nom.

#### Catalog Number:

- Brand-Rex CS50116
- General Cable 204220

#### Options:

- Armor – braid or interlocked armor
- Flame retardant, heat, moisture and radiation resistant, thermoset Ultrol® Cross-linked Polyethylene jacket



### Mechanical Data:

- Bend Radius:
  - 1.56" (Training)
  - 2.34" (Pulling)
- Cable Area: .030 in<sup>2</sup>
- Braid strength: 36 lbs

### Electrical Characteristics:

- Impedance: 50 ohms
- Capacitance: 31.8 pF/ft
- Velocity of Propagation: 64%
- DC Loop Resistance: 15.74 ohms/1000 ft
- Insulation Resistance: 26,000 megohms-1000ft
- Maximum Operating Voltage: 1400 volts, RMS
- Dielectric Strength: 5000 volts, RMS

### Industry Compliances:

- Class 1E Qualified in accordance with IEEE 323-1974 and IEEE 383-1974
- ICEA S-73-532

### Other:

- Quality Assurance program in accordance with NRC 10CFR50 Appendix B
- ANSI 45.2
- ASME NQA-1
- NIAC
- NUPIC

## Ultrol® 50 Ohm Coax, Class 1E Nuclear

RG-213/U Equivalent, CS50285



### Product Construction:

#### Conductor:

- 12 AWG 7/.0284 tinned copper
- O.D.: .085" nom.

#### Insulation:

- Flame retardant, heat, moisture and radiation resistant, thermoset Ultrol® Cross-linked Polyethylene
- Wall: .100" nom.
- O.D.: .285" nom.

#### Shield:

- 33 AWG tinned copper braid, 95% min. coverage

#### Jacket:

- Heavy-duty Chlorosulphonated Polyethylene (CSPE) – Black
- Wall: .044" nom.
- O.D.: .405" ± .005"

#### Print:

- GENERAL CABLE® BRAND REX BRAND (WC)  
CS50285 COAXIAL RG-213/U TYPE PLUS  
DAY/MONTH/YEAR OF MANUFACTURE UNIQUE  
SERIAL NUMBER SEQUENTIAL FOOTAGE MARK

#### Feature:

- Meets cold bend test at -40°C

#### Cable Weight:

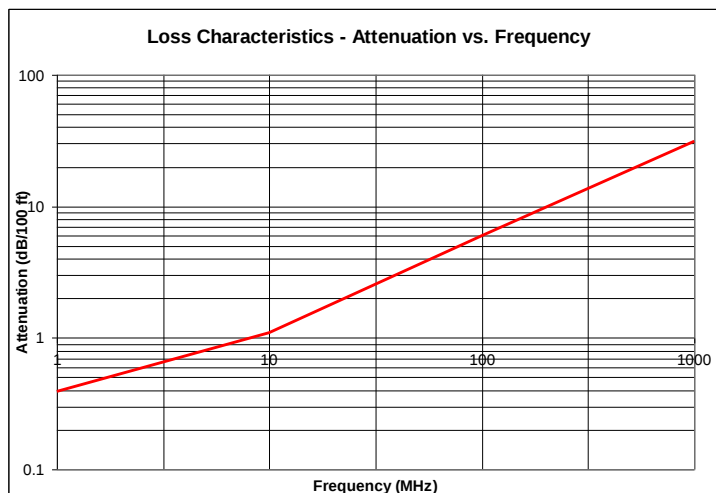
- 113.5 lbs/1000 ft

#### Catalog Number:

- Brand-Rex: CS50285
- General Cable: 204310

#### Options:

- Armor – braid or interlocked armor
- Flame retardant, heat, moisture and radiation resistant, thermoset Ultrol® Cross-linked Polyethylene jacket



### Mechanical Data:

- Bend Radius:
  - 3.24" (Training)
  - 4.86" (Pulling)
- Cable Area: .129 in<sup>2</sup>
- Braid strength: 160 lbs

### Electrical Characteristics:

- Impedance: 50 ohms
- Capacitance: 31.8 pF/ft
- Velocity of Propagation: 64%
- DC Loop Resistance: 3.13 ohms/1000 ft
- Insulation Resistance: 26,000 megohms–1000ft
- Maximum Operating Voltage: 3,700 volts, RMS
- Dielectric Strength: 10,000 volts, RMS

### Industry Compliances:

- Class 1E Qualified in accordance with IEEE 323-1974 and IEEE 383-1974
- ICEA S-73-532

### Other:

- Quality Assurance program in accordance with NRC 10CFR50 Appendix B
- ANSI 45.2
- ASME NQA-1
- NIAC
- NUPIC

## Ultrol® 75 Ohm Coax, Class 1E Nuclear RG-59B/U Equivalent, CS75146



### Product Construction:

#### Conductor:

- 24 AWG 16/36 tinned copper
- O.D.: .023" nom.

#### Insulation:

- Flame Retardant, heat, moisture and radiation resistant, thermoset Ultrol® Cross-linked Polyethylene
- Wall: .062" nom.
- O.D.: .148" nom.

#### Shield:

- 34 AWG tinned copper braid, 95% min. coverage

#### Jacket:

- Heavy-duty Chlorosulphonated Polyethylene (CSPE) – Black
- Wall: .033" nom.
- O.D.: .242" ± .005"

#### Print:

- GENERAL CABLE® BRAND REX BRAND (WC) CS75146  
COAXIAL RG-59B/U TYPE PLUS DAY/MONTH/YEAR  
OF MANUFACTURE UNIQUE SERIAL NUMBER  
SEQUENTIAL FOOTAGE MARK

#### Feature:

- Meets cold bend test at -40°C

#### Cable weight:

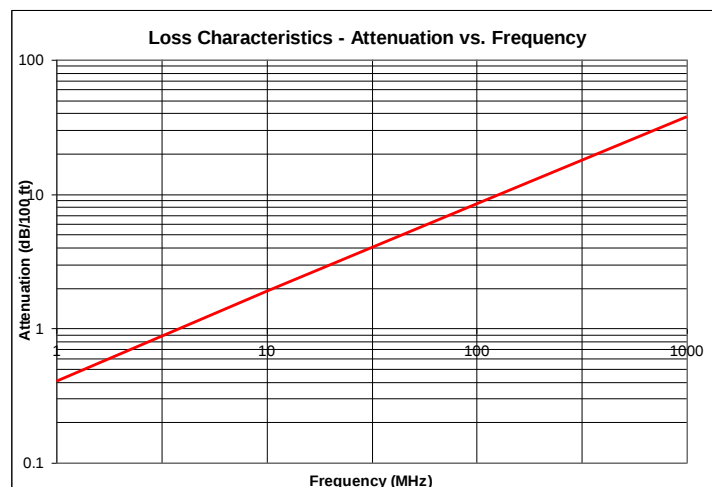
- 38.2 lbs/1000 ft

#### Catalog Number:

- Brand-Rex: CS75146
- General Cable: 204200

#### Options:

- Armor – braid or interlocked armor
- Flame Retardant, heat, moisture and radiation resistant, thermoset Ultrol® Cross-linked Polyethylene jacket



### Mechanical Data:

- Bend Radius:
  - 1.94" (Training)
  - 2.90" (Pulling)
- Cable Area: .046 in<sup>2</sup>
- Braid strength: 70 lbs

### Electrical Characteristics:

- Impedance: 75 ohms
- Capacitance: 21.2 pF/ft
- Velocity of Propagation: 64%
- DC Loop Resistance: 31.04 ohms/1000 ft
- Insulation Resistance: 40,000 megohms-1000ft
- Maximum Operating Voltage: 2,200 volts, RMS
- Dielectric Strength: 7,000 volts, RMS

### Industry Compliances:

- Class 1E Qualified in accordance with IEEE 323-1974 and IEEE 383-1974
- ICEA S-73-532

### Other:

- Quality Assurance program in accordance with NRC 10CFR50 Appendix B
- ANSI 45.2
- ASME NQA-1
- NIAC
- NUPIC

## Ultrol® 75 Ohm Coax, Class 1E Nuclear

RG-11A/U Equivalent, CS75285



### Product Construction:

#### Conductor:

- 19 AWG (7/27) tinned copper
- O.D.: .043" nom.

#### Insulation:

- Flame Retardant, heat, moisture and radiation resistant, thermoset Ultrol® Cross-linked Polyethylene
- Wall: .121" nom.
- O.D.: .285" nom.

#### Shield:

- 33 AWG tinned copper braid, 95% min. coverage

#### Jacket:

- Heavy-duty Chlorosulphonated Polyethylene (CSPE) – Black
- Wall: .045" nom.
- O.D.: .405" ± .007"

#### Print:

- GENERAL CABLE® BRAND REX BRAND (WC)  
CS75285 COAXIAL RG-11A/U TYPE PLUS  
DAY/MONTH/YEAR OF MANUFACTURE UNIQUE  
SERIAL NUMBER SEQUENTIAL FOOTAGE MARK

#### Feature:

- Meets cold bend test at -40°C

#### Cable weight:

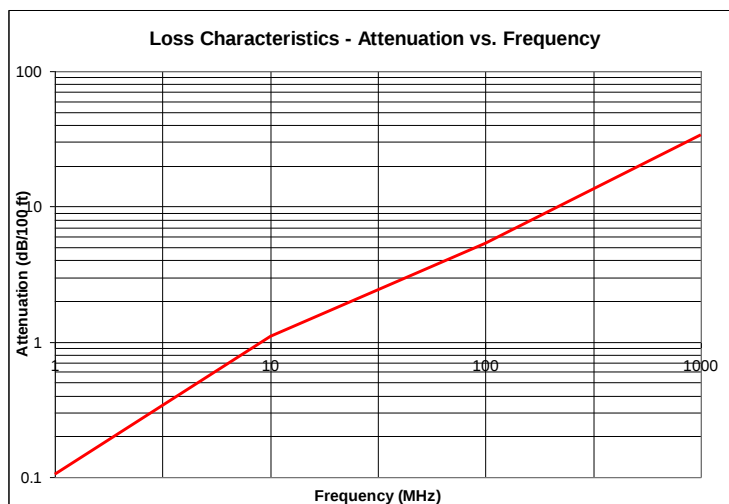
- 95.2 lbs/1000 ft

#### Catalog Number:

- Brand-Rex: CS75285
- General Cable: 204190

#### Options:

- Armor – braid or interlocked armor
- Flame retardant, heat, moisture and radiation resistant, thermoset Ultrol® Cross-linked Polyethylene jacket



### Mechanical Data:

- Bend Radius:
  - 3.24" (Training)
  - 4.86" (Pulling)
- Cable Area: .129 in<sup>2</sup>
- Braid strength: 160 lbs

### Electrical Characteristics:

- Impedance: 75 ohms
- Capacitance: 21.2 pF/ft
- Velocity of Propagation: 64%
- DC Loop Resistance: 7.35 ohms/1000 ft
- Insulation Resistance: 40,000 megohms–1000ft
- Maximum Operating Voltage: 4,000 volts, RMS
- Dielectric Strength: 10,000 volts, RMS

### Industry Compliances:

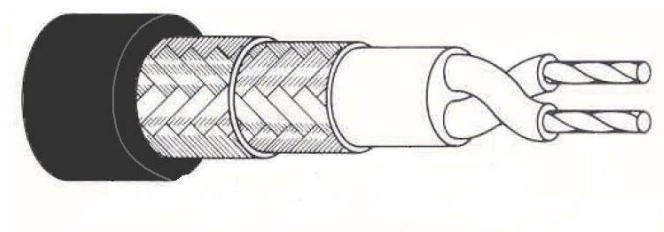
- Class 1E Qualified in accordance with IEEE 323-1974 and IEEE 383-1974
- ICEA S-73-532

### Other:

- Quality Assurance program in accordance with NRC 10CFR50 Appendix B
- ANSI 45.2
- ASME NQA-1
- NIAC
- NUPIC

## Ultrol® 89 Ohm Twin Coax, Class 1E Nuclear

RG-22B/U Equivalent, TCD95285



### Product Construction:

#### Conductor:

- 18 AWG (16/30) tinned copper
- O.D.: .046" nom.

#### Conductor Insulation:

- Flame retardant, heat, moisture and radiation resistant, thermoset Ultrol® Cross-linked Polyethylene
- Wall: .022" nom.
- O.D.: .092" nom.

#### Insulation:

- Flame retardant, heat, moisture and radiation resistant, thermoset Ultrol® Cross-linked Polyethylene
- Wall: .050" nom.
- O.D.: .285" nom

#### Inner Shield:

- 34 AWG tinned copper braid, 95% min. coverage

#### Inner Shield:

- 34 AWG tinned copper braid, 95% min. coverage

#### Jacket:

- Heavy-duty Chlorosulphonated Polyethylene (CSPE) – Black
- Wall: .040" nom.
- O.D.: .420" ± .010"

#### Print:

- GENERAL CABLE® BRAND REX BRAND (WC) TCD95285  
TWIN COAXIAL RG-22B/U TYPE PLUS  
DAY/MONTH/YEAR OF MANUFACTURE UNIQUE SERIAL  
NUMBER SEQUENTIAL FOOTAGE MARK

#### Feature:

- Meets cold bend test at -40°C

#### Cable weight:

- 124.7 lbs/1000 ft

### Catalog Number:

- Brand-Rex: TCD95285
- General Cable: 203250

### Options:

- Armor – braid or interlocked armor
- Flame retardant, heat, moisture and radiation resistant, thermoset Ultrol® Cross-linked Polyethylene jacket

### Mechanical Data:

- Bend Radius:
  - 3.36" (Training)
  - 5.04" (Pulling)
- Cable Area: .139 in<sup>2</sup>

### Electrical Characteristics:

- Impedance: 89 ohms
- Capacitance: 17.8 pF/ft
- Velocity of Propagation: 64%
- DC Loop Resistance: 13.3 ohms/1000 ft
- Insulation Resistance: 15,000 megohms–1000ft
- Maximum Operating Voltage: 2,000 volts, RMS
- Dielectric Strength: 2,000 volts, RMS

### Industry Compliances:

- Class 1E Qualified in accordance with IEEE 323-1974 and IEEE 383-1974
- ICEA S-73-532

### Other:

- Quality Assurance program in accordance with NRC 10CFR50 Appendix B
- ANSI 45.2
- ASME NQA-1
- NIAC
- NUPIC

## Ultrol® 95 Ohm Coax, Class 1E Nuclear

RG-62B/U Equivalent, CS95146



### Product Construction:

#### Conductor:

- 28 AWG copper-covered steel
- O.D.: .0126" nom.

#### Insulation:

- Flame retardant, heat, moisture and radiation resistant, thermoset Ultrol® Cross-linked Polyethylene
- Wall: .064" nom.
- O.D.: .140" nom.

#### Shield:

- 34 AWG tinned copper braid, 95% min. coverage

#### Jacket:

- Heavy-duty Chlorosulphonated Polyethylene (CSPE) – Black
- Wall: .037" nom.
- O.D.: .242" ± .005"

#### Print:

- GENERAL CABLE® BRAND REX BRAND (WC)  
CS95146 COAXIAL RG-62B/U TYPE PLUS  
DAY/MONTH/YEAR OF MANUFACTURE UNIQUE  
SERIAL NUMBER SEQUENTIAL FOOTAGE MARK

#### Feature:

- Meets cold bend test at -40°C

#### Cable Weight:

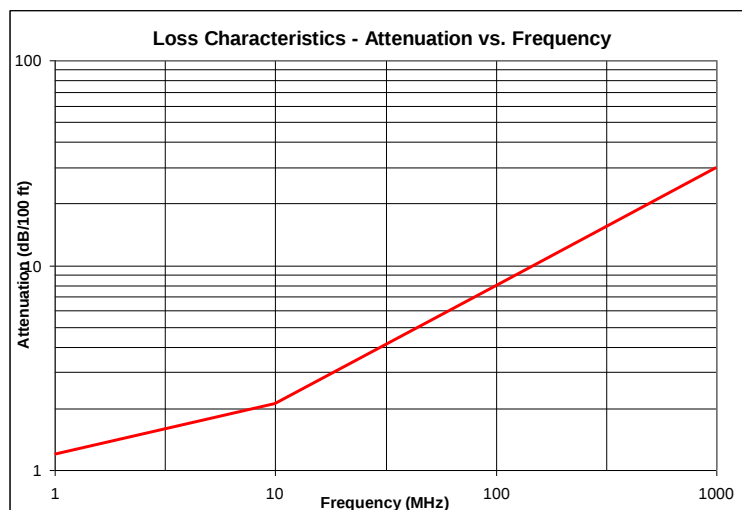
- 38.8 lbs/1000 ft

#### Catalog Number:

- Brand-Rex: CS95146
- General Cable: 204210

#### Options:

- Armor – braid or interlocked armor
- Flame retardant, heat, moisture and radiation resistant, thermoset Ultrol® Cross-linked Polyethylene jacket



### Mechanical Data:

- Bend Radius:
  - 1.94" (Training)
  - 2.90" (Pulling)
- Cable Area: .046 in<sup>2</sup>
- Braid strength: 70 lbs

### Electrical Characteristics:

- Impedance: 95 ohms
- Capacitance: 16.7 pF/ft
- Velocity of Propagation: 64%
- DC Loop Resistance: 169.6 ohms/1000 ft
- Insulation Resistance: 52,000 megohms–1000ft
- Maximum Operating Voltage: 2,000 volts, RMS
- Dielectric Strength: 7,500 volts, RMS

### Industry Compliances:

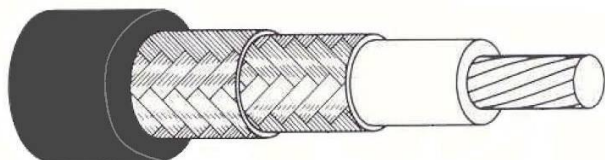
- Class 1E Qualified in accordance with IEEE 323-1974 and IEEE 383-1974
- ICEA S-73-532

### Other:

- Quality Assurance program in accordance with NRC 10CFR50 Appendix B
- ANSI 45.2
- ASME NQA-1
- NIAC
- NUPIC

## Ultrol® 95 Ohm Coax, Class 1E Nuclear

RG-71B/U Equivalent, CD95146



### Product Construction:

#### Conductor:

- 28 AWG copper-covered steel
- O.D.: .0126" nom.

#### Insulation:

- Flame retardant, heat, moisture and radiation resistant, thermoset Ultrol® Cross-linked Polyethylene
- Wall: .064" nom.
- O.D.: .140" nom.

#### Inner Shield:

- 34 AWG tinned copper braid, 95% min. coverage

#### Inner Shield:

- 34 AWG tinned copper braid, 95% min. coverage

#### Jacket:

- Heavy-duty Chlorosulphonated Polyethylene (CSPE) – Black
- Wall: .026" nom.
- O.D.: .250" ± .005"

#### Print:

- GENERAL CABLE® BRAND REX BRAND (WC)  
CD95146 COAXIAL RG-71B/U TYPE PLUS  
DAY/MONTH/YEAR OF MANUFACTURE UNIQUE  
SERIAL NUMBER SEQUENTIAL FOOTAGE MARK

#### Feature:

- Meets cold bend test at -40°C

#### Cable Weight:

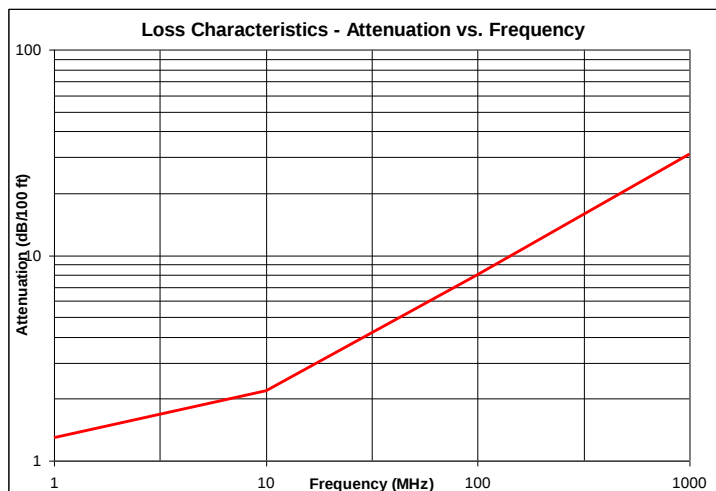
- 53.4 lbs/1000 ft

#### Catalog Number:

- Brand-Rex: CD95146
- General Cable: 204300

#### Options:

- Armor – braid or interlocked armor
- Flame retardant, heat, moisture and radiation resistant, thermoset Ultrol® Cross-linked Polyethylene jacket



#### Mechanical Data:

- Bend Radius:
  - 2.0" (Training)
  - 3.0" (Pulling)
- Cable Area: .049 in<sup>2</sup>
- Braid strength: 140 lbs

#### Electrical Characteristics:

- Impedance: 95 ohms
- Capacitance: 16.7 pF/ft
- Velocity of Propagation: 64%
- DC Loop Resistance: 168.2 ohms/1000 ft
- Insulation Resistance: 52,000 megohms-1000ft
- Maximum Operating Voltage: 2,000 volts, RMS
- Dielectric Strength: 7,500 volts, RMS

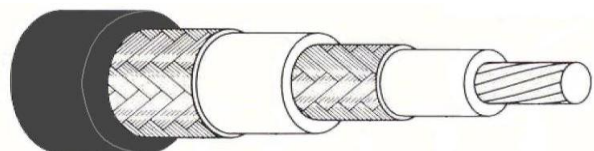
#### Industry Compliances:

- Class 1E Qualified in accordance with IEEE 323-1974 and IEEE 383-1974
- ICEA S-73-532

#### Other:

- Quality Assurance program in accordance with NRC 10CFR50 Appendix B
- ANSI 45.2
- ASME NQA-1
- NIAC
- NUPIC

## Ultrol® 75 Ohm Coax, Class 1E Nuclear RG-11A/U Equivalent, TS75285



### Product Construction:

#### Conductor:

- 19 AWG (7/27) tinned copper
- O.D.: .043" nom.

#### Insulation:

- Flame Retardant, heat, moisture and radiation resistant, thermoset Ultrol® Cross-linked Polyethylene
- Wall: .121" nom.—O.D.: .285" nom.

#### Inner Shield:

- 33 AWG tinned copper braid, 95% min. coverage

#### Intershield Insulation:

- Flame retardant, heat, moisture and radiation resistant, thermoset Ultrol® Cross-linked Polyethylene
- Wall: .025" nom.—O.D.: .365" nom.

#### Outer Shield:

- 33 AWG tinned copper braid, 95% min. coverage

#### Jacket:

- Heavy-duty Chlorosulphonated Polyethylene (CSPE) – Black
- Wall: .042" nom.—O.D.: .465" ± .010"

#### Print:

- GENERAL CABLE® BRAND REX BRAND (WC) TS75285 TRIAXIAL RG-11A/U TYPE PLUS DAY/MONTH/YEAR OF MANUFACTURE UNIQUE SERIAL NUMBER SEQUENTIAL FOOTAGE MARK

#### Feature:

- Meets cold bend test at -40°C

#### Cable weight:

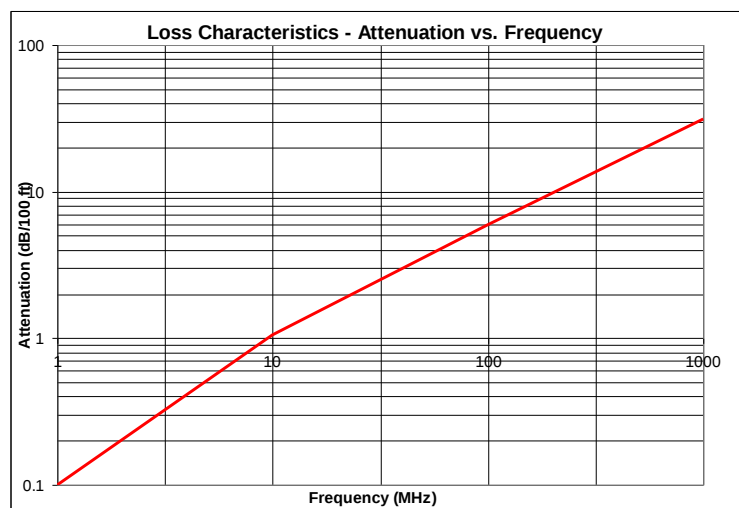
- 164.5 lbs/1000 ft

#### Catalog Number:

- Brand-Rex: TS75285
- General Cable: 204250

#### Options:

- Armor – braid or interlocked armor
- Flame retardant, heat, moisture and radiation resistant, thermoset Ultrol® Cross-linked Polyethylene jacket



### Mechanical Data:

- Bend Radius:
  - 3.72" (Training)
  - 5.58" (Pulling)
- Cable Area: .181 in<sup>2</sup>
- Braid strength: 160 lbs

### Electrical Characteristics:

- Impedance: 75 ohms
- Capacitance: 21.2 pF/ft
- Velocity of Propagation: 64%
- DC Loop Resistance: 8.83 ohms/1000 ft
- Insulation Resistance: 40,000 megohms–1000ft
- Maximum Operating Voltage: 4,000 volts, RMS
- Dielectric Strength: 10,000 volts, RMS

### Industry Compliances:

- Class 1E Qualified in accordance with IEEE 323-1974 and IEEE 383-1974
- ICEA S-73-532

### Other:

- Quality Assurance program in accordance with NRC 10CFR50 Appendix B
- ANSI 45.2
- ASME NQA-1
- NIAC
- NUPIC

# ULTROL® Nuclear Cables Catalog

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### 3. Industry Approvals and Certifications

# ULTROL® ... Still Ahead of Its Time After 35 Years

## Class 1E Nuclear Rated Cables

### Approvals and Certifications

General Cable's Ultrol® products have demonstrated their ability to deliver 40 years of reliable service by passing the stringent Loss of Coolant Accident (LOCA) and Steam Line Break (SLB) tests as well as postulated Design Basis Event (DBE) testing. All of General Cable's nuclear-rated 1E products meet IEEE 323-1974 and IEEE 383-1974 requirements.

| Compliance Standards                                                                                                                                                                                                                                                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• ANSI</li><li>• ICEA</li><li>• IEEE</li></ul>                                                                                                                                                                                 |
| Franklin Qualification Reports                                                                                                                                                                                                                                       |
| <ul style="list-style-type: none"><li>• F-C5120-1 – 300 V &amp; 600 V Constructions</li><li>• F-C5120-2 – Coaxial / Triaxial Constructions</li><li>• F-C5120-3 – All Constructions, 150 Day Total Testing Period</li><li>• F-C5120-4 – 300 V Constructions</li></ul> |

Every Ultrol cable is manufactured in conformance with the documented General Cable Quality Assurance program for Nuclear Facilities and Quality Control procedures, all under our ISO 9001:2008, ASME NQA-1:1994 and ASME NQA-1:2008 (and 2009 Supplemental) commitment-to-quality organization. General Cable's facility has maintained its nuclear status through regular audits by industry committees such as the Nuclear Procurement Issues Committee and several other quality assurance organizations.

| Quality Assurance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• International Standards Organization – ISO 9001:2008</li><li>• American National Standards Institute – ANSI N45.2</li><li>• American Society of Mechanical Engineers – ASME NQA-1:1994 and ASME NQA-1:2008 (and 2009 Supplemental) Nuclear Regulatory Commission – NRC 10 CFR 50 Appendix B</li><li>• Nuclear Regulatory Commission – NRC 10 CFR 50 Appendix B</li><li>• Nuclear Procurement Issues Committee (NUPIC)</li><li>• Nuclear Industry Assessment Committee (NIAC)</li></ul> |

# **ULTROL<sup>®</sup> Class 1E Nuclear Rated Cables**

## **Nuclear Procurement Issues Committee (NUPIC)**

Since March of 1993, the Willimantic, CT facility has maintained compliance with the standards set by the Nuclear Procurement Issues Committee (NUPIC). Every thirty months a team of five (Utility lead auditors and technical specialist) evaluate our Quality System and manufacturing operation's ability to successfully supply Class 1E instrumentation, power and control wire and cable for the nuclear industry. The audit scope includes ASME NQA-1:2008 and 2009 supplemental, 10 CFR 50 Appendix "B", 10 CFR 21. Last audit: June, 2010.

## **Nuclear Industry Assessment Committee (NIAC)**

General Cable, Willimantic, maintains compliance with the standards set by the Nuclear Industry Assessment Committee (NIAC). NIAC conducts an assessment every three years. Their assessment has verified our compliance with our own Quality Policy and procedures as well as compliance with 10 CFR 50 Appendix "B", 10 CFR 21, ASME NQA-1 and ANSI N45.2. Last audit: June, 2009.



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## Class 1E Nuclear Grade Cables and Qualification Report Identification

| Cable Type                                                 | Qualification Report No.                      | Construction                                        |                                                                       |
|------------------------------------------------------------|-----------------------------------------------|-----------------------------------------------------|-----------------------------------------------------------------------|
| Power & Control                                            | Franklin Report C5120-1<br>(08/19/80)         | 1/C #16<br>1/C #12<br>1/C #02<br>2/C #16<br>7/C #12 | FR-XLPE<br>FR-XLPE<br>FR-XLPE<br>FR-XLPE/Hypalon®<br>FR-XLPE/Hypalon® |
| Power & Control                                            | Franklin Report with Supplement<br>(01/08/81) | 1/C #16<br>1/C #12<br>1/C #02<br>2/C #16<br>7/C #12 | FR-XLPE<br>FR-XLPE<br>FR-XLPE<br>FR-XLPE/Hypalon®<br>FR-XLPE/Hypalon® |
| Coaxial and Triaxial                                       | Franklin Report C5120-2<br>(09/02/80)         | CS75285 (RG-11A/U)<br>CS75146 (RG-59B/U)            | FR-XLPE/Hypalon®<br>FR-XLPE/Hypalon®                                  |
| Power & Control<br>Instrumentation<br>Coaxial and Triaxial | Franklin Report C5120-3<br>(11/18/81)         | 1/C #16<br>1/C #12<br>1/C #02<br>CS75146 (RG-59B/U) | FR-XLPE<br>FR-XLPE<br>FR-XLPE<br>FR-XLPE/Hypalon®                     |
| Instrumentation                                            | Franklin Report C5120-4<br>(01/11/82)         | 1PR/#16                                             | FR-XLPE/Hypalon®                                                      |

# ULTROL® Nuclear Cables Catalog

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### 4. Technical Information

- **SPEC A101** — Common Color Sequence
- **SPEC A125** — Temperature Conversion Table
- **SPEC A150** — Metric Conversion
- **SPEC B025** — Class B Conductors for General Wiring
- **SPEC B030** — Class C Conductors for General Wiring
- **SPEC B035** — Class H Conductors for General Wiring
- **SPEC B040** — Class I Conductors for General Wiring
- **SPEC B045** — Class K Conductors for General Wiring
- **SPEC D005** — Recommended Reel Handling Practices
- **SPEC D026** — Recommended Cable Handling Practices
- **SPEC D050** — Recommended Cable Storage Practices
- **SPEC E005** — Pre-Installation Instructions
- **SPEC E025** — Installation — Overview and Checklist
- **SPEC E050** — Installation — Feed-In Setups
- **SPEC E075** — Installation — Conductor Maximum Pulling Tensions
- **SPEC E125** — Installation — Maximum Sidewall Pressure & Approval List of Cable Pulling Lubricants

# Common Color Sequence

## Method 1 - Table E1 Color Sequence

| CONDUCTOR<br>NUMBER | BACKGROUND<br>OR BASE<br>COLOR | FIRST<br>TRACER<br>COLOR | SECOND<br>TRACER<br>COLOR | CONDUCTOR<br>NUMBER | BACKGROUND<br>OR BASE<br>COLOR | FIRST<br>TRACER<br>COLOR | SECOND<br>TRACER<br>COLOR |
|---------------------|--------------------------------|--------------------------|---------------------------|---------------------|--------------------------------|--------------------------|---------------------------|
| 1                   | Black                          | -                        | -                         | 20                  | Red                            | Green                    | -                         |
| 2                   | White                          | -                        | -                         | 21                  | Orange                         | Green                    | -                         |
| 3                   | Red                            | -                        | -                         | 22                  | Black                          | White                    | Red                       |
| 4                   | Green                          | -                        | -                         | 23                  | White                          | Black                    | Red                       |
| 5                   | Orange                         | -                        | -                         | 24                  | Red                            | Black                    | White                     |
| 6                   | Blue                           | -                        | -                         | 25                  | Green                          | Black                    | White                     |
| 7                   | White                          | Black                    | -                         | 26                  | Orange                         | Black                    | White                     |
| 8                   | Red                            | Black                    | -                         | 27                  | Blue                           | Black                    | White                     |
| 9                   | Green                          | Black                    | -                         | 28                  | Black                          | Red                      | Green                     |
| 10                  | Orange                         | Black                    | -                         | 29                  | White                          | Red                      | Green                     |
| 11                  | Blue                           | Black                    | -                         | 30                  | Red                            | Black                    | Green                     |
| 12                  | Black                          | White                    | -                         | 31                  | Green                          | Black                    | Orange                    |
| 13                  | Red                            | White                    | -                         | 32                  | Orange                         | Black                    | Green                     |
| 14                  | Green                          | White                    | -                         | 33                  | Blue                           | White                    | Orange                    |
| 15                  | Blue                           | White                    | -                         | 34                  | Black                          | White                    | Orange                    |
| 16                  | Black                          | Red                      | -                         | 35                  | White                          | Red                      | Orange                    |
| 17                  | White                          | Red                      | -                         | 36                  | Orange                         | White                    | Blue                      |
| 18                  | Orange                         | Red                      | -                         | 37                  | White                          | Red                      | Blue                      |
| 19                  | Blue                           | Red                      | -                         |                     |                                |                          |                           |

Pair cables are Black, White and numbered. Triad cables are Black, White, Red and numbered.

## Method 1 - Table E2 Color Sequence

| CONDUCTOR<br>NUMBER | BACKGROUND<br>OR BASE<br>COLOR | TRACER<br>COLOR | CONDUCTOR<br>NUMBER | BACKGROUND<br>OR BASE<br>COLOR | TRACER<br>COLOR |
|---------------------|--------------------------------|-----------------|---------------------|--------------------------------|-----------------|
| 1                   | Black                          | -               | 19                  | Orange                         | Blue            |
| 2                   | Red                            | -               | 20                  | Yellow                         | Blue            |
| 3                   | Blue                           | -               | 21                  | Brown                          | Blue            |
| 4                   | Orange                         | -               | 22                  | Black                          | Orange          |
| 5                   | Yellow                         | -               | 23                  | Red                            | Orange          |
| 6                   | Brown                          | -               | 24                  | Blue                           | Orange          |
| 7                   | Red                            | Black           | 25                  | Yellow                         | Orange          |
| 8                   | Blue                           | Black           | 26                  | Brown                          | Orange          |
| 9                   | Orange                         | Black           | 27                  | Black                          | Yellow          |
| 10                  | Yellow                         | Black           | 28                  | Red                            | Yellow          |
| 11                  | Brown                          | Black           | 29                  | Blue                           | Yellow          |
| 12                  | Black                          | Red             | 30                  | Orange                         | Yellow          |
| 13                  | Blue                           | Red             | 31                  | Brown                          | Yellow          |
| 14                  | Orange                         | Red             | 32                  | Black                          | Brown           |
| 15                  | Yellow                         | Red             | 33                  | Red                            | Brown           |
| 16                  | Brown                          | Red             | 34                  | Blue                           | Brown           |
| 17                  | Black                          | Blue            | 35                  | Orange                         | Brown           |
| 18                  | Red                            | Blue            | 36                  | Yellow                         | Brown           |

Pair cables are Black, Red and numbered. Triad cables are Black, Red, Blue and numbered. Colors repeat after 36 conductors. There are no Green or White conductors or stripes.

## Method 3 - Table E1 Color Sequence

| CONDUCTOR<br>NUMBER | CONDUCTOR PRINTING |
|---------------------|--------------------|
| 1                   | "1-Black"          |
| 2                   | "2-White"          |
| 3                   | "3-Red"            |
| 4                   | "4-Green"          |

## Method 3 - Table E2 Color Sequence

| CONDUCTOR<br>NUMBER | CONDUCTOR PRINTING |
|---------------------|--------------------|
| 1                   | "1-Black"          |
| 2                   | "2-Red"            |
| 3                   | "3-Blue"           |
| 4                   | "4-Orange"         |

## Method 4 - All Conductors Black

| CONDUCTOR<br>NUMBER | CONDUCTOR PRINTING |
|---------------------|--------------------|
| 1                   | "1-One"            |
| 2                   | "2-Two"            |
| 3                   | "3-Three"          |
| 4                   | "4-Four"           |
| 5                   | "5-Five"           |



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# Temperature Conversion Table

Read known temperature in bold face type. Corresponding temperature in degrees Fahrenheit will be found in column to the right. Corresponding temperature in degrees Centigrade will be found in column to the left.

| -5 to -100 |             |      | 0 TO 100 |           |       |      |            |       | 100 TO 500 |            |     |
|------------|-------------|------|----------|-----------|-------|------|------------|-------|------------|------------|-----|
| °C         |             | °F   | °C       |           | °F    | °C   |            | °F    | °C         |            | °F  |
| -73.3      | <b>-100</b> | -148 | -17.8    | <b>0</b>  | 32.0  | 10.0 | <b>50</b>  | 122.0 | 38         | <b>100</b> | 212 |
| -70.5      | <b>- 95</b> | -139 | -17.2    | <b>1</b>  | 33.8  | 10.6 | <b>51</b>  | 123.8 | 43         | <b>110</b> | 230 |
| -67.8      | <b>- 90</b> | -130 | -16.7    | <b>2</b>  | 35.6  | 11.1 | <b>52</b>  | 125.6 | 49         | <b>120</b> | 248 |
| -65.0      | <b>- 85</b> | -121 | -16.1    | <b>3</b>  | 37.4  | 11.7 | <b>53</b>  | 127.4 | 54         | <b>130</b> | 266 |
| -62.2      | <b>- 80</b> | -112 | -15.6    | <b>4</b>  | 39.2  | 12.2 | <b>54</b>  | 129.2 | 60         | <b>140</b> | 284 |
| -59.5      | <b>- 75</b> | -103 | -15.0    | <b>5</b>  | 41.0  | 12.8 | <b>55</b>  | 131.0 | 66         | <b>150</b> | 302 |
| -56.7      | <b>- 70</b> | - 94 | -14.4    | <b>6</b>  | 42.8  | 13.3 | <b>56</b>  | 132.8 | 71         | <b>160</b> | 320 |
| -53.9      | <b>- 65</b> | - 85 | -13.9    | <b>7</b>  | 44.6  | 13.9 | <b>57</b>  | 134.6 | 77         | <b>170</b> | 338 |
| -51.1      | <b>- 60</b> | - 76 | -13.3    | <b>8</b>  | 46.4  | 14.4 | <b>58</b>  | 136.4 | 82         | <b>180</b> | 356 |
| -48.3      | <b>- 55</b> | - 67 | -12.8    | <b>9</b>  | 48.2  | 15.0 | <b>59</b>  | 138.2 | 88         | <b>190</b> | 374 |
| -45.6      | <b>- 50</b> | - 58 | -12.2    | <b>10</b> | 50.0  | 15.6 | <b>60</b>  | 140.0 | 93         | <b>200</b> | 392 |
| -42.8      | <b>- 45</b> | - 49 | -11.7    | <b>11</b> | 51.8  | 16.1 | <b>61</b>  | 141.8 | 99         | <b>210</b> | 410 |
| -40.0      | <b>- 40</b> | - 40 | -11.1    | <b>12</b> | 53.6  | 16.7 | <b>62</b>  | 143.6 | 100        | <b>212</b> | 413 |
| -37.2      | <b>- 35</b> | - 31 | -10.6    | <b>13</b> | 55.4  | 17.2 | <b>63</b>  | 145.4 | 104        | <b>220</b> | 428 |
| -34.4      | <b>- 30</b> | - 22 | -10.0    | <b>14</b> | 57.2  | 17.8 | <b>64</b>  | 147.2 | 110        | <b>230</b> | 446 |
| -31.6      | <b>- 25</b> | - 13 | -9.44    | <b>15</b> | 59.0  | 18.3 | <b>65</b>  | 149.0 | 116        | <b>240</b> | 464 |
| -28.9      | <b>- 20</b> | - 4  | -8.89    | <b>16</b> | 60.8  | 18.9 | <b>66</b>  | 150.8 | 121        | <b>250</b> | 482 |
| -26.1      | <b>- 15</b> | 5    | -8.33    | <b>17</b> | 62.6  | 19.4 | <b>67</b>  | 152.6 | 127        | <b>260</b> | 500 |
| -23.3      | <b>- 10</b> | 14   | -7.78    | <b>18</b> | 64.4  | 20.0 | <b>68</b>  | 154.4 | 132        | <b>270</b> | 518 |
| -20.5      | <b>- 5</b>  | 23   | -7.22    | <b>19</b> | 66.2  | 20.6 | <b>69</b>  | 156.2 | 138        | <b>280</b> | 536 |
|            |             |      | -6.67    | <b>20</b> | 68.0  | 21.1 | <b>70</b>  | 158.0 | 143        | <b>290</b> | 554 |
|            |             |      | -6.11    | <b>21</b> | 69.8  | 21.7 | <b>71</b>  | 159.8 | 149        | <b>300</b> | 572 |
|            |             |      | -5.56    | <b>22</b> | 71.6  | 22.2 | <b>72</b>  | 161.6 | 154        | <b>310</b> | 590 |
|            |             |      | -5.00    | <b>23</b> | 73.4  | 22.8 | <b>73</b>  | 163.4 | 160        | <b>320</b> | 608 |
|            |             |      | -4.44    | <b>24</b> | 75.2  | 23.3 | <b>74</b>  | 165.2 | 166        | <b>330</b> | 626 |
|            |             |      | -3.89    | <b>25</b> | 77.0  | 23.9 | <b>75</b>  | 167.0 | 171        | <b>340</b> | 644 |
|            |             |      | -3.33    | <b>26</b> | 78.8  | 24.4 | <b>76</b>  | 168.8 | 177        | <b>350</b> | 662 |
|            |             |      | -2.78    | <b>27</b> | 80.6  | 25.0 | <b>77</b>  | 170.6 | 182        | <b>360</b> | 680 |
|            |             |      | -2.22    | <b>28</b> | 82.4  | 25.6 | <b>78</b>  | 172.4 | 188        | <b>370</b> | 698 |
|            |             |      | -1.67    | <b>29</b> | 84.2  | 26.1 | <b>79</b>  | 174.2 | 193        | <b>380</b> | 716 |
|            |             |      | -1.11    | <b>30</b> | 86.0  | 26.7 | <b>80</b>  | 176.0 | 199        | <b>390</b> | 734 |
|            |             |      | -0.56    | <b>31</b> | 87.8  | 27.2 | <b>81</b>  | 177.8 | 204        | <b>400</b> | 752 |
|            |             |      | 0        | <b>32</b> | 89.6  | 27.8 | <b>82</b>  | 179.6 | 210        | <b>410</b> | 770 |
|            |             |      | 0.56     | <b>33</b> | 91.4  | 28.3 | <b>83</b>  | 181.4 | 216        | <b>420</b> | 788 |
|            |             |      | 1.11     | <b>34</b> | 93.2  | 28.9 | <b>84</b>  | 183.2 | 221        | <b>430</b> | 806 |
|            |             |      | 1.67     | <b>35</b> | 95.0  | 29.4 | <b>85</b>  | 185.0 | 227        | <b>440</b> | 824 |
|            |             |      | 2.22     | <b>36</b> | 96.8  | 30.0 | <b>86</b>  | 186.8 | 232        | <b>450</b> | 842 |
|            |             |      | 2.78     | <b>37</b> | 98.6  | 30.6 | <b>87</b>  | 188.6 | 238        | <b>460</b> | 860 |
|            |             |      | 3.33     | <b>38</b> | 100.4 | 31.1 | <b>88</b>  | 190.4 | 243        | <b>470</b> | 878 |
|            |             |      | 3.89     | <b>39</b> | 102.2 | 31.7 | <b>89</b>  | 192.2 | 249        | <b>480</b> | 896 |
|            |             |      | 4.44     | <b>40</b> | 104.0 | 32.2 | <b>90</b>  | 194.0 | 254        | <b>490</b> | 914 |
|            |             |      | 5.00     | <b>41</b> | 105.8 | 32.8 | <b>91</b>  | 195.8 | 260        | <b>500</b> | 932 |
|            |             |      | 5.56     | <b>42</b> | 107.6 | 33.3 | <b>92</b>  | 197.6 |            |            |     |
|            |             |      | 6.11     | <b>43</b> | 109.4 | 33.9 | <b>93</b>  | 199.4 |            |            |     |
|            |             |      | 6.67     | <b>44</b> | 111.2 | 34.4 | <b>94</b>  | 201.2 |            |            |     |
|            |             |      | 7.22     | <b>45</b> | 113.0 | 35.0 | <b>95</b>  | 203.0 |            |            |     |
|            |             |      | 7.78     | <b>46</b> | 114.8 | 35.6 | <b>96</b>  | 204.8 |            |            |     |
|            |             |      | 8.33     | <b>47</b> | 116.6 | 36.1 | <b>97</b>  | 206.6 |            |            |     |
|            |             |      | 8.89     | <b>48</b> | 118.4 | 36.7 | <b>98</b>  | 208.4 |            |            |     |
|            |             |      | 9.44     | <b>49</b> | 120.2 | 37.2 | <b>99</b>  | 210.2 |            |            |     |
|            |             |      |          |           |       | 37.8 | <b>100</b> | 212.0 |            |            |     |

## Interpolation Factors

| °C   |   | °F  | °C   |   | °F   | °C   |   | °F   |
|------|---|-----|------|---|------|------|---|------|
| 0.56 | 1 | 1.8 | 2.22 | 4 | 7.2  | 3.89 | 7 | 12.6 |
| 1.11 | 2 | 3.6 | 2.78 | 5 | 9.0  | 4.44 | 8 | 14.4 |
| 1.67 | 3 | 5.4 | 3.33 | 6 | 10.8 | 5.00 | 9 | 16.2 |

# Metric Conversion Factors

|                   | To Convert From                              | To                    | Multiply By            |
|-------------------|----------------------------------------------|-----------------------|------------------------|
| <b>Length</b>     | Inches                                       | Millimeters           | 25.4                   |
|                   | Millimeters                                  | Inches                | 0.03937                |
|                   | Inches                                       | Centimeters           | 2.54                   |
|                   | Centimeters                                  | Inches                | 0.3937                 |
|                   | Feet                                         | Meters                | 0.3048                 |
|                   | Meters                                       | Feet                  | 3.2808                 |
|                   | kilofeet (1000 ft)                           | kilometers            | 0.3048                 |
|                   | kilometers                                   | kilofeet (1000 ft)    | 3.2808                 |
| <b>Area</b>       | Square Inches                                | Square Millimeters    | 645.16                 |
|                   | Square Millimeters                           | Square Inches         | 0.00155                |
|                   | Square Inches                                | Square Centimeters    | 6.4516                 |
|                   | Square Centimeters                           | Square Inches         | 0.155                  |
|                   | Square Inches                                | Circular Mils         | 1,273,240              |
|                   | Circular Mils                                | Square Inches         | $7.854 \times 10^{-7}$ |
|                   | Circular Mils                                | Square Millimeters    | $5.066 \times 10^4$    |
|                   | Square Millimeters                           | Circular Mils         | 1973.51                |
| <b>Weight</b>     | Square Feet                                  | Square Meters         | 0.0929                 |
|                   | Square Meters                                | Square Feet           | 10.764                 |
|                   | Pounds                                       | Kilograms             | 0.4536                 |
|                   | Kilograms                                    | Pounds                | 2.2046                 |
|                   | Pound/Kilofeet                               | Kilograms/Kilometer   | 1.4882                 |
|                   | Kilograms/Kilometer                          | Pounds/Kilofeet       | 0.6720                 |
|                   | Ohms/Kilofeet                                | Ohms/Kilometer        | 3.2808                 |
|                   | Ohms/Kilometer                               | Ohms/Kilofeet         | 0.3048                 |
| <b>Electrical</b> | Microfarads/Kilofeet                         | Microfarads/Kilometer | 3.2808                 |
|                   | Microfarads/Kilometer                        | Microfarads/Kilofeet  | 0.3048                 |
|                   | Insulation Resistance:<br>Megohms — Kilofeet | Megohms — Kilometer   | 0.3048                 |
|                   | Megohms — Kilometer                          | Megohms — Kilofeet    | 3.2808                 |
| <b>Mechanical</b> | Pounds/Square Inch                           | Kilo Pascal*          | 6.895                  |
|                   | Kilo Pascal*                                 | Pounds/Square Inch    | 0.1432                 |
|                   | Pounds (force)                               | Newtons               | 4.448                  |

\* 1 Pascal = 1 newton/m<sup>2</sup>

# Class B Conductors for General Wiring

## Copper Conductor

### ASTM CLASS B

| COND. SIZE<br>AWG/kcmil | STRANDING<br>INCHES | NOMINAL AREA  |                 | NOMINAL WEIGHT           |         | CONCENTRIC<br>NOMINAL O.D. |       | COMPRESSED<br>NOMINAL O.D. |       | COMPACT<br>NOMINAL O.D. |       |
|-------------------------|---------------------|---------------|-----------------|--------------------------|---------|----------------------------|-------|----------------------------|-------|-------------------------|-------|
|                         |                     | CIRCULAR MILS | mm <sup>2</sup> | LBS/1000 FT <sup>1</sup> | kg/km   | INCHES                     | mm    | INCHES                     | mm    | INCHES                  | mm    |
| 22                      | 7/.0096             | 640           | 0.32            | 1.99                     | 2.96    | 0.029                      | 0.74  | —                          | —     | —                       | —     |
| 20                      | 7/.0121             | 1,020         | 0.52            | 3.15                     | 4.69    | 0.036                      | 0.91  | —                          | —     | —                       | —     |
| 18                      | 7/.0152             | 1,620         | 0.82            | 5.10                     | 7.59    | 0.046                      | 1.17  | —                          | —     | —                       | —     |
| 16                      | 7/.0192             | 2,580         | 1.31            | 7.74                     | 11.52   | 0.058                      | 1.47  | —                          | —     | —                       | —     |
| 14                      | 7/.0242             | 4,110         | 2.08            | 12.70                    | 18.90   | 0.073                      | 1.84  | 0.071                      | 1.80  | —                       | —     |
| 12                      | 7/.0305             | 6,530         | 3.31            | 20.20                    | 30.10   | 0.092                      | 2.32  | 0.089                      | 2.26  | —                       | —     |
| 10                      | 7/.0385             | 10,380        | 5.26            | 32.10                    | 47.80   | 0.116                      | 2.95  | 0.113                      | 2.87  | —                       | —     |
| 8                       | 7/.0486             | 16,510        | 8.36            | 51                       | 75.90   | 0.146                      | 3.71  | 0.142                      | 3.60  | 0.134                   | 3.40  |
| 6                       | 7/.0612             | 26,240        | 13.30           | 81.10                    | 120.70  | 0.184                      | 4.67  | 0.178                      | 4.53  | 0.169                   | 4.29  |
| 4                       | 7/.0772             | 41,740        | 21.20           | 129                      | 192     | 0.232                      | 5.89  | 0.225                      | 5.72  | 0.213                   | 5.41  |
| 2                       | 7/.0974             | 66,360        | 33.60           | 205                      | 305.10  | 0.292                      | 7.42  | 0.283                      | 7.19  | 0.268                   | 6.81  |
| 1                       | 19/.0664            | 83,690        | 42.40           | 258                      | 383.90  | 0.332                      | 8.43  | 0.322                      | 8.18  | 0.299                   | 7.59  |
| 1/0                     | 19/.0745            | 105,600       | 53.50           | 326                      | 485.10  | 0.373                      | 9.47  | 0.362                      | 9.19  | 0.336                   | 8.53  |
| 2/0                     | 19/.0837            | 133,100       | 67.40           | 411                      | 611.60  | 0.419                      | 10.64 | 0.406                      | 10.32 | 0.376                   | 9.55  |
| 3/0                     | 19/.0940            | 167,800       | 85              | 518                      | 770.90  | 0.470                      | 11.94 | 0.456                      | 11.58 | 0.423                   | 10.74 |
| 4/0                     | 19/.1055            | 211,600       | 107             | 653                      | 971.80  | 0.528                      | 13.41 | 0.512                      | 13.01 | 0.475                   | 12.07 |
| 250                     | 37/.0822            | 250,000       | 127             | 772                      | 1148.90 | 0.575                      | 14.61 | 0.558                      | 14.17 | 0.520                   | 13.21 |
| 300                     | 37/.0900            | 300,000       | 152             | 926                      | 1378    | 0.630                      | 16.00 | 0.611                      | 15.52 | 0.570                   | 14.48 |
| 350                     | 37/.0973            | 350,000       | 177             | 1,081                    | 1609    | 0.681                      | 17.30 | 0.661                      | 16.78 | 0.616                   | 15.65 |
| 400                     | 37/.1040            | 400,000       | 203             | 1,235                    | 1838    | 0.728                      | 18.49 | 0.706                      | 17.94 | 0.659                   | 16.74 |
| 500                     | 37/.1162            | 500,000       | 253             | 1,544                    | 2298    | 0.813                      | 20.65 | 0.789                      | 20.03 | 0.736                   | 18.69 |
| 600                     | 61/.0992            | 600,000       | 304             | 1,883                    | 2802    | 0.893                      | 22.68 | 0.866                      | 22.00 | 0.813                   | 20.65 |
| 750                     | 61/.1109            | 750,000       | 380             | 2,316                    | 3447    | 0.998                      | 25.35 | 0.968                      | 24.59 | 0.908                   | 23.06 |
| 1000                    | 61/.1280            | 1,000,000     | 507             | 3,088                    | 4595    | 1.152                      | 29.26 | 1.117                      | 28.38 | 1.060                   | 26.92 |

Dimensions and weights are nominal; subject to industry tolerances.

<sup>1</sup> Nominal conductor weights are applicable for Concentric Class B and Compressed Stranding per ASTM B8.

# Class C Conductors for General Wiring

## Copper Conductor

### ASTM CLASS C

| SIZE      | STRANDING | NOMINAL AREA  |                 | NOMINAL DIAMETER |       | NOMINAL WEIGHT |       |
|-----------|-----------|---------------|-----------------|------------------|-------|----------------|-------|
| AWG/kcmil | INCHES    | CIRCULAR MILS | mm <sup>2</sup> | INCHES           | mm    | LBS/KFT        | kg/km |
| 22        | 19/.0063  | 640           | 0.32            | 0.031            | 0.79  | 2.34           | 3.48  |
| 20        | 19/.0080  | 1,020         | 0.52            | 0.038            | 0.97  | 3.71           | 5.52  |
| 18        | 19/.0092  | 1,620         | 0.82            | 0.044            | 1.12  | 5.00           | 7.40  |
| 16        | 19/.0117  | 2,580         | 1.31            | 0.056            | 1.42  | 7.97           | 11.86 |
| 14        | 19/.0147  | 4,110         | 2.08            | 0.070            | 1.80  | 12.70          | 18.90 |
| 12        | 19/.0185  | 6,530         | 3.31            | 0.089            | 2.24  | 20.20          | 30.10 |
| 10        | 19/.0234  | 10,380        | 5.26            | 0.112            | 2.85  | 32.05          | 47.80 |
| 9         | 19/.0262  | 13,090        | 6.63            | 0.126            | 3.20  | 40.40          | 60.10 |
| 8         | 19/.0295  | 16,510        | 8.37            | 0.143            | 3.63  | 51.00          | 74.40 |
| 7         | 19/.0331  | 20,820        | 10.50           | 0.162            | 4.11  | 64.30          | 95.70 |
| 6         | 19/.0372  | 26,240        | 13.30           | 0.184            | 4.67  | 81.00          | 121   |
| 5         | 19/.0417  | 33,090        | 16.80           | 0.203            | 5.16  | 102            | 152   |
| 4         | 19/.0469  | 41,740        | 21.20           | 0.235            | 5.97  | 129            | 192   |
| 3         | 19/.0526  | 52,620        | 26.70           | 0.263            | 6.68  | 163            | 243   |
| 2         | 19/.0591  | 66,360        | 33.60           | 0.296            | 7.52  | 205            | 305   |
| 1         | 37/.0476  | 83,690        | 42.40           | 0.323            | 8.20  | 258            | 384   |
| 1/0       | 37/.0534  | 105,600       | 53.50           | 0.362            | 9.20  | 326            | 485   |
| 2/0       | 37/.0600  | 133,100       | 67.40           | 0.407            | 10.33 | 411            | 612   |
| 3/0       | 37/.0673  | 167,800       | 85              | 0.457            | 11.60 | 518            | 771   |
| 4/0       | 37/.0756  | 211,600       | 107             | 0.513            | 13.03 | 653            | 972   |
| 250       | 31/.0640  | 250,000       | 127             | 0.558            | 14.17 | 774            | 1150  |
| 262.6     | —         | —             | —               | —                | —     | —              | —     |
| 300       | 61/.0701  | 300,000       | 152             | 0.612            | 15.54 | 927            | 1380  |
| 313.1     | —         | —             | —               | —                | —     | —              | —     |
| 350       | 61/.0757  | 350,000       | 177             | 0.661            | 16.79 | 1082           | 1610  |
| 373.7     | —         | —             | —               | —                | —     | —              | —     |
| 400       | 61/.0810  | 400,000       | 203             | 0.711            | 18.10 | 1235           | 1838  |
| 444.4     | —         | —             | —               | —                | —     | —              | —     |
| 500       | 61/.0905  | 500,000       | 253             | 0.791            | 20.10 | 1545           | 2299  |
| 535.3     | —         | —             | —               | —                | —     | —              | —     |
| 592       | —         | —             | —               | —                | —     | —              | —     |
| 600       | 91/.0812  | 600,000       | 304             | 0.893            | 22.70 | 1853           | 2757  |
| 646.4     | —         | —             | —               | —                | —     | —              | —     |
| 750       | 91/.0908  | 750,000       | 380             | 0.999            | 25.40 | 2316           | 3446  |
| 777.7     | —         | —             | —               | —                | —     | —              | —     |
| 1000      | 91/.1048  | 1,000,000     | 507             | 1.153            | 29.30 | 3088           | 4595  |
| 1111      | —         | —             | —               | —                | —     | —              | —     |

Dimensions and weights are nominal; subject to industry tolerances.

# Class H Conductors for General Wiring

## Copper Conductor

### ASTM CLASS H

| SIZE      | STRANDING | NOMINAL AREA  |                 | NOMINAL DIAMETER |       | NOMINAL WEIGHT |       |
|-----------|-----------|---------------|-----------------|------------------|-------|----------------|-------|
| AWG/kcmil | INCHES    | CIRCULAR MILS | mm <sup>2</sup> | INCHES           | mm    | LBS/KFT        | kg/km |
| 9         | —         | —             | —               | —                | —     | —              | —     |
| 8         | 133/.0111 | 16,510        | 8.37            | 0.164            | 4.17  | 52             | 77    |
| 7         | 133/.0126 | 20,820        | 10.50           | 0.190            | 4.83  | 67             | 100   |
| 6         | 133/.0140 | 26,240        | 13.30           | 0.204            | 5.18  | 82             | 122   |
| 5         | 133/.0158 | 33,090        | 16.80           | 0.231            | 5.87  | 105            | 156   |
| 4         | 133/.0177 | 41,740        | 21.20           | 0.260            | 6.60  | 132            | 196   |
| 3         | 133/.0199 | 52,620        | 26.70           | 0.292            | 7.42  | 167            | 248   |
| 2         | 133/.0223 | 66,360        | 33.60           | 0.327            | 8.31  | 208            | 310   |
| 1         | 259/.0180 | 83,690        | 42.40           | 0.363            | 9.22  | 266            | 396   |
| 1/0       | 259/.0202 | 105,600       | 53.50           | 0.407            | 10.30 | 334            | 497   |
| 2/0       | 259/.0227 | 133,100       | 67.40           | 0.458            | 11.60 | 422            | 628   |
| 3/0       | 259/.0255 | 167,800       | 85              | 0.515            | 13.10 | 533            | 793   |
| 4/0       | 259/.0286 | 211,600       | 107             | 0.579            | 14.70 | 670            | 997   |
| 250       | 427/.0242 | 250,000       | 127             | 0.627            | 15.90 | 795            | 1183  |
| 262.6     | —         | —             | —               | —                | —     | —              | —     |
| 300       | 427/.0265 | 300,000       | 152             | 0.702            | 17.80 | 953            | 1418  |
| 313.1     | —         | —             | —               | —                | —     | —              | —     |
| 350       | 427/.0286 | 350,000       | 177             | 0.740            | 18.80 | 1110           | 1652  |
| 373.7     | —         | —             | —               | —                | —     | —              | —     |
| 400       | 427/.0306 | 400,000       | 203             | 0.809            | 20.50 | 1270           | 1890  |
| 444.4     | —         | —             | —               | —                | —     | —              | —     |
| 500       | 427/.0342 | 500,000       | 253             | 0.900            | 22.90 | 1590           | 2366  |
| 535.3     | —         | —             | —               | —                | —     | —              | —     |
| 592       | —         | —             | —               | —                | —     | —              | —     |
| 600       | 703/.0292 | 600,000       | 304             | 1.022            | 26.00 | 1920           | 2857  |
| 646.4     | —         | —             | —               | —                | —     | —              | —     |
| 750       | 703/.0327 | 750,000       | 380             | 1.122            | 28.50 | 2410           | 3586  |
| 777.7     | —         | —             | —               | —                | —     | —              | —     |
| 1000      | 703/.0377 | 1,000,000     | 507             | 1.294            | 32.90 | 3205           | 4769  |
| 1111      | —         | —             | —               | —                | —     | —              | —     |

Dimensions and weights are nominal; subject to industry tolerances.

# Class I Conductors for General Wiring

## Copper Conductor

ASTM CLASS I

| SIZE      | STRANDING  | NOMINAL AREA  |                 | NOMINAL DIAMETER |       | NOMINAL WEIGHT |       |
|-----------|------------|---------------|-----------------|------------------|-------|----------------|-------|
| AWG/kcmil | INCHES     | CIRCULAR MILS | mm <sup>2</sup> | INCHES           | mm    | LBS/KFT        | kg/km |
| 10        | 27/.0201   | 10,910        | 5.53            | 0.117            | 2.97  | 33.70          | 50    |
| 9         | —          | —             | —               | —                | —     | —              | —     |
| 8         | 37/.0201   | 14,950        | 7.57            | 0.135            | 3.43  | 46             | 68    |
| 7         | —          | —             | —               | —                | —     | —              | —     |
| 6         | 61/.0201   | 24,640        | 12.50           | 0.174            | 4.42  | 77             | 114   |
| 5         | 91/.0201   | 36,760        | 19              | 0.242            | 6.15  | 116            | 173   |
| 4         | 105/.0201  | 42,420        | 21              | 0.262            | 6.60  | 137            | 204   |
| 3         | 126/.0201  | 50,500        | 25              | 0.285            | 7.24  | 167            | 249   |
| 2         | 147/.0201  | 60,600        | 31              | 0.307            | 7.80  | 190            | 283   |
| 1         | 224/.0201  | 90,900        | 46              | 0.380            | 9.65  | 287            | 427   |
| 1/0       | 273/.0201  | 111,100       | 56              | 0.410            | 10.41 | 351            | 522   |
| 2/0       | 323/.0201  | 131,300       | 66              | 0.470            | 11.90 | 407            | 606   |
| 3/0       | 456/.0201  | 184,200       | 92              | 0.549            | 13.94 | 594            | 884   |
| 4/0       | 551/.0201  | 222,600       | 112             | 0.593            | 14.70 | 696            | 1035  |
| 250       | —          | —             | —               | —                | —     | —              | —     |
| 262.6     | 646/.0201  | 261,000       | 133             | 0.630            | 16    | 820            | 1220  |
| 300       | —          | —             | —               | —                | —     | —              | —     |
| 313.1     | 777/.0201  | 313,900       | 159             | 0.685            | 17.40 | 987            | 1469  |
| 350       | —          | —             | —               | —                | —     | —              | —     |
| 373.7     | 925/.0201  | 373,700       | 189             | 0.750            | 19    | 1176           | 1750  |
| 400       | —          | —             | —               | —                | —     | —              | —     |
| 444.4     | 1110/.0201 | 448,400       | 225             | 0.820            | 20.80 | 1413           | 2103  |
| 500       | —          | —             | —               | —                | —     | —              | —     |
| 535.3     | 1332/.0201 | 538,100       | 271             | 0.895            | 22.70 | 1697           | 2525  |
| 592       | 1480/.0201 | 597,900       | 303             | 0.972            | 24.70 | 1858           | 2765  |
| 600       | —          | —             | —               | —                | —     | —              | —     |
| 646.4     | 1591/.0201 | 642,800       | 327             | 0.980            | 24.90 | 2020           | 3006  |
| 750       | —          | —             | —               | —                | —     | —              | —     |
| 777.7     | 1924/.0201 | 777,700       | 394             | 1.075            | 27.30 | 2435           | 3624  |
| 1000      | —          | —             | —               | —                | —     | —              | —     |
| 1111      | 2745/.0201 | 1,111,000     | 563             | 1.328            | 33.70 | 3400           | 5059  |

Dimensions and weights are nominal; subject to industry tolerances.

# Class K Conductors for General Wiring

## Copper Conductor

ASTM CLASS K

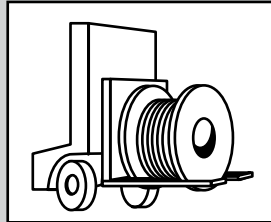
| SIZE      | STRANDING | NOMINAL AREA  |                 | NOMINAL DIAMETER |       | NOMINAL WEIGHT |       |
|-----------|-----------|---------------|-----------------|------------------|-------|----------------|-------|
| AWG/kcmil | INCHES    | CIRCULAR MILS | mm <sup>2</sup> | INCHES           | mm    | LBS/KFT        | kg/km |
| 22        | —         | —             | —               | —                | —     | —              | —     |
| 20        | 10/.010   | 1,020         | 0.52            | 0.036            | 0.91  | 3.2            | 4.8   |
| 18        | 16/.010   | 1,620         | 0.82            | 0.046            | 1.20  | 5              | 7.4   |
| 16        | 26/.010   | 2,580         | 1.31            | 0.057            | 1.40  | 7.97           | 12    |
| 14        | 41/.010   | 4,110         | 2.08            | 0.071            | 1.80  | 12.8           | 19    |
| 12        | 65/.010   | 6,530         | 3.31            | 0.088            | 2.20  | 20.3           | 30.2  |
| 10        | 105/.010  | 10,380        | 5.26            | 0.112            | 2.80  | 33.3           | 49.6  |
| 9         | 133/.010  | 13,090        | 6.63            | 0.150            | 3.80  | 42.4           | 63.1  |
| 8         | 168/.010  | 16,510        | 8.37            | 0.164            | 4     | 53.2           | 80.8  |
| 7         | 210/.010  | 20,820        | 10.50           | 0.175            | 4.40  | 66.8           | 99.4  |
| 6         | 266/.010  | 26,240        | 13.30           | 0.198            | 5.00  | 84.2           | 125   |
| 5         | 336/.010  | 33,090        | 16.80           | 0.261            | 6.60  | 106            | 158   |
| 4         | 420/.010  | 41,740        | 21.20           | 0.249            | 6.30  | 132            | 196   |
| 3         | 532/.010  | 52,620        | 26.70           | 0.298            | 7.60  | 169            | 251   |
| 2         | 665/.010  | 66,360        | 33.60           | 0.317            | 8.10  | 211            | 314   |
| 1         | 836/.010  | 83,690        | 42.40           | 0.356            | 9     | 266            | 396   |
| 1/0       | 1064/.010 | 105,600       | 53.50           | 0.401            | 10    | 338            | 503   |
| 2/0       | 1323/.010 | 133,100       | 67.40           | 0.501            | 13    | 425            | 632   |
| 3/0       | 1666/.010 | 167,800       | 85              | 0.562            | 14    | 535            | 796   |
| 4/0       | 2107/.010 | 211,600       | 107             | 0.627            | 15.93 | 676            | 1006  |
| 250       | 2499/.010 | 250,000       | 127             | 0.688            | 17    | 802            | 1193  |
| 262.6     | 2220/.010 | 222,000       | 112             | 0.680            | 17    | 824            | 1226  |
| 300       | 2989/.010 | 300,000       | 152             | 0.753            | 19    | 960            | 1428  |
| 313.1     | 3136/.010 | 313,600       | 159             | 0.750            | 19    | 969            | 1442  |
| 350       | 3458/.010 | 350,000       | 177             | 0.818            | 21    | 1120           | 1667  |
| 373.7     | 3737/.010 | 373,700       | 189             | 0.790            | 20    | 1210           | 1800  |
| 400       | 3990/.010 | 400,000       | 203             | 0.878            | 22    | 1290           | 1920  |
| 444.4     | —         | —             | —               | —                | —     | —              | —     |
| 500       | 5054/.010 | 500,000       | 253             | 0.990            | 25    | 1635           | 2433  |
| 535.3     | 5320/.010 | 532,000       | 270             | 0.950            | 24    | 1641           | 2442  |
| 592       | —         | —             | —               | —                | —     | —              | —     |
| 600       | 5985/.010 | 600,000       | 340             | 1.125            | 29    | 1950           | 2902  |
| 646.4     | 6466/.010 | 646,600       | 328             | 1.040            | 26    | 1987           | 2957  |
| 750       | 7448/.010 | 750,000       | 380             | 1.276            | 32    | 2427           | 3611  |
| 777.7     | —         | —             | —               | —                | —     | —              | —     |
| 1000      | 9975/.010 | 1,000,000     | 507             | 1.498            | 38    | 3250           | 4769  |
| 1111      | —         | —             | —               | —                | —     | —              | —     |

Dimensions and weights are nominal; subject to industry tolerances.

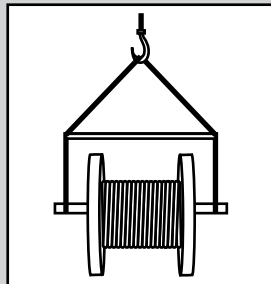
# Recommended Reel Handling Practices

## How to Handle Cable Reels

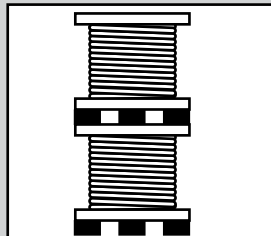
**YES**



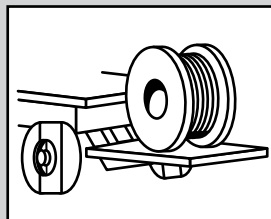
Cradle both reel flanges between forks.



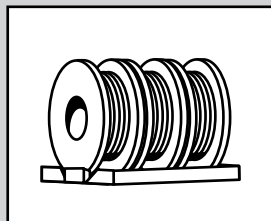
Reels can be hoisted with a shaft extended through both flanges.



Place spacers under the bottom flange and between reels to create a space to insert the forks.

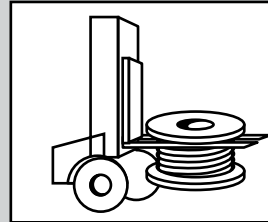


Lower reels from truck using hydraulic gate, hoist or fork lift. **LOWER CAREFULLY.**

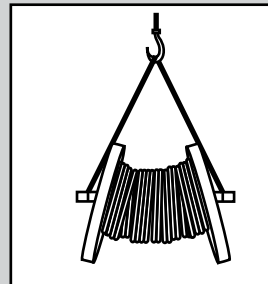


Always load with flanges on edge and chock and block securely.

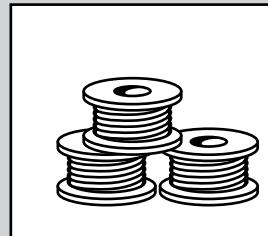
**NO**



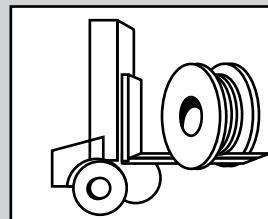
Do not lift by top flange. Cable or reel will be damaged.



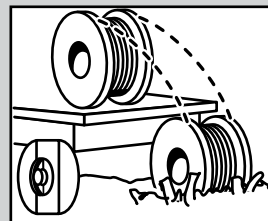
Use a spreader bar to prevent bending the reel flanges and mashing the cable.



Upended heavy reels will often arrive damaged. Refuse or receive subject to inspection for hidden damage.



Never allow forks to touch cable surface or reel wrap.



Never drop reels.

# Recommended Cable Handling Practices

## Unloading and Moving of Reels:

Cable reels are never shipped upended (flat side down). Cable reels that arrive in this manner should be rejected or received only after a thorough inspection for damage.

See “Recommended Reel Handling Practices” on the following pages.

Upon receipt, a cable’s protective covering and/or lagging should be inspected for evidence of damage during shipment. If evidence of damage is found, a report should immediately be made to the carrier.

Under no circumstances should reels be dropped from the delivering vehicle to the ground.

Unloading and reel handling should be accomplished so that the equipment used does not contact the cable surface, and in the case of protective wrap, that the equipment does not contact the protective wrap.

If unloading and reel handling is accomplished by crane, either a cradle supporting the reel flanges or a shaft through the arbor hole should be used. If a fork lift is utilized, the forks must lift the reel at 90° to the flanges and the forks must be long enough to make complete lifting contact with both flanges. Under no circumstances should the forks come into contact with the cable surface or the protective wraps.

When a reel of cable is rolled from one point to another, care must be taken to see that there are no objects on the surface area which could contact or damage the cable surface or protective wrap.

If an inclined ramp is used for unloading, the ramp must be wide enough to contact both flanges completely. The stopping of the reels at the bottom shall be accomplished by using the reel flanges and not the surface of the cable.

# Recommended Cable Storage Practices

## Storage and Storage Maintenance:

Finished cables have no established shelf-life. Moisture and atmospheric conditions can cause exposed conductors to oxidize and discolor. Uncovered/unsheltered cable will degrade due to exposure to direct sunlight and/or the elements. If the cables are protected, there should be no degradation of the insulation.

In general, any cable for use indoors should be stored indoors. Any cable suitable for installation outdoors is suitable for storage outdoors. Cables stored outdoors should have the ends sealed to prevent moisture ingress into the cable.

Cables should be stored in a sheltered area. While on the reel, cable should be covered with Masonite or a dark film wrap (to block the sun's rays and shield from the elements).

Cables with a cold temperature marking i.e.  $-10^{\circ}\text{C}$ ,  $-25^{\circ}\text{C}$ , or  $-40^{\circ}\text{C}$  may be stored outdoors. Cables without a cold temperature marking must be stored indoors.

Cable reels must remain in the upright position. Cable reels must not be stored on their sides. Reels must not be stacked.

Cable reels should be stored with the protective covering or lagging in place. If a length of cable has been cut from the reel, the cable end should be immediately resealed to prevent the entrance of moisture. If a part length is returned to storage, the reel's protective covering should be restored.

Wooden reels should be stored off the ground to prevent rotting. Reels should be stored on a flat, hard surface so that flanges do not sink into the earth. The weight of the reel and cable must be carried at all times by the reel flanges.

Cable reels and lagging must not be stored for an extended time period sitting in direct contact with water or dampness. Timbers or metal supports must be placed under the reel flanges to provide elevated storage of the reels away from the direct contact with water or damp soil.

Reels should be stored in an area where construction equipment, falling or flying objects or other materials will not contact the cable.

Cable should be stored in an area where chemicals or petroleum products will not be spilled or sprayed on the cable.

Cable should be stored in an area away from open fires or sources of high heat.

If the reels are relocated, they should be handled as suggested in the "Recommended Reel Handling Practices" section, and inspection made on each reel during the relocation.

If the cables are stored in a secure area and not exposed to the effects of the weather, an annual inspection should be satisfactory.

Where the reels are exposed to the weather, a bimonthly inspection should be performed to observe any sign of deterioration.

If the reels are exposed in a non-secure area, policing of the area at frequent intervals may be required depending on circumstances.

Records of delivery date, manufacturer, installation date, any extenuating circumstances, along with all test reports should be kept on file.

# Pre-Installation Instructions

## Pre-Installation

### Overview

To ensure safety during cable installation and reliability once the cable is installed, you should confirm the following prior to installation:

- The cable selected is proper for your application
- The cable has not been damaged in transit or storage

Review all applicable state and national codes to verify that the cable chosen is appropriate for the job. Also, consult your local building authority.

Next, you must identify any existing cable damage and prevent any further damage from occurring. This is done through proper cable inspection, handling and storage.

### Cable Inspection

Inspect every cable reel for damage before accepting the shipment. Be particularly alert for cable damage if:

- A reel is laying flat on its side
- Several reels are stacked
- Other freight is stacked on a reel
- Nails have been driven into reel flanges to secure shipping blocks
- A reel flange is damaged
- A cable covering is removed, stained or damaged
- A cable end seal is removed or damaged
- A reel has been dropped (hidden damage likely)

### Cabling Handling

Remove all nails and staples from the reel flanges before moving a reel, and avoid all objects that could crush, gouge or impact the cable when moving. NEVER use the cable as a means to move a reel.

When unreeling, observe recommended bending radii, use swivels to prevent twisting and avoid overruns.

# Installation—Overview and Checklist

## Installation

### Overview

Most cables are subjected to more mechanical stress during installation than they ever experience in actual operation. Needless to say, handling and pulling your cable according to manufacturer's recommendations is extremely important.

There are six main considerations in any cable installation:

- Ambient temperature
- Equipment
- Conduit fill
- Mechanical fit in raceway
- Physical limitations
- Knowledgeable installers

For more information, reference IEEE 1185 Recommended Practices for Cable Installations in Generating Stations and Industrial Facilities.

### Installation Temperature

Low temperatures are a cause for concern when installing cable. Cable should not be installed when temperatures are less than the cold bend temperature rating of the cable product plus 15°C (i.e., minimum installation temperature = cold bend temperature rating + 15°C). The cold bend temperature rating is indicated on the catalog Spec sheet.

Prior to performing a low temperature (less than 10°F or -12°C) cable installation, cable should be stored for a minimum of 24 hours at a temperature of 55°F (13°C) or higher.

Cable should be pulled more slowly and trained in place the same day it is removed from storage. Do not impact, drop, kink or bend cable sharply in low temperatures.

### Equipment

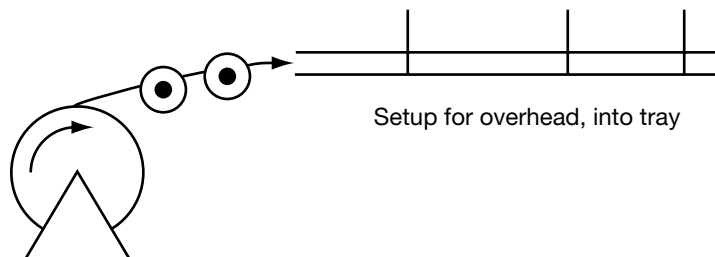
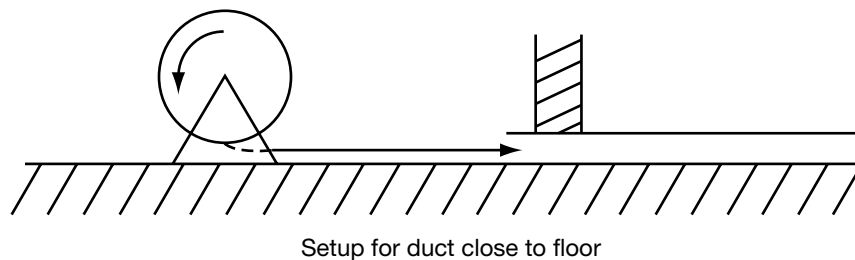
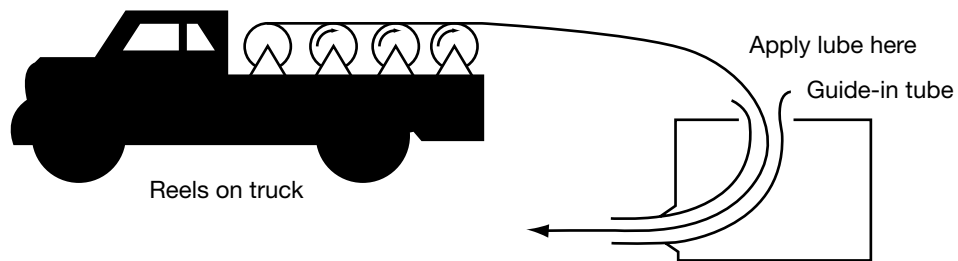
The proper use of appropriate equipment is crucial to a successful cable installation. The equipment needed for most installations is detailed in the following checklist:

- ☐ 0-1/5/10 kip dynamometer
- ☐ basket grip pullers
- ☐ cable cutter
- ☐ cable end seals
- ☐ cable pulling lubricant
- ☐ cable tray bend sheaves
- ☐ cable tray rollers
- ☐ capstan-type puller
- ☐ diameter tape
- ☐ duct cleaning mandrels
- ☐ electric safety blankets and clamps
- ☐ extension cords and GFCI protection
- ☐ fish tape or string blower/vacuum
- ☐ floodlights
- ☐ gang rollers: with at least 4 ft. effective radius
- ☐ gloves
- ☐ guide-in flexible tubing (elephant trunks)
- ☐ hand winches (come-a-long)
- ☐ HI-POT tester
- ☐ lint-free rags
- ☐ make-up air blower & hose
- ☐ manhole edge sheave
- ☐ measuring tape
- ☐ personal protection equipment (PPE)
- ☐ plywood sheets
- ☐ portable electric generator
- ☐ pre-lubing devices
- ☐ pulling rope
- ☐ pump, diaphragm
- ☐ radios or telephones
- ☐ reel arbor
- ☐ reel brakes
- ☐ reel jacks
- ☐ several wire rope slings of various lengths
- ☐ shackles/clevis
- ☐ short ropes for temp tie-offs
- ☐ swivels
- ☐ warning flags, signs

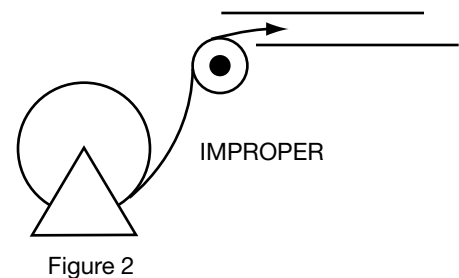
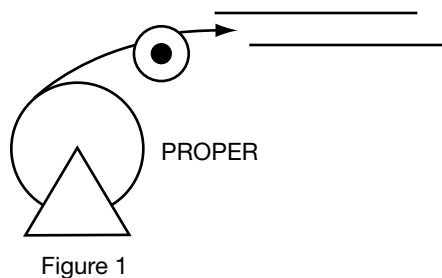
# Installation—Feed-In Setups

## Cable Feed-In Setups

The following diagrams illustrate various cable feed-in setups:



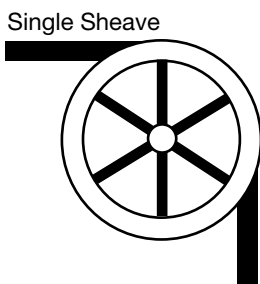
The feed-in setup should unreel the cable with a natural curvature (Figure 1) as opposed to a reverse "S" curvature (Figure 2).



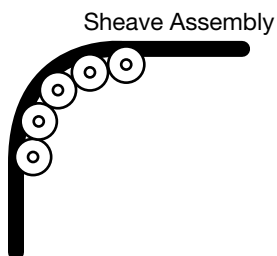
# Installation—Feed-In Setups

## Cable Feed-In Setups (continued)

Single sheaves should only be used for GUIDING cables. Arrange multiple blocks to maintain bending radii whenever cable changes direction or elevation.



For pulling around bends, use conveyor sheave assemblies of the appropriate radius series.



The pulleys must be positioned to ensure that the effective curvature is smooth and changes direction or elevation evenly at each pulley. Never allow a polygon curvature to occur (Figure 3).

The fit of a pulley around the cable is also important when pulling heavy weights (i.e. pulleys at the top of a vertical drop).

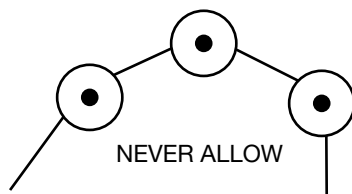
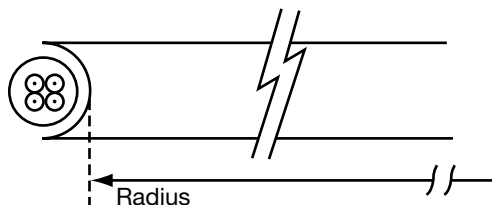


Figure 3

Remember to use the radius of the surface over which the cable is bent, not the outside flange diameter of the pulley. A "10 inch" cable sheave typically has a 10 inch outside flange diameter with a 6 inch inside diameter that provides an inside (bending) radius of 3 inches.



# Installation—Conductor Maximum Pulling Tensions

Multiconductor Cables Having Equal-Sized Conductors;  
In Parallel or as Multiplexed Assemblies

| AWG/kcmil | MAXIMUM ALLOWABLE PULLING TENSION (LBS) |       |       |       |       |       |
|-----------|-----------------------------------------|-------|-------|-------|-------|-------|
|           | NUMBER OF CONDUCTORS                    |       |       |       |       |       |
|           | 1                                       | 2     | 3     | 4     | 5     | 6     |
| 18        | 13                                      | 26    | 39    | 41    | 52    | 62    |
| 16        | 20                                      | 40    | 60    | 65    | 81    | 97    |
| 14        | 33                                      | 66    | 99    | 105   | 132   | 158   |
| 12        | 52                                      | 104   | 157   | 167   | 209   | 251   |
| 10        | 83                                      | 166   | 249   | 266   | 332   | 399   |
| 8         | 132                                     | 264   | 396   | 423   | 528   | 634   |
| 6         | 210                                     | 420   | 630   | 672   | 840   | 1008  |
| 4         | 334                                     | 668   | 1002  | 1069  | 1336  | 1603  |
| 2         | 531                                     | 1062  | 1593  | 1699  | 2124  | 2548  |
| 1         | 670                                     | 1339  | 2009  | 2142  | 2678  | 3214  |
| 1/0       | 845                                     | 1690  | 2534  | 2703  | 3379  | 4055  |
| 2/0       | 1065                                    | 2130  | 3194  | 3407  | 4259  | 5111  |
| 3/0       | 1342                                    | 2685  | 4027  | 4296  | 5370  | 6444  |
| 4/0       | 1693                                    | 3386  | 5078  | 5417  | 6771  | 8125  |
| 250       | 2000                                    | 4000  | 6000  | 6400  | 8000  | 9600  |
| 350       | 2800                                    | 5600  | 8400  | 8960  | 10000 | 10000 |
| 500       | 4000                                    | 8000  | 10000 | 10000 | 10000 | 10000 |
| 750       | 6000                                    | 10000 | 10000 | 10000 | 10000 | 10000 |
| 1000      | 8000                                    | 10000 | 10000 | 10000 | 10000 | 10000 |

The maximum allowable pulling tensions are for direct attachment to the conductor.

$T = 0.008 \times \text{cmil} \times n$ , if  $n \leq 3$

$T = 0.008 \times \text{cmil} \times n \times 0.8$ , if  $n > 3$

# Installation—Conductor Maximum Pulling Tensions

## Multiconductor Cables Having Equal-Sized Conductors, without Subassemblies

| Number Of Conductors | MAXIMUM ALLOWABLE PULLING TENSION (LBS) |     |     |      |      |
|----------------------|-----------------------------------------|-----|-----|------|------|
|                      | CONDUCTOR SIZE (AWG/kcmil)              |     |     |      |      |
|                      | 18                                      | 16  | 14  | 12   | 10   |
| 2                    | 26                                      | 40  | 66  | 104  | 166  |
| 3                    | 39                                      | 60  | 99  | 157  | 249  |
| 4                    | 41                                      | 65  | 105 | 167  | 266  |
| 5                    | 52                                      | 81  | 132 | 209  | 332  |
| 6                    | 62                                      | 97  | 158 | 251  | 399  |
| 7                    | 73                                      | 113 | 184 | 293  | 465  |
| 8                    | 83                                      | 129 | 210 | 334  | 531  |
| 9                    | 93                                      | 145 | 237 | 376  | 598  |
| 10                   | 104                                     | 161 | 263 | 418  | 664  |
| 12                   | 124                                     | 194 | 316 | 502  | 797  |
| 14                   | 145                                     | 226 | 368 | 585  | 930  |
| 15                   | 156                                     | 242 | 395 | 627  | 996  |
| 16                   | 166                                     | 258 | 421 | 669  | 1000 |
| 18                   | 187                                     | 290 | 473 | 752  | 1000 |
| 19                   | 197                                     | 306 | 500 | 794  | 1000 |
| 20                   | 207                                     | 323 | 526 | 836  | 1000 |
| 22                   | 228                                     | 355 | 549 | 919  | 1000 |
| 24                   | 249                                     | 387 | 631 | 1000 | 1000 |
| 25                   | 259                                     | 403 | 658 | 1000 | 1000 |
| 30                   | 311                                     | 484 | 789 | 1000 | 1000 |
| 37                   | 383                                     | 596 | 974 | 1000 | 1000 |

The maximum allowable pulling tensions are for multi conductor cables pulled into a raceway or cable tray using a basket grip or similar device secured directly to the cable jacket. It is recommended that a combination of basket grips and pulling eyes be used whenever possible.

$T = 0.008 \times \text{cmil} \times n$ , if  $n \leq 3$

$T = 0.008 \times \text{cmil} \times n \times 0.8$ , if  $n > 3$

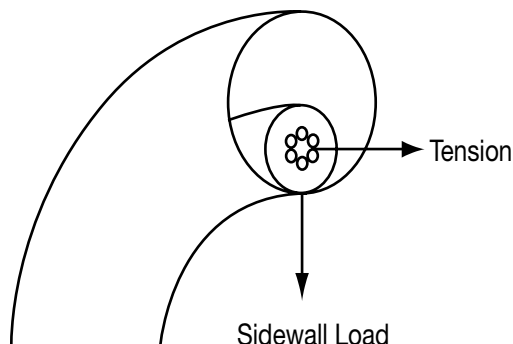
# Installation—Maximum Sidewall Pressure

## Overview

Sidewall bearing pressure (SWBP), or sidewall loading, is the radial force exerted on a cable being pulled around a conduit bend or sheave. Excessive SWBP can crush a cable and is, therefore, one of the most restrictive factors in installations having bends and requiring high pulling tensions. SWBP is reduced by increasing the radius of bends.

The maximum tension that can safely be applied to the cable during installation can be calculated using the maximum SWBP for the cable and the radius of the bend it is traversing.

For example, a cable having a maximum SWBP of 300 lb/ft that is being pulled around a bend having a radius of 2 feet should have no more than 300 lbs/ft x 2 ft or 600 lbs tension applied to it as the cable exits the bend.



| CABLE TYPE                                                            | SWBP (LBS/FT) |
|-----------------------------------------------------------------------|---------------|
| 300 V Nonshielded, 300 V and 600 V Shielded Control & Instrumentation | 500           |
| 600 V Nonshielded Control & Instrumentation                           | 500           |
| 600 V and 2400 V Nonshielded Power                                    | 1000          |
| 5 kV-35 kV Shielded Power                                             | 1000          |
| Interlocked Armored Cable (all voltage)                               | 300           |
| CCW <sup>®</sup> MC-HL Armored Cable                                  | 500           |

## General Cable's Approval List of Cable Pulling Lubricants

The following manufacturers, who are listed in the 2006 UL Electrical Construction Equipment Directory, provide wire pulling compounds intended for use as lubricants in installing electrical conductors in raceways. These manufacturers have had some of their products evaluated by Underwriters Laboratories (UL) to determine their compatibility with conductor insulation and coverings.

Since it is not feasible to test every possible combination of cable material with every wire pulling compound, the installer should check with the pulling compound manufacturer or the cable manufacturer to determine compatibility between specific cable materials and the pulling compound.

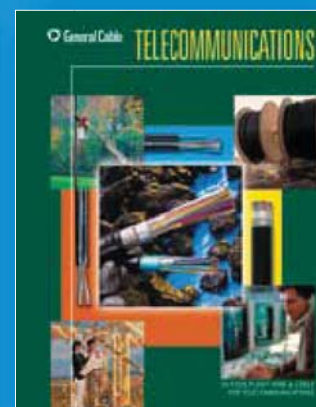
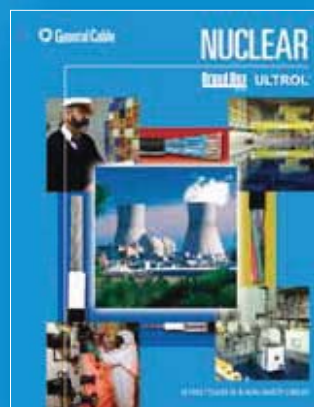
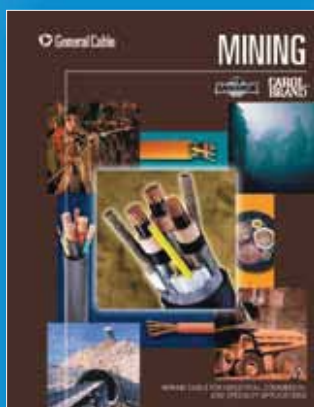
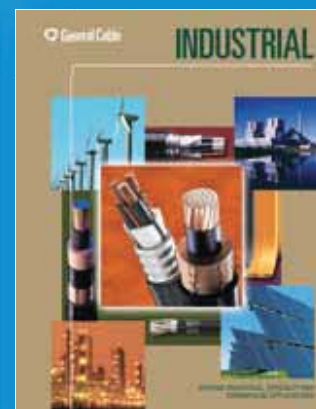
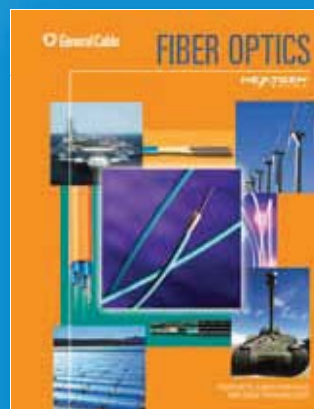
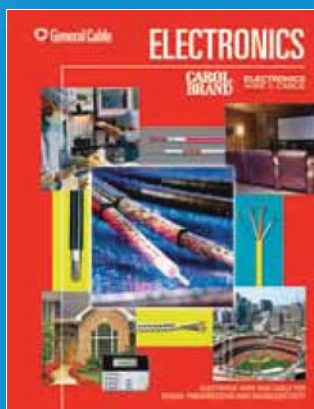
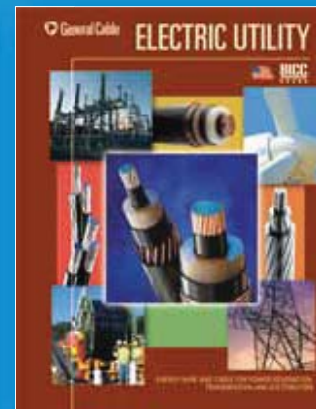
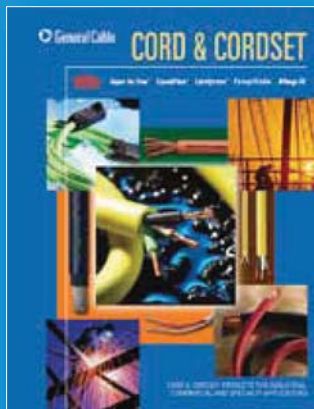
The Listing Mark for these products includes the UL symbol, together with the word "LISTED," a control number and the product name "Wire Pulling Compound." Refer to the latest edition of the UL Electrical Construction Equipment Directory for the current listing of manufacturers of wire pulling compounds and their control numbers.

|                                       |                                           |
|---------------------------------------|-------------------------------------------|
| 3 M Company                           | J. C. Whitlam Mfg. Co.                    |
| American Bentonite International Inc. | Klein Tools Inc.                          |
| American Polywater Corp.              | Madison Electric Products Inc.            |
| Arnco Corp.                           | Rainbow Technology Corp.                  |
| Dura-Line Corp.                       | Rectorseal                                |
| Formulated Solutions LLC              | Robinette Inc., DBA Electro Compounds Co. |
| Compound Co.                          | Thomas & Betts Corp.                      |
| Greenlee Textron                      |                                           |
| Ideal Industries Inc.*                |                                           |

\*Yellow 77 not recommended for use with UniShield<sup>®</sup> cables.

For LSZH jacketed cable, consult with pulling compound manufacturers.

Other wire pulling compounds may be suitable for use with General Cable constructions. Contact the wire pulling compound manufacturer regarding the suitability of their products with specific General Cable products.



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