



## ULTROL® ... Still ahead of its time after 30 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 600V 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, SIS Type and SIS/XHHW Type

- **Conductor:** 18 AWG thru 4/0 AWG 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 for sizes 14 AWG thru 4/0 AWG
- **Compliances:** ANSI N45.2 • ASME NQA-1 • ICEA S-95-658 • ICEA T-29-520 • IEEE 323-1974 • IEEE 383-1974 • NRC 10CFR50 • NUPIC • VW-1

#### Ultrol® Heavy Wall, Single Conductor, Power Cable, Class 1E Nuclear, 600V, 90°C, VW-1, SIS/XHHW Type and XHHW Type

- **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 XHHW, RHH or RHW for sizes 14 AWG thru 1000 kcmil • CT USE and SUNLIGHT RESISTANT for 1/0 AWG and larger
- **Compliances:** ANSI N45.2 • ASME NQA-1 • ICEA S-95-658 • ICEA T-29-520 • IEEE 323-1974 • IEEE 383-1974 • NRC 10CFR50 • NUPIC • VW-1

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

- **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), commonly referred to as Hypalon® - Black
- **Options:** Conductor stranding • Full-colored insulation • UL Listed RHH or RHW or USE for sizes 14 AWG thru 1000 kcmil • CT USE and SUNLIGHT RESISTANT for 1/0 AWG and larger
- **Compliances:** ANSI N45.2 • ASME NQA-1 • ICEA S-95-658 • ICEA T-29-520 • IEEE 323-1974 • IEEE 383-1974 • NRC 10CFR50 • NUPIC • VW-1

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## ULTROL<sup>®</sup> ... Still ahead of its time after 30 years Class 1E nuclear rated cables

### Ultrol<sup>®</sup> Class 1E Nuclear Instrumentation Cable

#### Ultrol<sup>®</sup> Instrumentation Cable, Multi-Conductor, Class 1E Nuclear, 600V, 90°C, VW-1

- **Conductor:** 18 AWG and 16 AWG tinned, annealed copper, Class B stranding
- **Insulation:** Flame-retardant, heat-, moisture- and radiation-resistant, thermoset Ultrol<sup>®</sup> Cross-Linked Polyethylene (FR-XLPE)
- **Identification:** Color coded per ICEA Method 1, Table E-1
- **Jacket:** Heavy-duty Chlorosulphonated Polyethylene (CSPE), commonly referred to as Hypalon<sup>®</sup> - Black
- **Options:** Conductor stranding • 300V • Overall galvanized steel or aluminum interlocked armor sheath
- **Compliances:** ANSI N45.2 • ASME NQA-1 • ICEA S-82-552 • ICEA T-29-520 • IEEE 323-1974 • IEEE 383-1974 • IEEE 1202 • NRC 10CFR50 • NUPIC • VW-1

#### Ultrol<sup>®</sup> Instrumentation Cable, Multi-Conductor, Overall Shield, Class 1E Nuclear, 600V, 90°C, VW-1

- **Conductor:** 18 AWG and 16 AWG tinned, annealed copper, Class B stranding
- **Insulation:** Flame-retardant, heat-, moisture- and radiation-resistant, thermoset Ultrol<sup>®</sup> 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), commonly referred to as Hypalon<sup>®</sup> - Black
- **Options:** Conductor stranding • 300V • Copper - mylar tape shield • Tinned copper braid shield • Overall galvanized steel or aluminum interlocked armor sheath
- **Compliances:** ANSI N45.2 • ASME NQA-1 • ICEA S-82-552 • ICEA T-29-520 • IEEE 323-1974 • IEEE 383-1974 • IEEE 1202 • NRC 10CFR50 • NUPIC • VW-1

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

- **Conductor:** 18 AWG and 16 AWG tinned, annealed copper, Class B stranding
- **Insulation:** Flame-retardant, heat-, moisture- and radiation-resistant, thermoset Ultrol<sup>®</sup> 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), commonly referred to as Hypalon<sup>®</sup> - Black
- **Options:** Conductor stranding • 300V • Copper - mylar tape shield • Tinned copper braid shield • Overall galvanized steel or aluminum interlocked armor sheath
- **Compliances:** ANSI N45.2 • ASME NQA-1 • ICEA S-82-552 • ICEA T-29-520 • IEEE 323-1974 • IEEE 383-1974 • IEEE 1202 • NRC 10CFR50 • NUPIC • VW-1

## ULTROL® ... Still ahead of its time after 30 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

- **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), commonly referred to as Hypalon® - Black
- **Options:** Conductor stranding • 1kV • 2kV • E-2 color code • Overall galvanized steel or aluminum interlocked armor sheath
- **Compliances:** ANSI N45.2 • ASME NQA-1 • ICEA S-73-532 • ICEA T-29-520 • IEEE 323-1974 • IEEE 383-1974 • IEEE 1202 • NRC 10CFR50 • NUPIC • VW-1

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

- **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), commonly referred to as Hypalon® - Black
- **Options:** Conductor stranding • 1kV • 2kV • E-2 color code • Helical tinned copper tape shield • Longitudinal corrugated tinned copper tape shield • Overall galvanized steel or aluminum interlocked armor sheath
- **Compliances:** ANSI N45.2 • ASME NQA-1 • ICEA S-73-532 • ICEA T-29-520 • IEEE 323-1974 • IEEE 383-1974 • IEEE 1202 • NRC 10CFR50 • NUPIC • VW-1

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

- **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), commonly referred to as Hypalon® - Black
- **Options:** Conductor stranding • 1kV • 2kV • Full-colored insulation • Helical tinned copper tape shield • Longitudinal corrugated tinned copper tape shield • Overall galvanized steel or aluminum interlocked armor sheath
- **Compliance:** ANSI N45.2 • ASME NQA-1 • ICEA S-95-658 • ICEA T-29-520 • IEEE 323-1974 • IEEE 383-1974 • IEEE 1202 • NRC 10CFR50 • NUPIC • VW-1



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### Ultrol<sup>®</sup> Class 1E Nuclear Coaxial and Triaxial Cables

50 Ohm Coax	RG-58C/U Equivalent	89 Ohm Coax	RG 22B/U Equivalent
0 Ohm Coax	RG-174/U Equivalent	95 Ohm Coax	RG 62B/U Equivalent
50 Ohm Coax	RG-213/U Equivalent	95 Ohm Coax	RG 71B/U Equivalent
75 Ohm Coax	RG-59B/U Equivalent	75 Ohm Triax	RG 11A/U Equivalent
75 Ohm Coax	RG-11A/U Equivalent		

**Compliances:** ANSI N45.2 • VW-1 • IEEE 323 • IEEE 383 • MIL-C-17 EQUIVALENT • NRC 10CFR50

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.

Compliances	Franklin 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 – 300V &amp; 600V 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 – 300V Constructions</li> </ul>

Every Ultrol generating station cable is manufactured in conformity with the documented General Cable Quality Assurance program requirements for Nuclear Facilities and Quality Control procedures all under our ISO 9001 and ASME NQA-1 'commitment to quality' organization. General Cable's facility has maintained their nuclear status through regular audits by industry committees such as NUPIC as well as others that are listed below:

Quality Assurance	
<ul style="list-style-type: none"> <li>International Standards Organization – ISO 9001</li> <li>American Society of Mechanical Engineers – ASME NQA-1</li> <li>Nuclear Regulatory Commission- NRC 10CFR50.49</li> </ul>	<ul style="list-style-type: none"> <li>Nuclear Regulatory Commission- NRC 10CFR50 Appendix B</li> <li>Nuclear Procurement Issues Committee (NUPIC)</li> <li>Nuclear Industry Assessment Committee (NIAC)</li> </ul>

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## NON-CLASS 1E COMMUNICATIONS CABLES

General Cable's non-Class 1E copper and fiber optic communications cables are designed and engineered to withstand the harsh environments associated with industrial and generating plant applications. From Category 5e and Category 3 low smoke cables for high-speed transmission to flame-resistant heavy-duty, loose tube fiber optic cable constructions, General Cable's highly engineered performance cables meet your exact communication requirements.

### Non-Class 1E Nuclear Copper & Fiber Optic Communications Cable

#### Category 5e Data Communications Cable, Paired, Non-Class 1E, Low Smoke

- **Conductor:** 24 AWG solid bare copper
- **Insulation:** Fluorinated ethylene-propylene (FEP)
- **Identification:** Color code – Pair 1: blue-white/blue; Pair 2: orange-white/orange; Pair 3: green-white/green; Pair 4: brown-white/brown
- **Jacket:** Fluorinated ethylene-propylene (FEP)
- **Options:** Other colors
- **Compliances:** UL 444 Type CMP / TIA/EIA-568-B.2 / ISO/IEC 11801 / NFPA-262 (UL 910) CMP

#### Category 3 Data Communications Cable, Paired, Non-Class 1E, Low-Smoke, Zero-Halogen

- **Conductor:** 22 AWG solid bare copper
- **Insulation:** Low-Smoke, Zero-Halogen (LSZH) Polyolefin (PO)
- **Identification:** Color code – Pair 1: blue-white/blue; Pair 2: orange-white/orange; Pair 3: green-white/green; Pair 4: brown-white/brown; etc.
- **Jacket:** UV Resistant, Low-Smoke, Zero-Halogen (LSZH) Polyolefin (PO) - Black
- **Compliances:** CSA Type CMG / CAT 3 Electricals / ISO/IEC 11801 / CSA CMG FT4 (IEEE 1202)

#### Fiber Optic Non-Class 1E, Flame Resistant Communications Cable – 1 to 36 and 37 to 48 Fiber Constructions

- **Loose Tube Component:** 6 or 12 fibers per tube
- **Outer Strength Member:** Contra-helical aramid yarn
- **Inner Jacket:** Black, Low-Smoke, Zero-Halogen (LSZH) Polymer
- **A armor:** Corrugated, .006 (0.15mm) thick, rodent resistant, chrome coated steel tape
- **Outer Jacket:** Black, Low-Smoke, Zero-Halogen (LSZH) Polymer
- **Compliance:** IEEE 383 / NEC 770-51(b) and 770-53(b) / ASTM E662 Issue 2 and NES 713 Issue 3 / Acid Gas per M24643, 1984

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