What’s New?

RENEWABLE POWER

As a company committed to environmental stewardship and renewable energy, General Cable has developed a reference guide to meet our customers’ renewable power needs. The SunGen® suite of cabling products effectively and efficiently links solar PV panels to the grid while being able to withstand the harsh operating environments of solar power applications.

FULL-LINE CATALOGS

Cord & Cordset Products

General Cable’s Carol® Brand is the most recognized name in flexible cords for temporary power. The extensive line includes portable cord, cordsets, portable power cable and premium-grade for commercial and industrial applications.

Electronics Cables

General Cable’s Carol® Brand fulfills the complete wire and cable requirements of the fast-changing electronics, sound and security marketplaces. We offer hook-up wire; communications cable; computer, coaxial and microphone cables; and designs for security systems, fire alarms and audio/visual applications.

Industrial Cables

General Cable’s line of industrial cables serves industrial, specialty and commercial applications. When you specify General Cable, not only are you assured of product excellence from legacy cables such as Uniblend®, FREP® and VNDC®, but you also have access to the most extensive line of high-quality industrial cables available anywhere in the industry.

MOBILE APPS

As a company, we continually look for ways to educate and provide time-saving tools for people interested in or using the products we manufacture. We have developed the following mobile tools and apps with you in mind.

Interactive Catalog Tool

Check out General Cable’s Calculation & Catalogs Apps and other mobile tools

North American Catalogs App

Voltage Drop Calculator

Ampacity Calculator

Conduit Fill Calculator
PRODUCT SELECTION LOCATOR

Section 1  Copper Building Wire — U.S. Market  1-10

Section 2  Aluminum Building Wire — U.S. Market  11-22

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POWERFUL PRESENCE · PRODUCTS
PERFORMANCE · PEOPLE

General Cable has been a wire and cable innovator for over 170 years, always dedicated to connecting and powering people’s lives. We are one of the largest wire and cable manufacturers in the world.

Our company serves customers through a network of manufacturing facilities in our core markets and has worldwide sales representation and distribution. We are dedicated to the production of high-quality aluminum, copper and fiber optic wire and cable and systems solutions for the energy, construction, industrial, specialty and communications sectors. With a vast portfolio of products to meet thousands of diverse application requirements, we continue to invest in research and development in order to maintain and extend our technology leadership by developing new materials, designing new products, and creating new solutions to meet tomorrow’s market challenges.

In addition to our strong brand recognition and strengths in technology and manufacturing, General Cable is also competitive in such areas as distribution and logistics, marketing, sales and customer service. This combination enables us to better serve our customers globally and as they expand into new geographic markets.

General Cable offers our customers all the strengths and value of a large company, but our people give us the agility and responsiveness of a small one. We service you globally and locally.

Visit our Website at www.generalcable.com
General Cable believes corporate social responsibility (CSR) is about creating shared value. That means keeping a dual focus in our business decisions: what is good for us as a company and what contributes to the greater good of the communities in which we live and work.

**SAFETY**
**Working safer by working together**
General Cable has one worldwide safety vision and goal – **ZERO & BEYOND**. We measure safety performance globally, share best practices and implement sound health and safety management systems. Many of our facilities worldwide are OHSAS 18001 [safety management system] certified. All North American facilities have implemented an equivalent health and safety management system. General Cable was a pioneer in obtaining the OHSAS 18001 Certificate for Occupational Health and Safety Management Systems in Europe and North Africa.

**SUSTAINABILITY**
**Responsible practices in daily operations**
As a global leader in the wire and cable industry, General Cable recognizes its role and responsibility in promoting sustainability. Our strongest business value is continuous improvement in all areas of our company. Across our many businesses, the quest to introduce new and better products through continuous improvement in environmental designs reflects our commitment to achieving industry-leading standards and responding proactively to global environmental issues. General Cable was the first cable manufacturer to obtain certification for its environmental management system, in accordance with the ISO 14001 and EMAS Standards.

**CITIZENSHIP**
**A commitment to being good citizens**
Being responsible citizens in our communities is of the utmost importance to us. Unequivocal honesty, integrity, forthrightness and fair dealing have long been part of General Cable’s core values and are expected globally in all of our business relationships with our customers, employees, suppliers, neighbors and competitors. Our company leaders and employees strive to make a difference throughout a host of volunteer activities and financial support, improving the communities in which we live and work.

**INNOVATION**
**Technologies that power and connect the world**
General Cable is delivering innovation that matters. We are focusing on R&D expertise and investing in developing wire and cable solutions that meet the challenges confronting our customers and the world. In working together and using all the ingenuity and creativity we have, we will reach the goal of being the preeminent supplier of wire and cabling solutions in the industry, with both green constructions and designs for the ever-growing renewable energy market.
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<td><strong>PRODUCT</strong></td>
<td><strong>DESCRIPTION</strong></td>
</tr>
<tr>
<td>Copper</td>
<td>THHN/THWN-2 High Speed (HS) PVC, Low-Voltage Power, 600 V, UL Type THHN/THWN-2, Single Conductor, Copper</td>
</tr>
<tr>
<td></td>
<td>TFFN PVC, Low-Voltage Wiring, 600 V, UL Type TFFN, Single Conductor, Copper</td>
</tr>
<tr>
<td></td>
<td>Unicon® USE-2/RHH/RHW-2 XLPE, Low-Voltage Power, 600 V, UL Type USE-2/RHH/RHW-2, Single Conductor, Copper</td>
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<tr>
<td></td>
<td>XHHW-2 VW-1 High Speed (HS) XLPE, Control and Low-Voltage Power, 600 V, UL Type SIS/XHHW-2, VW-1 Rated Single Conductor, Copper</td>
</tr>
<tr>
<td></td>
<td>XHHW-2 CT High Speed (HS) XLPE, Control and Low-Voltage Power, 600 V, UL Type XHHW-2, CT Rated Single Conductor, Copper</td>
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<td>Hook-Up Wire UL Types MTW, TFF, AWM and CSA TEW 90°C, 600 Volt, MTW, TFF, 105°C, 1000 Volt, AWM, 600 Volt TEW</td>
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<td>Heavy Wall UL Types MTW, AWM, NEC Type THW and CSA TEW 90°C, 600 Volt</td>
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<th>Section 2</th>
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<tr>
<td><strong>PRODUCT</strong></td>
<td><strong>DESCRIPTION</strong></td>
</tr>
<tr>
<td>STABILOY® Brand — Commercial</td>
<td>STABILOY® Brand THHN/THWN-2 High Speed (HS) PVC, Low-Voltage Power, 600 V, UL Type THHN/THWN-2, Single Conductor, Aluminum</td>
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<tr>
<td></td>
<td>STABILOY® Brand XHHW-2 High Speed (HS) XLPE, Low-Voltage Power, 600 V, UL Type XHHW-2, Single Conductor, Aluminum</td>
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<td></td>
<td>STABILOY® Brand USE-2/RHH/RHW-2 XLPE, Low-Voltage Power, 600 V, UL Type USE-2/RHH/RHW-2, Single Conductor, Aluminum</td>
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<td></td>
<td>STABILOY® Brand Tray Cable XLPE, Low-Voltage Power, 600 V, UL Type TC-ER, Multi-Conductor, Aluminum</td>
</tr>
<tr>
<td></td>
<td>STABILOY® Brand MC (Metal Clad) Cable XLPE, 600 V, UL Type MC, Multi-Conductor, Aluminum</td>
</tr>
<tr>
<td></td>
<td>STABILOY® Brand MC (Metal Clad) Cable with PVC Jacket XLPE, 600 V, UL Type MC with PVC Jacket, Multi-Conductor, Aluminum</td>
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<tr>
<td>STABILOY® Brand — Residential</td>
<td>STABILOY® Brand Service Entrance Cable (SEU) XLPE, Low-Voltage Power, 600 V, UL Type SE Style U, Multi-Conductor, Aluminum</td>
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<td>STABILOY® Brand Service Entrance Cable (SER) XLPE, Low-Voltage Power, 600 V, UL Type SE Style R, Multi-Conductor, Aluminum</td>
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<td>STABILOY® Brand Mobile Home Feeder Cable XLPE, Low-Voltage Power, 600 V, UL Type USE-2/RHH/RHW-2, Multi-Conductor, Aluminum</td>
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<th>DESCRIPTION</th>
<th>SPECIFICATION NUMBER</th>
<th>REVISION DATE</th>
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<tr>
<td><strong>NUAL® Brand — Aluminum</strong></td>
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<tr>
<td>NUAL® Brand AC90 Cable</td>
<td>XLPE, 600 V, CSA Type AC90, Aluminum</td>
<td>8780A</td>
<td>June 2017</td>
<td>25</td>
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<tr>
<td>NUAL® Brand ACWU90 Cable</td>
<td>XLPE, 600 V, CSA Type ACWU90, Aluminum</td>
<td>8790A</td>
<td>June 2017</td>
<td>26</td>
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<tr>
<td>NUAL® Brand RW90 High Speed (HS)</td>
<td>XLPE, Low-Voltage Power, 600 V, CSA Type RW90, Single Conductor, Aluminum</td>
<td>5500A</td>
<td>June 2017</td>
<td>27</td>
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<tr>
<td>NUAL® Brand RWU90 High Speed (HS)</td>
<td>XLPE, Low-Voltage Power, 1000 V, CSA Type RWU90, Single Conductor, Aluminum</td>
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<td>June 2017</td>
<td>28</td>
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<tr>
<td><strong>Copper</strong></td>
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<tr>
<td>RW90 High Speed (HS)¹</td>
<td>XLPE, Low-Voltage Power, 600 V, CSA Type RW90, Single Conductor, Copper</td>
<td>5500</td>
<td>June 2017</td>
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<tr>
<td>RWU90 High Speed (HS)¹</td>
<td>XLPE, Low-Voltage Power, 1000 V, CSA Type RWU90, Single Conductor, Copper</td>
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<tr>
<td>T90 High Speed (HS)</td>
<td>PVC, Low-Voltage Power, 600 V, CSA Type T90/TWN75, Single Conductor, Copper</td>
<td>5490</td>
<td>June 2017</td>
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# Section 4  Renewable Energy Cable — Aluminum and Copper

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<td><strong>Aluminum</strong></td>
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<tr>
<td>SunGen® Photovoltaic Wire</td>
<td>XLPE, RHH or RHW-2, 600 V, UL Type PV, Single Conductor, Aluminum</td>
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<td>SunGen® Photovoltaic Wire</td>
<td>XLPE, RHH or RHW-2, 1000 V or 2000 V, UL Type PV, Single Conductor, Aluminum</td>
<td>5851A</td>
<td>June 2017</td>
<td>36</td>
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<tr>
<td>SunGen® Photovoltaic Wire</td>
<td>XLPE, 600 V, 1000 V, 2000 V, CSA Type RPV90, Single Conductor, Aluminum</td>
<td>5860A</td>
<td>June 2017</td>
<td>37</td>
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<tr>
<td>SunGen® Photovoltaic Wire</td>
<td>XLPE, 1000 V or 2000 V, CSA Type RPVU90, Single Conductor, Aluminum</td>
<td>5870A</td>
<td>June 2017</td>
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<td><strong>Copper</strong></td>
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<tr>
<td>SunGen® Photovoltaic Wire</td>
<td>XLP, RHH/RHW-2, VW-1, 600 V, UL Type PV, Single Conductor, Copper</td>
<td>5841</td>
<td>June 2017</td>
<td>41</td>
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<td>SunGen® Photovoltaic Wire</td>
<td>XLP, RHH/RHW-2, VW-1, RPVU90, FT1, 2000 V, UL Type PV, Single Conductor, Copper</td>
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<td>SunGen® Photovoltaic Wire</td>
<td>Dual Layer EPR/XL-CPE, USE-2 at 600 V, RHH/RHW-2, RWU90, 600 V, UL Type PV Single Conductor, Copper</td>
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<tr>
<td>SunGen® Photovoltaic Wire</td>
<td>Dual Layer EPR/XL-CPE, USE-2 at 600 V, RHH/RHW-2, RWU90, 2000 V, UL Type PV Single Conductor, Copper</td>
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<td>Class B and Class C Conductors for General Wiring</td>
<td>B027</td>
<td>Jan. 2012</td>
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<td><strong>Handling and Storage Recommendations</strong></td>
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<td>Recommended Reel Handling Practices</td>
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<td>Recommended Cable Handling Practices</td>
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<td><strong>Cable Installation Guidelines</strong></td>
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<td>Pre-Installation Instructions</td>
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<tr>
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</table>
General Cable is dedicated to providing in-stock quality wire and cable offered at competitive prices, such as:

- **NUAL® Brand and STABILOY® Brand** aluminum building wire as well as copper building wire for permanent power in many commercial and institutional buildings across North America
- **Carol® Brand cord products** used for portable power during construction
- **SunGen® PV wire** for small- to medium-scale solar photovoltaic applications such as rooftops, parking lots, highways and brownfields

Offering a total building wire solution that features the **High Speed** line of building wire, General Cable provides cutting and paralleling services as well as pulling eyes for easy installation. Our rugged **Super Vu-Tron® Supreme SJ00W and S00W cord products**, featuring **TRU-Mark® Sequential Footage Marking**, are designed to withstand severe environmental conditions for applications where flexible cords are used.

Go ALL-IN with General Cable when your customers **Demand Better and Expect More™**.

Learn more about our three freight incentive options by visiting gcna.us/all-in or call us today at **800-243-8020**.
**Program Overview**

With job site logistics often being the major cause of project delays, the need for a complete services solution plays a crucial part in the success of an installation. With this in mind, General Cable is pleased to offer its *Emerald Service™ Program*. Emerald Service is a complete package of critical cable services offered on our complete line of Construction & Industrial cables.

With the Emerald Service Program from General Cable, you can be assured that you get the right product, packaged to your specifications, in the timeframe needed to optimize your demanding project schedules.

Our Emerald Service Program addresses two primary areas of cable management, which can be provided to reduce your overall labor cost and installation time at the job site.

- **Packaging/Reel Preparation/Site Management**, which can limit issues associated with cable handling
- **Field Engineering Services**, for cable installation recommendation in accordance with the National Electrical Code® (NEC®) as well as other applicable industry guidelines

**Preparation Services***

<table>
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<th>Cut, Package &amp; Ship</th>
<th>Reel Preparation</th>
<th>Pulling Eye for Single-Conductor, Multi-Conductor, Multiplexed or Paralleled Cables</th>
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<tr>
<td>• Cut to Length</td>
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<td>• Custom Reel Stenciling</td>
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<td>• Paralleling</td>
<td>• Type 2 — Weather-Resistant Linerboard</td>
<td>• Weatherproof Tags</td>
</tr>
<tr>
<td>• Duplex, Triplex or Quadplex (factory shipment only)</td>
<td>• Type 3 — Lamiflex® Reinforced Fiberboard</td>
<td>• Metal Reel Tags</td>
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<td>• Joy Winding (both ends of cable exposed)</td>
<td>• Type 4 — Full Wood Lagging</td>
<td>• Flat Bed Shipping Service</td>
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<td></td>
<td></td>
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<tr>
<td>• Palletization</td>
<td></td>
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<tr>
<td>• Sealed End Caps</td>
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<tr>
<td>• Colored Tape Phase ID</td>
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</table>

**Site Management and Labeling Services**

- Laminate Tags
- Payoff Direction Tagging
- Lay Flat/Do Not Flop Tags
- Reel Cradles
- Test Reports
- Custom Reel Stenciling
- Weatherproof Tags
- Metal Reel Tags
- Flat Bed Shipping Service

**Technical Support**

- Pulling Calculations
- Engineering Site Visit
- Voltage Drop Calculations
- Ampacity Calculations

*Please consult General Cable for specific lead times and charges where applicable.*
Technical Services*

While choosing the right cable is the first critical factor in job site management, General Cable also recognizes the importance of being able to accurately respond to both difficult and changing conditions during installation. To address this critical need, we are pleased to offer as part of our Emerald Service™ Program a complete range of Engineering & Technical Advisory Services, designed to assist you through even the most difficult installations. The following services are offered at an additional charge and can be estimated prior to the service(s) being started:

- Ampacity Calculations
- Voltage Drop Calculations
- Impedance Calculations
- Pulling Stress Calculations
- Sag & Tension Calculations
- Side & Wall Bearing Pressure Calculations
- Field Site & Inspection Services

Time-Saving Applications

Looking for ways to simplify calculations? Let us do the math! General Cable’s apps provide the quick information you need to keep your jobs on track. Download them today from the App Store or Google Play.

Voltage Drop
Calculate maximum circuit distance and minimum conductor size for the required voltage drop

Conductor Ampacity
Calculate conductor ampacities for different temperature ratings

Conduit Fill
Calculate the minimum conduit size per National Electrical Code*

General Cable provides a broad range of quality Construction & Industrial products including:

Construction Cable
- Aluminum Building Wire (Commercial: XHHW-2, THHN/THWN-2, USE-2/RHH/RHW-2, MC Cable, MC Jacketed, Tray, RW90, RWU90, TECK90; Residential: SE Style U and R, Mobile Home Feeder, AC90, ACWU90, RW90, RWU90)
- Copper Building Wire (THHN/THWN-2, TFFN, T90, XHHW-2 VW-1, XHHW-2 CT, XLPE, MTW)
- Photovoltaic (PV) Wire

Industrial & Specialty Cable
- Portable & Temporary Power Cord & Cordsets
- Instrumentation Cable
- Multi-Conductor Control & Power Cable
- Low-Volt Power Cable, 600 V – 2 kV
- Med-Volt Industrial Cable, 2.4 kV – 35 kV
- Industrial Automation Cable
- Armored Cable
- Mining Cable

To see all products, visit www.generalcable.com/na/us-can/products-solutions.

With General Cable’s Emerald Service Program, we can help you power your business forward — saving you time, reducing costs and increasing efficiency. Call us today for the solutions you need, 1.800.243.8020!

* Please consult General Cable for specific lead times and charges where applicable.

Learn more today at gcna.us/EmeraldService

EmeraldService@generalcable.com
When you partner with General Cable, you get One Company that manufactures and delivers all of the wire and cable products you need — from Carol® Brand cord, cordsets and electronics wire to General Cable’s industrial instrumentation, power and control cables that serve an extensive range of applications and environments.

General Cable’s copper building wire product line expands and enhances its current construction offering with a broad spectrum of copper products that range from 600 to 2,000 volts. Our product portfolio supports the commercial construction markets while delivering the same product quality, manufacturing expertise and service that our customers have always received from General Cable.

General Cable’s building wire products include copper XHHW-2, RHH/RHW-2/USE-2 and machine tool wire. Our THHN copper products come in a variety of colors and offer a High Speed jacket designed to improve installation even under the most difficult conditions. By maintaining inventory within a network of regional distribution centers across the country, General Cable is able to ensure maximum availability for our customers. Put us to work for you.
# Copper Building Wire — U.S. Market

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<td>THHN/THWN-2 High Speed (HS)</td>
<td>5290</td>
<td>June 2017</td>
<td>3-4</td>
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<td>PVC, Low-Voltage Power, 600 V, UL Type THHN/THWN-2, Single Conductor, Copper</td>
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<td>Unicon® USE-2/RHH/RHW-2</td>
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</table>
Copper U.S. Market

THHN/THWN-2 High Speed (HS)
PVC, Low-Voltage Power
600 V, UL Type THHN/THWN-2, Single Conductor, Copper

Product Construction:

Conductor:
• 14 AWG thru 1000 kcmil bare annealed compressed stranded copper per ASTM B3 and ASTM B8
• 14 AWG thru 10 AWG solid plain copper per ASTM B3

Insulation:
• Color-coded premium-grade flame-retardant, heat- and moisture-resistant Polyvinyl Chloride (PVC)

Jacket:
• Tough Polyamide (Nylon)

Print:
For 14 AWG solid thru 10 AWG solid:
• GENERAL CABLE® MN (YEAR) HIGH SPEED THHN/THWN-2 (UL) E66903 (SIZE) AWG (SIZE MM²) GRI AND GRII 600 V VW-1 OR T90 NYLON/TWN75 C(UL) FT1 (-25°C)

For 14 AWG strand thru 10 AWG strand:
• GENERAL CABLE® MN (YEAR) HIGH SPEED MTW OR THHN/THWN-2 (UL) (SIZE) AWG (SIZE MM²) GRI AND GRII 600 V VW-1 OR AWM OR T90 NYLON/TWN75 C(UL) FT1 (-25°C)

For 8 AWG thru 1 AWG, black only:
• GENERAL CABLE® MI (MM)/(YYYY) HIGH SPEED MTW OR THHN/THWN-2 (UL) (SIZE) AWG (SIZE MM²) GRI AND GRIII SUN RES 600 V VW-1 OR AWM OR T90 NYLON/TWN75 C(UL) FT1 (-25°C)

For 8 AWG thru 1 AWG, all colors:
• GENERAL CABLE® MI (MM)/(YYYY) HIGH SPEED MTW OR THHN/THWN-2 (UL) (SIZE) AWG (SIZE MM²) GRI AND GRII 600 V VW-1 OR AWM OR T90 NYLON/TWN75 C(UL) FT1 (-25°C)

Print (cont’d.):
For 1/0 and larger, black only:
• GENERAL CABLE® MI (MM)/(YYYY) HIGH SPEED MTW OR THHN/THWN-2 (UL) (SIZE) AWG (SIZE MM²) GRI AND GRII SUN RES FOR CT USE 600 V VW-1 OR AWM OR T90 NYLON/TWN75 C(UL) FT1 (-25°C)

For 1/0 and larger, all colors:
• GENERAL CABLE® MI (MM)/(YYYY) HIGH SPEED MTW OR THHN/THWN-2 (UL) (SIZE) AWG (SIZE MM²) GRI AND GRIII FOR CT USE 600 V VW-1 OR AWM OR T90 NYLON/TWN75 C(UL) FT1 (-25°C)

Applications:
• General purpose building wire for services, feeders and branch circuits
• Conduit and raceways
• 1/0 and larger for cable tray use

Features:
• 1/0 AWG and larger are rated for cable tray use
• Rated Gasoline and Oil Resistant II
• Resistant to abrasion, acids, alkalines, ozone and water
• For THHN/THWN-2 applications, the conductor is appropriate for wet or dry locations not to exceed 90°C
• For MTW applications, the conductor is appropriate for use in dry locations at 90°C or not to exceed 60°C in wet locations or where exposed to oil or coolants (with ampacity limited to that for 75°C conductor temperature) as outlined in NFPA 79 Electrical Standards for Industrial Machinery

Features (cont’d.):
• Sequential foot markings every 2 feet on 8 AWG and larger for easy measuring
• Sunlight-resistant for 8 AWG and larger, black only
• Meets cold bend and cold impact tests at -25°C
• High Speed (HS) cable features a specially designed system that allows for fast and easy cable pulls

Compliances:
Industry Compliances:
• ASTM B3 and B8
• UL Standard 83 – THHN/THWN-2
• UL Standard 1063 for machine tool wire (MTW)
• ICEA S-95-658/NEMA WC70
• NEC® Article 310
• c(UL) – T90 Nylon

Flame Test Compliances:
• UL 2556 VW-1 rated through 1 AWG
• UL 2556 CT USE 1/0 and larger
• CSA C22.2 No. 0.3-92 FT1 Vertical Flame Test

Other Compliances:
• RoHS Compliant

Packaging:
• Material cut to length and shipped on non-returnable wood reels
# Copper Building Wire — U.S. Market

## THHN/THWN-2 High Speed (HS)
PVC, Low-Voltage Power
600 V, UL Type THHN/THWN-2, Single Conductor, Copper

<table>
<thead>
<tr>
<th>CATALOG NUMBER</th>
<th>CONDUCTOR SIZE</th>
<th>NUMBER OF WIRES</th>
<th>MIN. AVG. INSULATION THICKNESS</th>
<th>JACKET THICKNESS</th>
<th>NOMINAL CABLE DIAMETER</th>
<th>COPPER WEIGHT</th>
<th>NET WEIGHT</th>
<th>AMPERAGE (1) 30°C AMBIENT</th>
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Dimensions and weights are nominal; subject to industry tolerances.

Adjustments and corrections may apply.

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### COLOR CODE CHART

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### PACKAGING CODE CHART

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<tr>
<td>33</td>
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<td>54</td>
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</table>

(12/2017)
Copper Building Wire — U.S. Market

**TFFN**

PVC, Low-Voltage Wiring
600 V, UL Type TFFN, Single Conductor, Copper

**Product Construction:**
- **Conductor:**
  - 18 AWG and 16 AWG fully annealed bare copper per ASTM B3 and B174
- **Insulation:**
  - Color-coded premium-grade flame-retardant, heat- and moisture-resistant Polyvinyl Chloride (PVC)
- **Jacket:**
  - Tough Polyamide (Nylon)
- **Print:**
  - GENERAL CABLE® (PLANT OF MFG) (YEAR OF MFG) TYPE MTW OR TFFN (UL) SIZE AWG (SIZE MM²) GASOLINE AND OIL RESISTANT II 600 V OR AWM

**Applications:**
- Internal wiring of fixtures
- Fixture raceways
- Fire alarm circuits in raceways

**Features:**
- Rated Gasoline and Oil Resistant II
- Resistant to abrasion, acids, alkalines, ozone and water
- For TFFN applications, the conductor is appropriate for use in dry locations not to exceed 90°C
- For MTW applications, the conductor is appropriate for use in dry locations at 90°C or not to exceed 60°C in wet locations or where exposed to oil or coolants
- Meets cold bend and cold impact tests at -25°C

**Compliances:**
- Industry Compliances:
  - ASTM B3 and B174
  - UL Standard 66 for fixture wire
  - UL Standard 1063 for machine tool wire (MTW)
  - NFPA 90 (NEC® Article 402)
- Other Compliances:
  - RoHS Compliant

**Packaging:**
- 4 x 500’ in a carton
- 2500’ reels

---

### Catalog Number

**Conductor Size** | **No. of Wires** | **Min. Avg. Insulation Thickness** | **Jacket Thickness** | **Nominal Cable Diameter** | **Copper Weight** | **Net Weight** | **Ampacity (1)** @30°C Ambient
---|---|---|---|---|---|---|---
28018 | 18 | 0.015 | 0.004 | 0.10 | 2.18 | 5 | 7 | 10 | 6
28016 | 16 | 0.015 | 0.004 | 0.10 | 2.46 | 8 | 12 | 14 | 8

**Dimensions and weights are nominal; subject to industry tolerances.**

(1) Allowable ampacities shown are for general use as specified by the National Electric Code. Adjustment and corrections may apply.

**NOTE:** For MTW applications, the conductor is appropriate for use in dry locations at 90°C or not to exceed 60°C in wet locations or when exposed to oil or coolants (with ampacity limited to that for 75°C conductor temperature) as outlined in NFPA 79 Electrical Standards for Industrial Machinery.

---

### Color Code Chart

<table>
<thead>
<tr>
<th>Color Code</th>
<th>Color</th>
<th>Color Code</th>
<th>Color</th>
</tr>
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<td>1</td>
<td>Black</td>
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### Packaging Code Chart

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<tr>
<td>34</td>
<td>2500’ Reel</td>
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</tbody>
</table>

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Phone: 855-720-2792
www.generalcable.com
Product Construction:

Conductor:
- 14 AWG thru 1000 kcmil annealed bare copper compressed Class B stranding per ASTM B8

Insulation:
- Flame-retardant Cross-linked Polyethylene (XLPE), black

Print:
- For 14 AWG thru 2 AWG:
  - GENERAL CABLE® (PLANT OF MFG) UNICON XLP TYPE USE-2 OR RHH OR RHW-2 VW-1 SIZE (AWG OR KCMIL) (SIZE MM2) 600 VOLTS SUN RES (UL) (MM)/(YYYY) SEQUENTIAL FEET
- For 1/0 AWG and larger:
  - GENERAL CABLE® (PLANT OF MFG) UNICON XLP TYPE USE-2 OR RHH OR RHW-2 VW-1 SIZE 600 VOLTS SUN RES FOR CT USE (UL) (MM)/(YYYY) SEQUENTIAL FEET

Options:
- 2 kV version
- Tinned copper conductor
- Class C stranding
- Various colors available
- Unicon® FREP® - flame-retardant Ethylene Propylene Rubber (EPR) insulation
- Other constructions available upon request

Applications:
- Ideally suited for use in a broad range of commercial, industrial and utility applications where reliability is a major concern, where maximum performance will be demanded and where space is limited
- In free air, raceways or direct burial in accordance with NEC

Features:
- Rated at 90˚C wet or dry
- Smaller cable O.D.
- Excellent electrical, thermal and physical properties
- Excellent resistance to moisture
- Excellent resistance to crush, compression cuts and heat deformation
- Excellent flame resistance
- Excellent low temperature cold bend characteristics
- Meets cold bend test at -25˚C
- High Speed (HS) cable features a specially designed XLPE insulation that allows for fast and easy cable pulls for 8 AWG and larger

Compliances:

Industry Compliances:
- National Electrical Code (NEC®)
- ICEA S-95-658/NEMA WC70
- “FOR CT USE” on 1/0 AWG and larger in accordance with NEC
- UL 44 Type RHH/RHW-2, UL File # E90499
- UL 854 Type USE-2, UL File # E90499

Flame Test Compliances:
- UL 1581 VW-1
- For 1/0 AWG and larger: IEEE 383, IEEE 1202/CSA FT4, ICEA T-29-520

Other Compliances:
- EPA 40 CFR, Part 261 for leachable lead content per TCLP
- OSHA Acceptable
- RoHS Compliant

Packaging:
- Material cut to length and shipped on non-returnable wood reels

Dimensions and weights are nominal; subject to industry tolerances.
* Non-stock item; minimum runs apply. Please consult Customer Service for price and delivery.
(1) Allowable ampacities shown are for general use as specified by the National Electric Code. Adjustment and corrections may apply.
Copper Building Wire — U.S. Market

XHHW-2 VW-1 High Speed (HS)¹
XLPE, Control and Low-Voltage Power
600 V, UL Type SIS/XHHW-2, VW-1 Rated, Single Conductor, Copper

Product Construction:
Conductor:
• 18 AWG thru 1000 kcmil tinned, annealed copper per ASTM B33
• Class B stranding per ASTM B8
Insulation:
• Flame-retardant Cross-linked Polyethylene (XLPE)

Print:
For 18 AWG and 16 AWG:
• GENERAL CABLE® (PLANT OF MFG) 1C SIZE AWG COPPER XLPE SIS TYPE (UL) 600 V 90˚C YEAR
For 14 AWG thru 4 AWG:
• GENERAL CABLE® (PLANT OF MFG) 1C SIZE AWG COPPER XLPE SIS/XHHW-2 VW-1 (UL) 600 V 90˚C SUN RES FOR CT USE MONTH/YEAR SEQUENTIAL FOOTAGE MARK
¹ Sizes smaller than 1/0 AWG do not include "FOR CT USE"

Applications:
• For use in power and control circuits in switchboards, control panels and raceways in applications not exceeding 600 volts
• Acceptable for use in OSHA-regulated installations

Features:
• Rated at 90˚C wet or dry
• UL Listed as SIS/XHHW-2* and XHHW-2** for general power or control wiring in accordance with the National Electrical Code, Section 310.15, Tables 310.15(B)(16) or 310.15(B)(17)
• Sizes 1/0 and larger listed "SUN RES FOR CT USE"
• Excellent flame resistance
• Excellent physical, thermal and electrical properties
• High Speed (HS) cable features a specially designed XLPE insulation that allows for fast and easy cable pulls - 8 AWG and larger
• Meets cold bend and cold impact tests at -25˚C

Compliances:
Industry Compliances:
• UL Type SIS 18 AWG and 16 AWG
• UL Type SIS/XHHW-2* - 600 V
• UL File E90494
• UL Type XHHW-2** - 600 V
• ICEA S-95-658/NEMA WC70
• 1/0 and larger are listed “SUN RES FOR CT USE” in accordance with NEC

Flame Test Compliances:
• UL 44 VW-1

Other Compliances:
• EPA 40 CPR, Part 261 for leachable lead content per TCLP method
• OSHA Acceptable
• RoHS Compliant

Packaging:
• Material to be shipped on spools or non-returnable wood reels

SPEC 5150
June, 2017

Copper U.S. Market

Dimensions and weights are nominal; subject to industry tolerances.
¹ Non-stock item: minimum runs apply. Please consult Customer Service for price and delivery.
² Allowable ampacities shown are for general use as specified by the National Electric Code.
Adjustment and corrections may apply.

Phone: 855-720-2792
www.generalcable.com

General Cable

RoHS Compliant
# Copper Building Wire — U.S. Market

## XHHW-2 CT High Speed (HS)\(^1\)

XLPE, Control and Low-Voltage Power
600 V, UL Type XHHW-2, CT Rated, Single Conductor, Copper

### Product Construction:

**Conductor:**
- 14 AWG thru 750 kcmil bare annealed compressed copper per ASTM B3
- Class B stranding per ASTM B8

**Insulation:**
- Flame-retardant Cross-linked Polyethylene (XLPE)

**Print:**
- GENERAL CABLE\(^{(1)}\) (PLANT OF MFG) 1C SIZE AWG (SIZE MM\(^2\)) HIGH SPEED TYPE XHHW-2 (UL) 600 V SUN RES FOR CT USE MONTH/YEAR SEQUENTIAL FOOTAGE MARK

**Options:**
- Tinned copper conductor
- Full colored insulation

**Applications:**
- General purpose building wire for use primarily in conduit or other recognized raceways as specified in the National Electrical Code (NEC\(^{(2)}\))
- Industrial environments where superior insulation toughness and chemical resistance are required
- Maximum operating temperature not to exceed 90°C wet or dry locations
- In free air, raceways or cable trays in accordance with NEC

**Features:**
- "FOR CT USE" on 1/0 AWG and larger
- Sunlight-resistant for 1/0 AWG and larger, all colors
- Rated at 90°C wet or dry
- Smaller cable O.D.
- Excellent electrical, thermal and physical properties
- Excellent resistance to moisture
- Excellent resistance to crush, compression cuts and heat deformation
- High Speed (HS) cable features a specially designed XLPE insulation that allows for fast and easy cable pulls - 8 AWG and larger
- Meets cold bend and cold impact tests at -25°C

**Compliances:**

**Industry Compliances:**
- National Electric Code (NEC\(^{(2)}\))
- UL 44 Standard for Rubber Insulated Wire and Cable
- ICEA S-95-658/NEMA WC70
- UL listed as Type 2, UL File #E90494

**Flame Test Compliances:**
- UL 1685, Method 1
- Other Compliances:
  - EPA 40 Cert, Part 261 for leachable lead content per TCLP
  - RoHS Compliant
  - OSHA Acceptable

**Packaging:**
- Material cut to length and shipped on non-returnable wood reels

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### Catalog Number | Cond. Size (AWG/kcmil) | No. of Wires | Nom. Cond. Diameter | Min. Avg. Insulation Thickness | Nom. Cable Diameter | Copper Weight | Net Weight | Ampacity (1) | 30°C Ambient NET WEIGHT | LBS/1000 FT kg/km | LBS/1000 FT kg/km @75˚C | LBS/1000 FT kg/km @90˚C |
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Dimensions and weights are nominal; subject to industry tolerances.

(1) Allowable ampacities shown are for general use as specified by the National Electric Code. Adjustment and corrections may apply.
Copper Building Wire — U.S. Market

Hook-Up Wire UL Types MTW, TFF, AWM and CSA TEW
90°C, 600 Volt, MTW, TFF, 105°C, 1000 Volt, AWM, 600 Volt TEW

Product Construction:

Conductor:
• 18 through 8 AWG fully annealed stranded bare copper

Insulation:
• Premium-grade, color-coded PVC
• Temperature range:
  MTW: -40ºC to +90ºC
  AWM: -40ºC to +105ºC
  TEW: -30ºC to +105ºC
• Color code: See chart below

Jacket Marking:
• For 18 and 16 AWG:
  CAROL AWG (MM²) 600 V E135243-8 MTW (UL) OR TFF OR AWM 1015/1032/1335 VW-1 -- CSA TEW 105°C FT1 ROHS (YEAR)
• For 14 thru 8 AWG:
  CAROL AWG (MM²) 600 V E135243-8 MTW (UL) OR AWM 1015/1032/1335 VW-1 -- CSA TEW 105°C FT1 ROHS (YEAR)

Applications:
• Motor and transformer lead
• External wiring of machinery

Features:
• Outstanding oil, flame and moisture resistance
• Extra-flexible

Industry Approvals:
• UL Type MTW/AWM
• CSA TEW
• Passes VW-1 Vertical Flame Test
• OSHA Acceptable
• AWM Style 1015 – 18-8 AWG
• AWM Style 1335 – 18-10 AWG
• AWM Style 1336 – 8 AWG
• RoHS Compliant

Packaging:
• 18 and 16 AWG:
  500’ (152.4 m) spools
  2500’ (762 m) spools
• 14 through 10 AWG:
  500’ (152.4 m) spools
  2500’ (762 m) reels
• 8 AWG: 500’ (152.4 m) reels
• Other put-ups available on special order

UL TYPE MTW, AWM, TFF, CSA TYPE TEW - 600 VOLT

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(6) Actual shipping weight may vary.

COLOR CODE CHART

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Copper U.S. Market

Phone: 855-720-2792
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Copper Building Wire — U.S. Market

SPEC 3325
June, 2017

RoHS Compliant
UL Listed
Flame Test
Passes UL VW-1 Vertical Flame Test
Underwriters Laboratories, Inc.
CE Certified
Heavy Wall UL Types MTW, AWM, NEC Type THW and CSA TEW
90°C, 600 Volt

Product Construction:
Conductor:
- 6 and 4 AWG fully annealed stranded bare copper
Insulation:
- Premium-grade, color-coded PVC, black
- Temperature range:
  - MTW: -40°C to +90°C
  - AWM: -40°C to +105°C
  - TEW: -30°C to +105°C
Jacket Marking:
- CAROL AWG (MM) 600 V E135243-8 MTW OR THW (UL) OR AWM 1015/1032/1337 VW-1 -- CSA TEW 105°C FT1 ROHS (YEAR)
Applications:
- Motor and transformer lead
- External wiring of machinery
Features:
- Outstanding oil, flame and moisture resistance
- Extra-flexible
Industry Approvals:
- UL Type AWM
- UL and NMTBA Type MTW
- NEC Type THW
- CSA TEW
- Passes UL VW-1 Vertical Flame Test
- RoHS Compliant
Packaging:
- 500' (152.4 m) reels
- Other put-ups available on special order

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(1) Actual shipping weight may vary.
General Cable has a rich history of experience and innovation, with roots dating back more than 170 years. As a global leader in the wire and cable industry, General Cable focuses its resources on providing outstanding quality and delivering maximum value to its customers.

General Cable’s comprehensive aluminum building wire product line supports the commercial, residential and industrial construction markets. Our superior, high-quality aluminum building wire products are made in state-of-the-art manufacturing facilities, delivered with the excellent service that our customers can count on from General Cable.

Aluminum building wire is the fastest-growing wiring solution for commercial and industrial construction projects.

General Cable’s STABILOY® Brand has been the standard in quality, reliability, cost-effective installation savings and long-term performance, with aluminum building wire products used in commercial and residential applications for over 40 years.

Our STABILOY® Brand aluminum XHHW-2 feeder cable products have been featured in many high-profile stadiums, casinos, hospitals and commercial office towers throughout the United States. General Cable’s XHHW-2 High Speed aluminum cable features a specially designed XLPE-2 insulation that allows for fast and easy cable pulls. These feeder cable products are available with color phase ID where specified or preferred.

General Cable’s STABILOY® Brand SER and SEU service entrance products are regarded as best-in-class for workmanship and ease of installation and are frequently specified by residential electrical contractors for service entrance applications.

All General Cable aluminum building wire products are stocked in regional distribution centers, available to fulfill our customers’ needs immediately.
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**STABILOY® Brand Aluminum Building Wire — U.S. Market**

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Aluminum Building Wire — U.S. Market

STABILOY® Brand THHN/THWN-2 High Speed (HS)
PVC, Low-Voltage Power
600 V, UL Type THHN/THWN-2, Single Conductor, Aluminum

Product Construction:

Conductor:
- 6 AWG thru 2 AWG Class B compact stranded aluminum alloy (8000 Series) per ASTM B960 and ASTM B801
- 1 AWG thru 350 kcmil compact stranded SIW aluminum alloy (8000 Series) per ASTM B960, ASTM B801 and ASTM B836
- 400 kcmil thru 750 kcmil Class B compact stranded aluminum alloy (8000 Series) per ASTM B960 and ASTM B801

Insulation:
- Premium-grade flame-retardant, heat- and moisture-resistant Polyvinyl Chloride (PVC)

Jacket:
- Tough Polyamide (Nylon)

Print:
- For 6 AWG thru 1 AWG, black:
  - GENERAL CABLE® (PLANT OF MFG) (MM)
  - (YY) HIGH SPEED THHN/THWN-2 (UL) SIZE AWG OR KCMIL (MM2) LOGO COMPACT AL GRI AND GRII SUN RES FOR CT USE 600 V VW-1 OR AWM SEQUENTIAL FEET

For 6 AWG thru 1 AWG, all colors:
- GENERAL CABLE® (PLANT OF MFG) (MM)
- (YY) HIGH SPEED THHN/THWN-2 (UL) SIZE AWG OR KCMIL (MM2) LOGO COMPACT AL GRI AND GRII SUN RES FOR CT USE 600 V VW-1 OR AWM SEQUENTIAL FEET

For 1/0 AWG and larger, black:
- GENERAL CABLE® (PLANT OF MFG) (MM)
- (YY) HIGH SPEED THHN/THWN-2 (UL) SIZE AWG OR KCMIL (MM2) LOGO COMPACT AL GRI AND GRII SUN RES FOR CT USE 600 V VW-1 OR AWM SEQUENTIAL FEET

For 1/0 AWG and larger, all colors:
- GENERAL CABLE® (PLANT OF MFG) (MM)
- (YY) HIGH SPEED THHN/THWN-2 (UL) SIZE AWG OR KCMIL (MM2) LOGO COMPACT AL GRI AND GRII SUN RES FOR CT USE 600 V VW-1 OR AWM SEQUENTIAL FEET

Options:
- Available in black and full color skin coat

Applications:
- General purpose building wire for services, feeders and branch circuits
- Conduit and raceways

Features:
- 1/0 AWG and larger are rated “FOR CT USE”
- Gas and Oil Res GRI/GRII
- Resistant to abrasion, acids, alkaline, ozone and water
- For THHN applications, the conductor is appropriate for use in dry locations not to exceed 90°C
- For THWN-2 applications, the conductor is appropriate for use in dry locations not to exceed 90°C
- UV/sunlight-resistant (black only), moisture-resistant and flame-retardant insulation
- Excellent electrical, thermal and physical properties
- Sequential foot markings every 2 feet for easy measuring
- Meets cold bend and cold impact tests at -25°C
- STABILOY® Brand AA-8000 aluminum alloy conductors are lightweight and provide increased flexibility for easy installation
- High Speed (HS) cable features a specially designed system that reduces for fast and easy cable pulls

Compliances:
- Industry Compliances:
  - UL B3 Type THHN/THWN-2, UL File E66903
  - IEC 60092-598:2013, NEMA WC70
  - NEC® Article 310
- Flame Test Compliances:
  - UL 2556 VW-1 rated through 1 AWG
  - UL 2556 CT USE 1/0 and larger
- Other Compliances:
  - RoHS Compliant

Packaging:
- Material cut to length and shipped on non-returnable wood reels

Phone: 855-720-2792
www.generalcable.com
STABILOY® Brand XHHW-2 High Speed (HS) 
XLPE, Low-Voltage Power 
600 V, UL Type XHHW-2, Single Conductor, Aluminum

**Product Construction:**

**Conductor:**
- 6 AWG thru 2 AWG Class B compact stranded aluminum alloy (8000 Series) per ASTM B800 and ASTM B801
- 1 AWG thru 350 kcmil compact stranded SIW aluminum alloy (8000 Series) per ASTM B800, ASTM B801 and ASTM B836
- 400 kcmil thru 1000 kcmil Class B compact stranded aluminum alloy (8000 Series) per ASTM B800 and ASTM B801

**Insulation:**
- Flame-retardant Cross-linked Polyethylene (XLPE)

**Print:**
- GENERAL CABLE® (PLANT OF MFG)
- SIZE (AWG OR KCMIL) (MM) COMPACT STABILOY® AA-8030 AL XLPE 600 V XHHW-2 SUN RES (-40˚C) (UL) YEAR DATE (TIME OF MFG) NOM ANCE SEQUENTIAL FOOTAGE

**Options:**
- Other sizes and stranding options available upon request
- VW-1 Flame Rating
- “FOR CT USE” for 1/0 AWG and larger
- Available in non-High Speed
- Available in black and full color skin coat
- FeederPlex HS® Type XHHW-2

**Applications:**
- General purpose building wire for use primarily in conduit or other recognized raceways as specified in the National Electric Code® (NEC®)
- Maximum operating temperature not to exceed 90°C in wet or dry locations
- 600 V approved for use as specified by the NEC®

**Features:**
- Oil Resistant PRI/PRII
- Gas and Oil Res GRI/GRII
- UV/sunlight-resistant, moisture-resistant and flame-retardant insulation in all colors
- Meets cold bend and cold impact tests at -40°C
- Excellent electrical, thermal and physical properties
- Resistant to crush, compression cuts and heat deformation
- STABILOY® Brand AA-8000 aluminum alloy conductors are lightweight and provide increased flexibility for easy installation
- High Speed (HS) cable features a specially designed XLPE insulation that allows for fast and easy cable pulls

**Compliances:**

**Industry Compliances:**
- UL 44 Type XHHW-2, UL File E39406
- National Electric Code® (NEC®)

**Flame Test Compliances:**
- UL 2556 Horizontal Burn
- CT UL 1685
- UL 2556 VW-1

**Other Compliances:**
- OSHA Acceptable
- RoHS Compliant

**Packaging:**
- Material cut to length and shipped on non-returnable wood reels

---

**COLOR CODE CHART**

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<th>COLOR CODE</th>
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Dimensions and weights are nominal; subject to industry tolerances.

(1) Ampacities per NEC® Table 310.15(B)(16). Adjustment and corrections may apply.

Dwelling - For dwelling units, conductors shall be permitted as listed ampacities at 120/240-volt, 3-wire, single-phase services and feeders.

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**SPEC 5180A**
June, 2017
STABILOY® Brand USE-2/RHH/RHW-2
XLPE, Low-Voltage Power
600 V, UL Type USE-2/RHH/RHW-2, Single Conductor, Aluminum

Product Construction:
Conductor:
- 6 AWG thru 4 AWG Class B compact stranded aluminum alloy (8000 Series) per ASTM B800 and ASTM B801
- 1 AWG thru 350 kcmil compact stranded SW aluminum alloy (8000 Series) per ASTM B800, ASTM B801 and ASTM B836
- 400 kcmil thru 1000 kcmil Class B compact stranded aluminum alloy (8000 Series) per ASTM B800 and ASTM B801

Insulation:
- Flame-retardant Cross-linked Polyethylene (XLPE)

Print:
- GENERAL CABLE® (PLANT OF MFG)

Options:
- Other sizes and stranding options available upon request

Applications:
- STABILOY® Brand Type USE-2/RHH/RHW-2 cable is designed for use in residential, commercial and industrial building applications, and also in underground power distribution and network systems. The cable is also listed for RHH or RHW-2 and is suitable for installation on both sides of service points.
- Triple-Rated (USE-2 or RHH or RHW-2 URD) conductors can be used as Type USE-2 direct-buried underground service entrance cable, but are also listed as RHH and RHW-2, making them suitable for interior and exterior applications in raceways for general purpose lighting and power circuits covered under the National Electrical Code®.
- 600 V approved for use as specified by the NEC®

Features:
- Rated 90°C wet or dry locations
- Oil Resistant PRI/PRII
- Gas and Oil Res GR/GRII
- UV/sunlight-resistant, moisture-resistant and flame-retardant insulation
- Meets cold bend and cold impact tests at -40°C
- Excellent electrical, thermal and physical properties
- Resistant to crush, compression cuts and heat deformation
- STABILOY® Brand AA-8000 aluminum alloy conductors are lightweight and provide increased flexibility for easy installation

Compliances:
- Industry Compliances:
  - UL 854 Type USE-2, UL File #E39725
  - UL 44 for Types RHH and RHW-2, UL File #E39406
  - National Electrical Code (NEC®)
- Flame Test Compliances:
  - UL 2556 Horizontal Burn
- Other Compliances:
  - OSHA Acceptable
  - RoHS Compliant

Packaging:
- Material cut to length and shipped on non-returnable wood reels

Dimensions and weights are nominal; subject to industry tolerances.
* Non-stock item; minimum runs apply. Please consult Customer Service for price and delivery.
(1) Ampacities per NEC® Table 310.15(B)(16). Adjustment and corrections may apply.
Dwelling - For dwelling units, conductors shall be permitted as listed ampacities at 120/240 volt, 3-wire, single-phase services and feeders.
## Aluminum Building Wire — U.S. Market

### STABILOY® Brand Tray Cable

#### XLPE, Low-Voltage Power

- **600 V, UL Type TC-ER, Multi-Conductor, Aluminum**

#### Dimensions and weights are nominal; subject to industry tolerances.

- **600 V, UL Type TC-ER, Multi-Conductor, Aluminum**

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### Insulation:
- Flame-retardant Cross-linked Polyethylene (XLPE)

### Jacket:
- Heat-, moisture- and sunlight-resistant Polyvinyl Chloride (PVC) applied over a taped assembly

#### Markings/Print:
- **GENERAL CABLE® SIZE (AWG OR KCMIL) (MM²) COMPACT STABILOY® AA-8030 AL XLPE 600 V XHHW-2 SUN RES (UL) YEAR DATE (TIME OF MFG) SEQUENTIAL FOOTAGE**

#### Options:
- Other sizes and stranded options available upon request
- Custom constructions and oversize neutrals upon request

#### Applications:
- **“Type TC-ER” is used to supply power to motors and other electrical devices**
- Installed in cable trays, raceways or outdoor location where supported by a messenger wire
- Approved for direct burial and for use in Class I and II, Division 2 hazardous locations per NEC® Article 500
- Rated 600 volt at temperature not to exceed 90°C for wet or dry locations

#### Features:
- Oil resistant PPR/PRII conductors
- Gas and Oil Res GR/GRII conductors
- UV/sunlight-resistant, moisture-resistant and flame-retardant PVC jacket suitable for direct burial
- Excellent electrical, thermal and physical properties
- Resistant to crush, compression cuts and heat deformation
- STABILOY® Brand AA-8000 aluminum alloy conductors are lightweight and provide increased flexibility for easy installation
- Meets cold bend and cold impact tests at -25°C

### Compliances:
- **Industry Compliances:**
  - UL 1277 Type TC Power and Control Cables, UL File # E179238
  - UL 44 Type XHHW-2, UL File # E39406
  - National Electrical Code (NEC®)
- **Flame Test Compliances:**
  - UL 2556 Horizontal Burn
  - UL 2556 FT/RV-1002
- **Other Compliances:**
  - OSHA Acceptable
  - RoHS Compliant

### Packaging:
- Material cut to length and shipped on non-returnable wood reels

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*Non-stock item; minimum runs apply. Please consult Customer Service for price and delivery.*

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**Aluminum U.S. Market**

### SPEC 4555A

June, 2017

**General Cable**

Phone: 855-720-2792

www.generalcable.com

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**Dimensions and weights are nominal; subject to industry tolerances.**

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**Markings/Print:**

- Phased conductor print:
  - **GENERAL CABLE® SIZE (AWG OR KCMIL) (MM²) COMPACT STABILOY® AA-8030 AL XLPE 600 V XHHW-2 SUN RES (UL) YEAR DATE (TIME OF MFG) SEQUENTIAL FOOTAGE**

- **Jacketed print:**
  - **GENERAL CABLE (PLT. OF MFG.), STABILOY® AA-8030 AL TYPE TC-ER XHHW-2 90°C WET OR DRY 600 V ( # OF CDRS) SIZE (AWG OR KCMIL) (MM²) (# OF CDRS) SIZE (AWG OR KCMIL) (MM²) JACKET SUN RES DIR BUR (UL) YEAR DATE (TIME OF MFG) SEQUENTIAL FOOTAGE**
Aluminum Building Wire — U.S. Market

STABILOY® Brand MC (Metal Clad) Cable
XLPE
600 V, UL Type MC, Multi-Conductor, Aluminum

Product Construction:

Conductor:
- 6 AWG thru 2 AWG Class B compact stranded aluminum alloy (8000 Series) per ASTM B800 and ASTM B801
- 1 AWG thru 500 kcmil compact stranded SWG aluminum alloy (8000 Series) per ASTM B800, ASTM B801 and ASTM B836
- 400 kcmil thru 900 kcmil Class B compact stranded aluminum alloy (8000 Series) per ASTM B800 and ASTM B801

Insulation:
- Flame-retardant Cross-linked Polyethylene (XLPE)

Markings/Print:
The cable assembly is identified with a marker tape placed under the binder tape
- GENERAL CABLE® TYPE MC-ST1
- STABILOY® AA-8030 AL 600 V (UL) FOR CT MARKED) FT4/IEEE 1202 NOMANCE

Applications:
STABILOY® Brand MC cable is designed for above-ground applications and is approved for use in many applications including cable tray, power lighting and signal circuits as well as in hazardous locations as permitted in NEC Articles 501, 502, 503 and 504. Ideal for use in cable tray, power lighting and signal circuits as well as in hazardous locations per NEC®

Options:
- 2000 V RHH/RHW-2 is available
- Other sizes and stranding options available upon request
- Custom constructions and oversize neutrals available

Specifications:

**Three Conductor with Ground**

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<th>CONDUCTOR SIZE (AWG/kcmil)</th>
<th>MINIMUM AVERAGE INSULATION THICKNESS</th>
<th>SUB ASSEMBLY</th>
<th>NOMINAL CABLE DIAMETER OVER ARMOR</th>
<th>ALUMINUM CONDUCTOR WEIGHT</th>
<th>NET WEIGHT</th>
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Dimensions and weights are nominal; subject to industry tolerances.

Use the GravityGrip® per NEC® recommendations.
Secure MC Cable without the risk of damage to conductors or running the risk of conductor pull-out.
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<th>NOM. JACKET THICKNESS</th>
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<td>IN mm</td>
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Dimensions and weights are nominal; subject to industry tolerances.

* Non-stock item; minimum runs apply. Please consult Customer Service for price and delivery.

### Aluminum Building Wire — U.S. Market

**STABILOY® Brand MC (Metal Clad) Cable with PVC Jacket**

| XLPE              | 600 V, UL Type MC with PVC Jacket, Multi-Conductor, Aluminum |

#### Product Construction:

**Conductor:**
- 6 AWG thru 2 AWG Class B compact stranded aluminum alloy (6000 Series) per ASTM B800 and ASTM B801
- 1 AWG thru 350 kcmil compact stranded SIW aluminum alloy (6000 Series) per ASTM B800, ASTM B801 and ASTM B805
- 400 kcmil thru 900 kcmil Class B compact stranded aluminum alloy (6000 Series) per ASTM B800 and ASTM B801

**Insulation:**
- Flame-retardant Cross-linked Polyethylene (XLPE)

#### Markings/Print:

- The cable assembly is identified with a marker tape placed under the binder tape
- GENERAL CABLE® TYPE MC-ST1 STABILOY® AA-8030 AL 600 V (UL) FOR CT USE (NOT "ST1" ON JACKETED MC UNLESS SO MARKED) FT4/IEEE 1302 NOM ANCE SEQUENTIAL FOOTAGE

#### Jacketed Print:

- GENERAL CABLE (PLT. OF MFG.) TYPE MC STABILOY® AA-8030 AL 600 V FOR CT USE SUN RES DIRECT BURIAL FT4/IEEE 1302 (40˚C) (# OF CDRS) SIZE (AWG OR KCMIL) (MM) (# OF CDR) SIZE (AWG OR KCMIL) (MM) (UL) YEAR DATE (TIME OF MFG) NOM ANCE SEQUENTIAL FOOTAGE

#### Options:

- 2000 V (HHH/RHW-2) is available
- Other sizes and stranding options available upon request
- Custom constructions and oversize neutrals available

#### Applications:

- Additional applications for STABILOY® MC cable with PVC jacket over armor include:
  - Outdoors
  - In cable tray
  - Direct buried
  - Encased in concrete
  - Exterior/interior temporary power
  - As aerial cable on a messenger
  - In hazardous locations per NEC®
  - Maximum operating temperature not to exceed 90°C in wet or dry locations

#### Features:

- Oil resistant PRI/PRR conductors
- Gas and Oil Res GR/GRII conductors
- UV/sunlight-resistant, for CT use, moisture-resistant and flame-retardant insulation
- 4 AWG and larger meets cold bend and cold impact tests at -40°C
- Excellent electrical, thermal and physical properties

#### Compliances:

- Industry Compliances:
  - UL 1569 Metal-Clad Cables, UL File #E109108
  - UL 44 Type XHHW-2
  - National Electrical Code (NEC®)
  - Flame Test Compliances:
    - CT UL 1665
    - UL 2566 FT4/IEEE 1202
  - Other Compliances:
    - OSHA Acceptable
    - RoHS Compliant

#### Packaging:

- Material cut to length and shipped on non-returnable wood reels
Aluminum Building Wire — U.S. Market

STABILOY® Brand Service Entrance Cable (SEU)
XLPE, Low-Voltage Power
600 V, UL Type SE Style U, Multi-Conductor, Aluminum

Product Construction:

Conductor:
- 8 AWG thru 2 AWG Class B compact stranded aluminum alloy (8000 Series) per ASTM B800 and ASTM B801
- 1 AWG thru 4/0 AWG compact stranded SIW aluminum alloy (8000 Series) per ASTM B800, ASTM B801 and ASTM B836

Insulation:
- Flame-retardant Cross-linked Polyethylene (XLPE)
- Type XHHW-2

Jacket:
- Sunlight-resistant Polyvinyl Chloride (PVC), gray

Print:
- GENERAL CABLE® (PLANT OF MFG)
- STABILOY® AA-8030 AL TYPE SE CABLE
- STYLE U XHHW-2 600 V 2 CDRS SIZE AWG (MM²) 1 CDR SIZE AWG (MM²) SUN RES (UL)
- YEAR DATE (TIME OF MFG) SEQUENTIAL FOOTAGE

Applications:
STABILOY® Brand SEU cable is used in service and feeder applications for dwelling units and other interior wiring applications
- Above-ground service entrance and branch circuit
- Maximum operating temperature not to exceed 90°C in wet or dry locations
- 600 V approved for use as specified by the NEC®

Features:
- Oil Resistant PRI/PRII
- Gas and Oil Res GRI/GRII
- UV/sunlight-resistant, moisture-resistant and flame-retardant insulation
- Excellent electrical, thermal and physical properties
- Smaller cable O.D.
- Meets cold bend and cold impact tests at -40°C

Compliances:
Industry Compliances:
- UL 854 Type SE Style U, UL File #E39725
- UL 44 for Types RHH and RHW-2, UL File #E39406
- National Electrical Code (NEC®)
Flame Test Compliances:
- UL 1581, Vertical Flame 1081
Other Compliances:
- OSHA Acceptable
- RoHS Compliant

Packaging:
- Material available in standard packages and shipped on non-returnable wood reels

Dimensions and weights are nominal; subject to industry tolerances.
* Non-stock item; minimum runs apply. Please consult Customer Service for price and delivery.
(1) Amperages per NEC® Table 310.15(B)(16). Adjustment and corrections may apply.

---

**Table: Product Construction Details**

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Dimensions and weights are nominal; subject to industry tolerances.
* Non-stock item; minimum runs apply. Please consult Customer Service for price and delivery.
(1) Amperages per NEC® Table 310.15(B)(16). Adjustment and corrections may apply.
### Aluminum Building Wire — U.S. Market

**STABILOY® Brand Service Entrance Cable (SER)**

**XLPE, Low-Voltage Power**

**600 V, UL Type SE Style R, Multi-Conductor, Aluminum**

### Product Construction:

**Conductor:**
- 8 AWG thru 2 AWG Class B compact stranded aluminum alloy (8000 Series) per ASTM B800 and ASTM B801
- 1 AWG thru 300 kcmil compact stranded SIW aluminum alloy (8000 Series) per ASTM B800, ASTM B801 and ASTM B836

**Insulation:**
- Flame-retardant Cross-linked Polyethylene (XLPE)
- Type XHHW-2

**Jacket:**
- Sunlight-resistant Polyvinyl Chloride (PVC), gray

**Print:**
- GENERAL CABLE® (PLANT OF MFG)
- STABILOY® AA-8030 AL TYPE SE CABLE
- STYLE R XHHW-2 600 V (NUMBER OF CONDUCTORS) CDRS SIZE (AWG OR KCMIL) (MM²) 1 CDR SIZE AWG (MM²) SUN RES (UL) YEAR DATE (TIME OF MFG) SEQUENTIAL FOOTAGE

### Applications:

STABILOY® Brand SER cable is used in service and feeder applications for dwelling units and other interior wiring applications
- Above-ground service entrance and branch circuit
- Maximum operating temperature not to exceed 90°C in wet or dry locations
- 600 V approved for use as specified by the NEC®

### Features:

- Oil Resistant PRI/PRII
- Gas and Oil Res GRI/GRII
- UV/sunlight-resistant, moisture-resistant and flame-retardant insulation
- Excellent electrical, thermal and physical properties
- Meets cold bend and cold impact tests at -40°C

### Compliances:

**Industry Compliances:**
- UL 854 Type SE Style U, UL File #E39725
- UL 44 for Types RHH and RHW-2, UL File #E39406
- National Electrical Code (NEC®)

**Flame Test Compliances:**
- UL 1581, Vertical Flame

**Other Compliances:**
- OSHA Acceptable
- RoHS Compliant

### Packaging:

- Material available in standard packages and shipped on non-returnable wood reels

---

### Table: STABILOY® Brand Service Entrance Cable (SER)

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Dimensions and weights are nominal; subject to industry tolerances.

* Non-stock item; minimum runs apply. Please consult Customer Service for price and delivery.

(1) Ampacities per NEC® Table 310.15(B)(16). Adjustment and corrections may apply.
## STABILOY® Brand Mobile Home Feeder Cable

**XLPE, Low-Voltage Power**

**600 V, UL Type USE-2/RHH/RHW-2, Multi-Conductor, Aluminum**

### Product Construction:

#### Conductor:
- 6 AWG thru 4 AWG Class B compact stranded aluminum alloy (8000 Series) per ASTM B800 and ASTM B801
- 1 AWG thru 4/0 AWG compact stranded SIW aluminum alloy (8000 Series) per ASTM B800, ASTM B801 and ASTM B836

#### Insulation:
- Flame-retardant Cross-linked Polyethylene (XLPE)

#### Print:
- GENERAL CABLE® (PLANT OF MFG) SIZE AWG (MM) COMPACT STABILOY® AA-8030 AL XLPE 600 V USE-2 OR RHH OR RHW-2 SUN RES (UL) YEAR DATE (TIME OF MFG)

#### Applications:
- STABILOY® Brand mobile home feeder cable is listed for direct burial applications and approved for use in raceways and underground installations in accordance with the requirements of the National Electrical Code®

#### Features:
- Oil Resistant PRI/PRII
- Gas and Oil Res GRI/GRII
- Rated 90°C wet or dry locations
- UV/sunlight-resistant, moisture-resistant and flame-retardant insulation
- Meets cold bend and cold impact tests at -40°C
- Excellent electrical, thermal and physical properties
- Resistant to crush, compression cuts and heat deformation
- STABILOY® Brand AA-8000 aluminum alloy conductors are lightweight and provide increased flexibility for easy installation

#### Compliances:

**Industry Compliances:**
- UL 854 Type USE-2/RHH/RHW-2, UL File #E39725
- UL 44 for Types RHH and RHW-2, UL File #E39406
- National Electrical Code (NEC®)

**Flame Test Compliances:**
- UL 2556 Horizontal Burn

**Other Compliances:**
- OSHA Acceptable
- RoHS Compliant

### Packaging:
- Material available in standard packages and shipped on non-returnable wood reels

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<th>PHASE/NEUTRAL INSULATION THICKNESS</th>
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Dimensions and weights are nominal, subject to industry tolerances.
* Non-stock item; minimum runs apply. Please consult Customer Service for price and delivery.
Aluminum Building Wire — U.S. Market

Notes
General Cable & NUAL® Brand are names synonymous with excellence. We are One Company, with one of the broadest product offerings and global reach in the wire and cable industry. As part of General Cable’s Canadian portfolio of wire and cable products, NUAL Brand aluminum alloy building wire offers RW90, RWU90, AC90 and ACWU90 constructions of power distribution feeder cables.

Our NUAL Brand ACM (Aluminum Conductor Material) conductors were introduced to the Canadian market in 1980. These CSA-certified conductors meet all of the requirements of the Canadian Electrical Code and are specifically formulated for use in building wire applications. Just as important, NUAL Brand conductors provide superior value and quality to the electrical contractor, thereby enabling building owners to create cost-effective, sustainable, energy-efficient structures.

Our distribution centre, technical centre and manufacturing facilities have attained ISO 9001 registrations (Quality Management System) and are certified to and/or have equivalent management systems to 14001 (Environmental Management System) and OHSAS certification 18001 (Occupational Health & Safety Management).

Above all, we believe that our customers’ satisfaction relies equally on the quality of our products and customer service. That's why we work so very hard to ensure that each and every product we manufacture is consistently superior to anything else on the market and delivered with expert service and support.
# Table of Contents

## Section 3

<table>
<thead>
<tr>
<th>PRODUCT DESCRIPTION</th>
<th>SPECIFICATION NUMBER</th>
<th>REVISION DATE</th>
<th>PAGE NUMBER</th>
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<td><strong>NUAL® Brand AC90 Cable</strong></td>
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Aluminum & Copper Building Wire — Canadian Market

NUAL® Brand AC90 Cable
XLPE
600 V, CSA Type AC90, Aluminum

Product Construction:
Conductor:
- 6 AWG thru 2 AWG Class B compact stranded aluminum alloy (8000 Series) per ASTM B800 and ASTM B801
- 1 AWG thru 350 kcmil compact stranded SIW aluminum alloy (8000 Series) per ASTM B800, ASTM B801 and ASTM B836
- 400 kcmil thru 750 kcmil Class B compact stranded aluminum alloy (8000 Series) per ASTM B800 and ASTM B801

Insulation:
- Flame-retardant Cross-linked Polyethylene (XLPE), Type RW90

Print:
- GENERAL CABLE® (PLT. OF MFG.) SIZE (AWG OR KCMIL) AL ACM NUAL® XLPE -40˚C 600 V SUN RES CSA YEAR DATE (TIME OF MFG)

Options:
- Other sizes and stranding options available upon request

Applications:
NUAL® Brand AC90 armored cable is designed for the following above-ground applications:
- For service entrance and feeders
- For power lighting and signal circuits
- Indoor locations
- In cable tray
- In dry locations and embedded in plaster finish on brick or other masonry except in damp or wet conditions
- In certain hazardous locations
- Interior temporary power

Features:
- Rated 90°C dry locations
- UV/sunlight-resistant, moisture-resistant and flame-retardant insulation
- Meets cold and bend impact test at -40°C
- Excellent electrical, thermal and physical properties
- Excellent crush, oil and chemical resistance

Compliances:
Industry Compliances:
- CSA C22.2 No. 38
- CSA C22.2 No. 51
- CSA Approved File # LL 28117
- Canadian Electrical Code (CEC)
Other Compliances:
- OSHA Acceptable
- RoHS Compliant

Packaging:
- Material cut to length and shipped on non-returnable wood reels

Dimensions and weights are nominal; subject to industry tolerances.
### Aluminum & Copper Building Wire — Canadian Market

#### NUAL® Brand ACWU90 Cable

**XLPE**

600 V, CSA Type ACWU90, Aluminum

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### Insulation:

- Flame-retardant Cross-linked Polyethylene (XLPE), Type RW90

### Applications:

- NUAL® Brand ACWU90 armored cable is designed for use in the following applications:
  - Outdoor exposed locations
  - In wet locations (Type RW90 conductors)
  - Direct buried
  - In cable trays
  - Encased in concrete
  - Temporary power
  - As aerial cable on a messenger

### Features:

- Rated 90°C wet or dry locations
- UV/sunlight-resistant, moisture-resistant and flame-retardant insulation
- Meets cold and bend impact test at -40°C
- Excellent electrical, thermal and physical properties
- Excellent crush, oil and chemical resistance
- Rated AG14 (Acid Gas)

### Compliances:

- CSA C22.2 No. 38
- CSA C22.2 No. 51
- CSA C22.2 No. 174 (Hazardous Locations)
- CSA Approved File # LL 28117
- Canadian Electrical Code (CEC)

### Flame Test Compliances:

- CSA FT1 and FT4

### Packaging:

- Material cut to length and shipped on non-returnable wood reels

---

**Dimensions and weights are nominal, subject to industry tolerances.**

---

**Print:**

**Product Construction:**

- 6 AWG thru 2 AWG Class B compact stranded aluminum alloy (8000 Series) per ASTM B800 and ASTM B801
- 1 AWG thru 350 kcmil compact stranded Sw aluminum alloy (8000 Series) per ASTM B800, ASTM B801 and ASTM B836
- 400 kcmil thru 1000 kcmil Class B compact stranded aluminum alloy (8000 Series) per ASTM B800 and ASTM B801

---

**Specifications:**

- **Conductor:**
  - 6 AWG thru 1 AWG Class B compact stranded aluminum alloy (8000 Series) per ASTM B800 and ASTM B801
  - 1 AWG thru 350 kcmil compact stranded aluminum alloy (8000 Series) per ASTM B800, ASTM B801 and ASTM B836
  - 400 kcmil thru 1000 kcmil Class B compact stranded aluminum alloy (8000 Series) per ASTM B800 and ASTM B801

- **Insulation:**
  - Flame-retardant Cross-linked Polyethylene (XLPE), Type RW90

- **Applications:**
  - NUAL® Brand ACWU90 armored cable is designed for use in the following applications:
    - Outdoors (exposed locations)
    - In wet locations (Type RW90 conductors)
    - Direct buried
    - In cable trays
    - Encased in concrete
    - Temporary power
    - As aerial cable on a messenger

- **Features:**
  - Rated 90°C wet or dry locations
  - UV/sunlight-resistant, moisture-resistant and flame-retardant insulation
  - Meets cold and bend impact test at -40°C
  - Excellent electrical, thermal and physical properties
  - Excellent crush, oil and chemical resistance
  - Rated AG14 (Acid Gas)

- **Compliances:**
  - CSA C22.2 No. 38
  - CSA C22.2 No. 51
  - CSA C22.2 No. 174 (Hazardous Locations)
  - CSA Approved File # LL 28117
  - Canadian Electrical Code (CEC)

- **Flame Test Compliances:**
  - CSA FT1 and FT4

- **Other Compliances:**
  - CSA Acceptable
  - RoHS Compliant
Aluminum & Copper Building Wire — Canadian Market

NUAL® Brand RW90 High Speed (HS) XLPE, Low-Voltage Power 600 V, CSA Type RW90, Single Conductor, Aluminum

Product Construction:

Conductor:
- 8 AWG thru 2 AWG Class B compact stranded aluminum alloy (8000 Series) per ASTM B800 and ASTM B801
- 1 AWG thru 1000 kcmil compact stranded SW aluminum alloy (8000 Series) per ASTM B800, ASTM B801 and ASTM B836
- 400 kcmil thru 1000 kcmil Class B compact stranded aluminum alloy (8000 Series) per ASTM B800 and ASTM B801

Insulation:
- Flame-retardant Cross-linked Polyethylene (XLPE)

Print:
- GENERAL CABLE® (PLANT OF MFG) SIZE (AWG OR KCMIL/MM) AL ACM NUAL® RW90 XLPE HS (-40˚C) 600 V SUN RES CSA LL 28117 YEAR DATE (TIME OF MFG) SEQUENTIAL METER MARK

Options:
- Other sizes and stranding options available upon request
- Available in non-High Speed
- Available in black and full color skin coat
- Available in FeederPlex HS® Type RW90

Applications:
- In accordance with Canadian Electrical Code (CEC), Part 1
- For wiring exposed to the weather
- For use in raceways (except cable trays) in dry, damp or wet locations in accordance with Canadian Electrical Code (CEC)
- For termination and splicing of aluminum conductors, refer to CEC Rule 12-118
- Type RW90 XPLE is certified to be pulled into underground ducts
- Standard RW90 XLPE is not approved for direct burial in the earth

Features:
- Rated 90°C wet and dry locations
- UV/sunlight-resistant, moisture-resistant and flame-retardant insulation in all colors
- Meets cold bend and cold impact tests at -40°C
- Excellent electrical, thermal and physical properties
- Resistant to crush, compression cuts and heat deformation
- High Speed (HS) cable features a specially designed XLPE insulation that allows for fast and easy cable pulls

Compliances:
- Industry Compliances:
  - CSA C22.2 No. 38 Type RW90, CSA File # LL 28117
  - Canadian Electrical Code (CEC)
- Other Compliances:
  - OSHA Acceptable
  - RoHS Compliant

Packaging:
- Material cut to length and shipped on non-returnable wood reels

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Product Construction:

Conductor:
- 8 AWG thru 2 AWG Class B compact stranded aluminum alloy (8000 Series) per ASTM B800 and ASTM B801
- 1 AWG thru 350 kcmil compact stranded SW aluminum alloy (8000 Series) per ASTM B800, ASTM B801 and ASTM B836
- 400 kcmil thru 1000 kcmil Class B compact stranded aluminum alloy (8000 Series) per ASTM B800 and ASTM B801

Insulation:
- Flame-retardant Cross-linked Polyethylene (XLPE)

Print:
- GENERAL CABLE® (PLANT OF MFG) SIZE (AWG OR KCMIL)/MM® AL ACM NUAL® RWU90 XLPE HS (-40°C) 600 V SUN RES CSA LL 28117 YEAR DATE (TIME OF MFG) SEQUENTIAL METER MARK

Options:
- Other sizes and stranding options available upon request
- Available in black and full color skin coat

Applications:
- In accordance with Canadian Electrical Code (CEC), Part 1
- For wiring exposed to the weather
- For use in raceways (except cable trays) in dry, damp or wet locations in accordance with Canadian Electrical Code (CEC)
- For termination and splicing of aluminum conductors, refer to CEC Rule 12-118

Features:
- Rated 90°C wet and dry locations
- UV/sunlight-resistant, moisture-resistant and flame-retardant insulation in all colors
- Meets cold bend and cold impact tests at -40°C
- Excellent electrical, thermal and physical properties
- Resistant to crush, compression cuts and heat deformation
- Rated for direct burial
- High Speed (HS) cable features a specially designed XLPE insulation that allows for fast and easy cable pulls

Compliances:
- Industry Compliances:
  - CSA C22.2 No. 38 Type RWU90, CSA File # LL 28117
  - Canadian Electrical Code (CEC)
- Other Compliances:
  - OSHA Acceptable
  - RoHS Compliant

Packaging:
- Material cut to length and shipped on non-returnable wood reels
**Product Construction:**

**Conductor:**
- 14 AWG thru 1000 kcmil annealed Class B compressed stranded soft drawn plain copper
- 14 AWG thru 10 AWG solid plain copper

**Insulation:**
- Heat- and moisture-resistant, low-temperature Cross-linked Polyethylene (XLPE), Type RW90, -40°C
- Color code: 14 AWG, 12 AWG, 10 AWG (solid)
  - black, white, red, blue, green, yellow, orange, brown; 10 AWG — black, white, red, blue, green;
  - 8 AWG thru 2 AWG — black, white, red, blue, green; 1 AWG and larger — black (other colors available subject to minimum order quantity)

**Print:**
- 14 AWG through 10 AWG, all colors:
  - **GENERAL CABLE® (PLANT OF MFG) RW90** CSA (SIZE) (MM) (YYYY)
- 8 AWG and larger, all colors:
  - **GENERAL CABLE® (PLANT OF MFG)** (SIZE MM) HIGH SPEED (HS) (MM) (YYYY)
- **7.50M 2M**

**Options:**
- For 1000 volt applications, use RWU90
- PVC jacket (FT1 rating)

**Applications:**
- In accordance with Canadian Electrical Code (CEC), Part 1
- For wiring exposed to the weather (black color only)
- For use in raceways (except cable trays) in dry, damp or wet locations in accordance with Canadian Electrical Code (CEC)
- Refer to CEC, Table 19 for conditions of use

**Features:**
- Rated at 90°C wet or dry
- Meets cold bend and cold impact tests at -40°C
- Sunlight-resistant, black only
- High Speed (HS) cable features a specially designed XLPE insulation that allows for fast and easy cable pulls — 8 AWG and larger

**Compliances:**
- CSA Standard C22.2 No. 38
- CSA Approval File Number 156400

**Packaging:**
- 14 AWG thru 10 AWG — 300 m reels
- 8 AWG thru 350 kcmil — 300 m or 1500 m reels
- 500 kcmil — 300 m or 1200 m reels
- 600 kcmil and 750 kcmil — 600 m reels

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**PACKAGING**

- **14 AWG through 10 AWG**, all colors:
  - GENERAL CABLE® (PLANT OF MFG) RWU90 CSA (SIZE) (SIZE MM) XLPE (-40°C) 1000 V
- **14 AWG and larger, all colors**: GENERAL CABLE® (PLANT OF MFG) 1C (SIZE) (SIZE MM) HIGH SPEED CU XLPE 1000 V RWU90 CSA (-40°C) (MM) (YYYY)
- **8 AWG and larger, black**: GENERAL CABLE® (PLANT OF MFG) 1C (SIZE) (SIZE MM) HIGH SPEED CU XLPE 1000 V RWU90 CSA (-40°C) SR (MM) (YYYY)

**Option:**
- PVC jacket (FT1 rating)

**Applications:**
- For use in raceways (except cable trays) in dry, damp or wet locations in accordance with Canadian Electrical Code (CEC)
- Approved for direct burial per CEC Rule 12-012
- For service entrance below ground
- Refer to CEC, Table 19 for conditions of use

**Features:**
- Rated at 90°C wet or dry
- Meets cold bend and cold impact tests at -40°C
- Sunlight-resistant, black only
- High Speed (HS) cable features a specially designed XLPE insulation that allows for fast and easy cable pulls - 8 AWG and larger

**Compliances:**
- CSA Standard C22.2 No. 38
- CSA Approval File Number 156400

**Packaging:**
- **14 AWG thru 10 AWG**: 300 m reels
- **8 AWG thru 350 kcmil**: 300 m or 1200 m reels
- **500 kcmil and 750 kcmil**: 6000 m reels
Aluminum & Copper Building Wire — Canadian Market

T90 High Speed (HS) PVC, Low-Voltage Power 600 V, CSA Type T90/TWN75, Single Conductor, Copper

Product Construction:
- 14 AWG thru 10 AWG stranded bare annealed copper
- 8 AWG thru 500 kcmil compressed stranded bare annealed copper
- 14 AWG thru 10 AWG solid plain copper

Insulation:
- Color-coded premium-grade flame-retardant, heat- and moisture-resistant Polyvinyl Chloride (PVC)

Jacket:
- Tough Polyamide (Nylon)

Print:
- GENERAL CABLE ® (PLANT OF MFG) (YEAR)

Compliances:
- c(UL) CSA Standard C22.2 No. 75
- RoHS Compliant

Package:
- 14 AWG thru 10 AWG: 300 m reels
- 8 AWG thru 6 AWG: 300 m or 3,000 m reels
- 4 AWG thru 4/0: 300 m or 1,500 m reels
- 250 kcmil thru 500 kcmil: 900 m reels

Dimensions and weights are nominal; subject to industry tolerances.

**Non-stock item; minimum runs apply. Please consult Customer Service for price and delivery.
**Non-standard item; minimum runs apply. Please consult Customer Service for price and delivery.

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Harnessing the Renewable Power of the Sun

Solar Photovoltaic Wire: Why Choose SunGen®?

The SunGen® Difference

As a company committed to environmental stewardship and renewable energy, General Cable has specifically designed its UL 4703 SunGen® suite of photovoltaic (PV) products to effectively and efficiently connect solar panels and concentrated solar power technologies while being able to withstand the harsh operating environments of solar power applications.

- Resistant to UV/sunlight, ozone and water absorption
- Rated for direct burial
- Stable electrical properties over a broad temperature range (-40°C to 90°C)
- Excellent flexibility and performance in low-temperature environments
- Highly resistant to deformation, even in prolonged exposure at high temperatures
- Mechanically rugged construction resists cutting, tearing and abrasions
- CSA RPV90 and RPVU90 options available
- Single and multi-conductor cable constructions
- 18 AWG – 1000 kcmil stranded copper and 6 AWG – 1000 kcmil aluminum conductors

When it comes to the wire and cable for today’s solar energy projects with PV module interconnections within the photovoltaic array, General Cable’s SunGen® UL Listed 4703 PV wire offers far more superior sunlight resistance and low-temperature flexibility for maximum performance and reliability for long-term outdoor exposure to the sun.

SunGen® — the obvious choice for solar photovoltaic applications.

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# Table of Contents

**Section 4** Renewable Energy Cable — Aluminum and Copper

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Renewable Energy Cable

SunGen® Photovoltaic Wire
XLPE, RHH or RHW-2
600 V, UL Type PV, Single Conductor, Aluminum

Product Construction:
Conductor:
• 6 AWG thru 2 AWG Class B compact stranded aluminum alloy (8000 Series) per ASTM B800 and ASTM B801
• 1 AWG thru 350 kcmil compact stranded SW aluminum alloy (8000 Series) per ASTM B800, ASTM B801 and ASTM B836
• 400 kcmil thru 1000 kcmil Class B compact stranded aluminum alloy (8000 Series) per ASTM B800 and ASTM B801

Insulation:
• Flame-retardant Cross-linked Polyethylene (XLPE)
• RHH/RHW-2 (XLPE)

Print:
• GENERAL CABLE® (PLANT OF MFG)
• SUNGEN® AA-8030 AL XLPE 600 V RHH RHW-2 90˚C SUN RES (-40˚C) PV WIRE VW-1 DIR BUR (UL) YEAR DATE (TIME OF MFG)
• SEQUENTIAL FOOTAGE

Options:
• Other sizes and stranding options available upon request
• CT for 1/0 AWG and larger, RHH/RHW-2
• Available in black and full color skin coat

Applications:
• Single conductor, sunlight-resistant, direct burial photovoltaic wire rated 90°C wet or dry, 600 V, for interconnection wiring of grounded and ungrounded photovoltaic power systems described in NEC® Article 690
• Stable electrical properties over a broad temperature range
• General purpose building wire for use primarily in conduit or other recognized raceways as specified in the National Electric Code® (NEC®)
• Maximum operating temperature not to exceed 90°C in wet or dry locations

Features:
• Oil Resistant PRI/PRII
• Gas and Oil Res GRI/GRII
• UV/sunlight-resistant, moisture-resistant and flame-retardant insulation in all colors
• Meets cold bend and cold impact tests at -40°C
• Excellent electrical, thermal and physical properties
• Resistant to crush, compression cuts and heat deformation
• Rated for direct burial

Compliances:
Industry Compliances:
• UL 4703 Type PV, UL File #E343277
• UL 44 Type RHH or RHW-2, UL File #39406
• National Electrical Code (NEC®)

Flame Test Compliances:
• UL 2556 Horizontal Burn
• CT UL 1685, RHH/RHW-2
• VW-1 UL 2556

Other Compliances:
• RoHS Compliant
• OSHA Acceptable

Packaging:
• Material cut to length and shipped on non-returnable wood reels

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Dimensions and weights are nominal; subject to industry tolerances.
* Non-stock item; minimum runs apply. Please consult Customer Service for price and delivery.

(12/2017)
### Renewable Energy Cable

#### SunGen® Photovoltaic Wire

**XLPE, RHH or RHW-2**

1000 V or 2000 V, UL Type PV, Single Conductor, Aluminum

---

**Product Construction:**

**Conductor:**
- 6 AWG thru 2 AWG Class B compact stranded aluminum alloy (8000 Series) per ASTM B800 and ASTM B801
- 1 AWG thru 350 kcmil compact stranded SIW aluminum alloy (8000 Series) per ASTM B800, ASTM B801 and ASTM B836
- 400 kcmil thru 1000 kcmil Class B compact stranded aluminum alloy (8000 Series) per ASTM B800 and ASTM B801

**Insulation:**
- Flame-retardant Cross-linked Polyethylene (XLPE)
- RHH/RHW-2 (XLPE)

**Print:**
- GENERAL CABLE® (PLANT OF MFG) SIZE (AWG OR KCMIL) (MM 2) COMPACT SUNGEN® (VOLTS) PV WIRE OR RHH OR RHW-2 AA-8030 AL XLPE 90°C SUN RES (-40°C) VW-1 DIR BUR (UL) OR (UL) (VOLTS) RP/UV10 FT1 YEAR DATE (TIME OF MFG) SEQUENTIAL FOOTAGE

**Options:**
- Other sizes and stranding options available upon request
- "FOR CT USE" for 1/0 AWG and larger, RHH/RHW-2
- Available in black and full color skin coat

**Applications:**
- Single conductor, sunlight-resistant, direct burial photovoltaic wire rated 90°C wet or dry, 1000 V or 2000 V, for interconnection wiring of grounded and ungrounded photovoltaic power systems described in NEC® Article 690
- Stable electrical properties over a broad temperature range
- General purpose building wire for use primarily in conduit or other recognized raceways as specified in the National Electric Code® (NEC®)
- Maximum operating temperature not to exceed 90°C in wet or dry locations

**Features:**
- Oil Resistant PRI/PRII
- Gas and Oil Res GRI/GRII
- UV/sunlight-resistant, moisture-resistant and flame-retardant insulation in all colors
- Meets cold bend and cold impact tests at -40°C
- Excellent electrical, thermal and physical properties
- Resistant to crush, compression cuts and heat deformation
- Rated for direct burial

**Compliances:**
- Industry Compliances:
  - UL 4703 Type PV, UL File #E343277
  - UL 44 Type RHH or RHW-2, UL File #39406
  - National Electrical Code (NEC®)
- Flame Test Compliances:
  - UL 2556 Horizontal Burn
  - CT UL 1685, RHH/RHW-2
  - VW-1 UL 6556
- Other Compliances:
  - OSHA Acceptable
  - RoHS Compliant

**Packaging:**
- Material cut to length and shipped on non-returnable wood reels

---

### COLOR CODE CHART

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**NOW AVAILABLE IN SUN-RESISTANT COLORS**

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**SPEZ 5851A**

June, 2017

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**Dimensions and weights are nominal; subject to industry tolerances.**

* Non-stock item; minimum runs apply. Please consult Customer Service for price and delivery.

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Renewable Energy Cable

SunGen® Photovoltaic Wire
XLPE
600 V, 1000 V, 2000 V, CSA Type RPV90, Single Conductor, Aluminum

Product Construction:
Conductor:
- 6 AWG thru 1 AWG Class B compact stranded aluminum alloy (8000 Series) per ASTM B800 and ASTM B801
- 1 AWG thru 350 kcmil compact stranded SW aluminum alloy (8000 Series) per ASTM B800, ASTM B801 and ASTM B836
- 400 kcmil thru 1000 kcmil Class B compact stranded aluminum alloy (8000 Series) per ASTM B800 and ASTM B801

Insulation:
- Flame-retardant Cross-linked Polyethylene (XLPE)

Print:
- GENERAL CABLE® (PLANT OF MFG)
- SIZE (AWG OR KCMIL) (MM 2) AL ACM SUNGEN® RPV90 XLPE (-40˚C) (VOLTS) SR CSA LL 28117 YEAR DATE (TIME OF MFG) SEQUENTIAL FOOTAGE

Options:
- Available in black and full color skin coat

Applications:
- Single conductor 600 V, 1000 V and 2000 V photovoltaic wire rated 90°C wet or dry for interconnection wiring of grounded and ungrounded photovoltaic power systems described in CSA 22.2 No. 271
- Stable electrical properties over a broad temperature range

Features:
- Available in 600 V, 1000 V or 2000 V
- Rated 90°C wet or dry locations
- UV/sunlight-resistant, moisture-resistant and flame-retardant insulation
- Resistant to crush, compression cuts and heat deformation

Compliances:
Industry Compliances:
- CSA 22.2 No. 271 File #LL 28117
- Canadian Electrical Code (CEC)
Flame Test Compliances:
- CSA 22.2 No. 2556
- OSHA Acceptable
- RoHS Compliant

Packaging:
- Material cut to length and shipped on non-returnable wood reels

Dimensions and weights are nominal; subject to industry tolerances.
* Non-stock item; minimum runs apply. Please consult Customer Service for price and delivery.

<table>
<thead>
<tr>
<th>COND. SIZE (AWG/kcmil)</th>
<th>NUMBER OF WIRES</th>
<th>NOMINAL CONDUCTOR DIAMETER (IN mm)</th>
<th>NOMINAL INSULATION THICKNESS (IN mm)</th>
<th>NOMINAL CABLE DIAMETER (IN mm)</th>
<th>ALUMINUM CONDUCTOR WEIGHT (LBS/1000 FT)</th>
<th>NET WEIGHT (LBS/1000 FT)</th>
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<td>0.060</td>
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<td>0.469</td>
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<td>1/0'</td>
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<td>3/0'</td>
<td>16</td>
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<td>0.060</td>
<td>1.52</td>
<td>0.581</td>
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<td>4/0'</td>
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<td>750'</td>
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<td>1000'</td>
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<td>1.060</td>
<td>26.92</td>
<td>0.080</td>
<td>2.03</td>
<td>1.220</td>
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</table>

| 6 AWG - 1000 kcmil CONDUCTORS - 1000 V |
| 6' | 7 | 0.169 | 4.29 | 0.060 | 1.52 | 0.289 | 7.34 | 25 | 37 | 46 | 66 |
| 4' | 7 | 0.213 | 5.41 | 0.060 | 1.52 | 0.333 | 8.46 | 39 | 58 | 65 | 97 |
| 2' | 8 | 0.268 | 6.91 | 0.060 | 1.52 | 0.388 | 9.66 | 62 | 92 | 92 | 140 |
| 1' | 10 | 0.337 | 8.56 | 0.060 | 1.52 | 0.469 | 12.62 | 99 | 147 | 142 | 216 |
| 1/0' | 12 | 0.421 | 10.69 | 0.060 | 1.52 | 0.534 | 15.96 | 125 | 186 | 176 | 262 |
| 3/0' | 16 | 0.470 | 11.94 | 0.060 | 1.52 | 0.581 | 14.76 | 199 | 296 | 234 | 362 |
| 4/0' | 19 | 0.514 | 13.06 | 0.060 | 1.52 | 0.630 | 16.00 | 199 | 296 | 262 | 390 |
| 750' | 61 | 0.908 | 23.06 | 0.080 | 2.03 | 1.068 | 27.13 | 706 | 1051 | 813 | 1210 |
| 1000' | 61 | 1.060 | 26.92 | 0.080 | 2.03 | 1.220 | 30.99 | 941 | 1400 | 1066 | 1580 |

| 6 AWG - 1000 kcmil CONDUCTORS - 2000 V |
| 6' | 7 | 0.169 | 4.29 | 0.070 | 1.78 | 0.309 | 7.85 | 25 | 37 | 46 | 66 |
| 4' | 7 | 0.213 | 5.41 | 0.070 | 1.78 | 0.353 | 8.97 | 39 | 58 | 65 | 97 |
| 2' | 8 | 0.268 | 6.91 | 0.070 | 1.78 | 0.408 | 10.36 | 62 | 92 | 92 | 140 |
| 1' | 10 | 0.337 | 8.56 | 0.070 | 1.78 | 0.478 | 12.14 | 79 | 118 | 126 | 189 |
| 1/0' | 12 | 0.421 | 10.69 | 0.070 | 1.78 | 0.517 | 13.13 | 99 | 147 | 152 | 226 |
| 3/0' | 16 | 0.470 | 11.94 | 0.070 | 1.78 | 0.554 | 14.07 | 125 | 186 | 183 | 272 |
| 4/0' | 19 | 0.514 | 13.06 | 0.070 | 1.78 | 0.601 | 15.27 | 158 | 235 | 222 | 330 |
| 750' | 61 | 0.908 | 23.06 | 0.105 | 2.67 | 1.240 | 31.50 | 941 | 1400 | 1081 | 1609 |
| 1000' | 61 | 1.060 | 26.92 | 0.105 | 2.67 | 1.400 | 33.10 | 1400 | 2076 | 1609 | 2470 |

Dimensions and weights are nominal; subject to industry tolerances.
* Non-stock item; minimum runs apply. Please consult Customer Service for price and delivery.
SunGen® Photovoltaic Wire
XLPE
1000 V or 2000 V, CSA Type RPVU90, Single Conductor, Aluminum

Product Construction:
Conductor:
- 6 AWG thru 2 AWG Class B compact stranded aluminum alloy (8000 Series) per ASTM B800 and ASTM B801
- 1 AWG thru 350 kcmil compact stranded SiW aluminum alloy (8000 Series) per ASTM B800, ASTM B801 and ASTM B836
- 400 kcmil thru 1000 kcmil Class B compact stranded aluminum alloy (8000 Series) per ASTM B800 and ASTM B801

Insulation:
- Flame-retardant Cross-linked Polyethylene (XLPE)

Print:
- GENERAL CABLE® (PLANT OF MFG) SIZE (AWG OR KCMIL) (MM²) AL ACM SUNGEN® RPVU90 XLPE (-40˚C) (VOLTS) SR CSA LL 28117 YEAR DATE (TIME OF MFG) SEQUENTIAL FOOTAGE

Options:
- Available in black and full color skin coat

Applications:
- Stable electrical properties over a broad temperature range
- For use in interconnection wiring of grounded and ungrounded photovoltaic power systems as described in CSA 22.2 No. 271

Features:
- Available in 1000 V and 2000 V
- Rated 90°C wet or dry locations
- UV/sunlight-resistant, moisture-resistant and flame-retardant insulation
- Meets cold bend and cold impact tests at -40°C
- Excellent electrical, thermal and physical properties
- Resistant to crush, compression cuts and heat deformation
- Exposed and concealed in wet or dry locations
- Rated for direct burial

Compliances:
Industry Compliances:
- CSA 22.2 No. 271 File #LL 28117
- Canadian Electrical Code (CEC)

Flame Test Compliances:
- CSA C22.2 No. 2556

Other Compliances:
- OSHA Acceptable
- RoHS Compliant

Packaging:
- Material cut to length and shipped on non-returnable wood reels

Dimensions and weights are nominal; subject to industry tolerances.

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<tr>
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<th>MIN. AVG. INSULATION THICKNESS</th>
<th>NOMINAL CABLE DIAMETER</th>
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* Non-stock item; minimum runs apply. Please consult Customer Service for price and delivery.
Product Construction:

Conductor:
- 6 AWG thru 2 AWG Class B compact stranded aluminum alloy (8000 Series) per ASTM B800 and ASTM B801
- 1 AWG thru 350 kcmil compact stranded SIW aluminum alloy (8000 Series) per ASTM B800, ASTM B801 and ASTM B836
- 400 kcmil thru 1000 kcmil Class B compact stranded aluminum alloy (8000 Series) per ASTM B800 and ASTM B801

Insulation:
- Flame-retardant Cross-linked Polyethylene (XLPE)

Print:
- GENERAL CABLE® (PLANT OF MFG)
- STABILOY® AA-8030 AL XLPE 2000 V RHH/RHW-2 SUN RES (UL) ZEPHYR2000™ YEAR DATE (TIME OF MFG)

Options:
- Other sizes and stranding options available upon request
- VW-1 Flame Rating
- “FOR CT USE” for 1/0 AWG and larger
- Available in black and full color skin coat

Applications:
STABILOY® Brand Zephyr2000™ is the aluminum conductor solution for wind power generation, from the turbine to the step-up transformer
- Installed in raceways in accordance with the requirements of the NEC® and may be used in cable trays when marked “FOR CT USE”
- Suitable for use in special applications such as wind power generation

Features:
- Oil Resistant PRI/PRII
- Gas and Oil Res GRI/GRII
- Rated 90°C wet or dry locations
- Sunlight-resistant RHH/RHW-2 (XLPE)
- Meets cold bend and cold impact tests at -40°C
- Excellent electrical, thermal and physical properties
- Resistant to crush, compression cuts and heat deformation

Compliances:
- Industry Compliances:
  - UL 44 Type RHH/RHW-2, UL File E39406
  - National Electrical Code (NEC®)
  - Flame Test Compliances:
    - UL 2556 Horizontal Burn
    - CT UL 1685, RHH/RHW-2
    - UL 2556 VW-1
  - Other Compliances:
    - OSHA Acceptable
    - RoHS Compliant

Packaging:
- Material cut to length and shipped on non-returnable wood reels

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Dimensions and weights are nominal; subject to industry tolerances.
* Non-stock item; minimum runs apply. Please consult Customer Service for price and delivery.
Notes
Product Construction:

Conductor:
- 12 AWG thru 1000 kcmil bare compressed copper. Class B per ASTM B33 and B8
- 12 AWG thru 8 AWG bare copper, compressed, Class B stranding per ASTM B33 and B8
- 12 AWG thru 8 AWG tinned coated compressed copper. Class C stranding per ASTM B33 and B8

Insulation:
- Flame-retardant Cross-linked Polyethylene (XLPE), black

Print:
- GENERAL CABLE® (PLANT OF MFG)
- SUNGEN® 600 V PV WIRE DIR BUR OR RHH OR RHH-2 (SIZE) XLPE 90°C WET OR DRY SUN RESIS UL-40°C VW-1 MONTH/YEAR OF MFG SEQUENTIAL FOOTAGE MARK

Options:
- Bare or tinned copper conductors
- Other stranding options are available upon request
- Now available in colors
- Available in UL 1685 CT Flame rated ≥ 1/0 AWG RHH-2

Applications:
- Single conductor, sunlight-resistant, direct burial photovoltaic wire rated 90°C wet or dry, 600 V for interconnection wiring of grounded and ungrounded photovoltaic power systems as described in Section 690.31(A) and other applicable parts of the National Electrical Code® (NEC), NFPA 70

Features:
- Rated 90°C wet and dry
- Rated for direct burial
- Deformation-resistant at high temperatures
- Excellent moisture resistance, exceeds UL 44
- Stable electrical properties over a broad temperature range
- Increased flexibility
- Resistant to crush and compression cuts
- UV/sunlight-resistant
- Meets cold bend and cold impact tests at -40°C

Compliances:
- Industry Compliances:
  - UL 4703 Type PV, UL File # E343277
  - National Electrical Code (NEC®)
  - UL 44 Type RHH-2, UL File # E39406
- Flame Test Compliances:
  - UL 1911 VW-1
- Other Compliances:
  - EPA 40 CFR, Part 261 for leadable lead content per TCLP
  - OSHA Acceptable
  - RoHS Compliant

Packaging:
- Material cut to length and shipped on non-returnable wood reels

Dimensions and weights are nominal; subject to industry tolerances.
- Non-stack item; minimum runs apply. Please contact Customer Service for price and delivery.
**Renewable Energy Cable**

**SunGen® Photovoltaic Wire**

**XLPE, RHH/RHW-2, VW-1, RPVU90, FT1**

**2000 V, UL Type PV, Single Conductor, Copper**

---

**Product Construction:**

**Conductor:**
- 12 AWG thru 1000 kcmil bare compressed copper. Class B per ASTM B9
- 12 AWG thru 8 AWG bare copper, compressed. Class B stranding per ASTM B33 and B8
- 12 AWG thru 8 AWG tinned coated compressed copper. Class C stranding per ASTM B33 and B8

**Insulation:**
- Flame-retardant Cross-linked Polyethylene (XLPE), black

**Print:**
- GENERAL CABLE® (PLANT OF MFG)
- SUNGEN® 2000 V PV WIRE DIR BUR OR RHH OR RHW-2 (SIZE) XLPE 90°C WET OR DRY, SUN RES UL-486C VW-1 OR C/UL
- 2000 V RPVU90 FT1 MONTH/YEAR OF MFG

**Options:**
- Bare or tinned copper conductors
- Other stranding options are available upon request
- Now available in colors
- Available in UL 1685 CT Flame rated ≥ 1/0 AWG RHW-2

**Applications:**
- Single conductor, sunlight-resistant, direct burial photovoltaic wire rated 90°C wet or dry, 2000 V for interconnection wiring of grounded and ungrounded photovoltaic power systems as described in Section 690.31(A) and other applicable parts of the National Electrical Code® (NEC®), NFPA 70

**Features:**
- Rated 90°C wet and dry
- Rated for direct burial
- Deformation-resistant at high temperatures
- Excellent moisture resistance, exceeds UL 44
- Stable electrical properties under a wide temperature range
- Increased flexibility
- Excellent resistance to crush and compression cuts
- UV-sunlight-resistant
- Meets cold bend and cold impact tests at -40°C

**Compliances:**

**Industry Compliances:**
- UL 4703 Type PV, UL File # E343277
- cUL CSA C22.2 No. 271 RPVU90 File # E343277
- National Electrical Code (NEC®)
- UL 44 Type RHW-2, UL File # E39406

**Flame Test Compliances:**
- UL 1581 VW-1

**Other Compliances:**
- EPA 40 CFR, Part 261 for leachable lead content per TCLP
- OSHA Acceptable
- RoHS Compliant

**Packaging:**
- Material cut to length and shipped on non-returnable wood reels
Product Construction:
Conductor:
- 14 AWG thru 2 AWG tinned coated compressed copper. Class C stranding per ASTM B33 and B8
- 1 AWG thru 1000 kcmil tinned coated compressed copper. Class B stranding per ASTM B33 and B8

Insulation:
Lead-free Ethylene Propylene Rubber (EPR) colored for contrast with black jacket

Jacket:
Black, lead-free, flame-retardant, oil-, chemical- and sunlight-resistant Cross-linked Chlorinated Polyethylene (XL-CPE)

Print:
- GENERAL CABLE® (PLANT OF MFG) SUNGEN® 600 V PV WIRE Dir Bur or RHH or RHW-2 or USE-2 at 600 V, UL Type PV, Single Conductor, Copper

Applications:
- Single conductor, sunlight-resistant, direct burial photovoltaic wire rated 90°C wet or dry, 600 V for interconnection wiring of grounded and ungrounded photovoltaic power systems as described in Section 690.31(A) and other applicable parts of the National Electrical Code® (NEC), NFPA 70

Features:
- Rated 90°C wet and dry
- Rated for direct burial
- Deformation-resistant at high temperatures
- Excellent moisture resistance, exceeds UL 44
- Stable electrical properties over a broad temperature range
- Extra tough, mechanically rugged dual-layer construction
- Increased flexibility
- Resistant to most oils and chemicals
- UV/sunlight-resistant
- Meets cold bend and cold impact tests at -40°C

Compliances:
- UL 4703 Type PV, UL File # E323451
- National Electrical Code (NEC®)
- ISEA S-95-658/NEMA WC70
- UL 44 Type RHH or RHW-2, UL File # E90494 or E54260
- UL 854 Type USE-2 for 600 V, UL File # E90499 or EB6307
- Limited Smoke-Rating per UL
- Flame Test Compliances:
  - UL 1581 VW-1
  - For sizes 1/0 and larger: IEEE 383, IEEE 1202/C R-14
- Other Compliances:
  - EPA 40 CFR, Part 261 for leachable lead content per TCLP
  - OSHA Acceptable
  - RoHS Compliant

Packaging:
- Material cut to length and shipped on non-returnable wood reels

---

### SunGen® Photovoltaic Wire

**Dual Layer EPR/XL-CPE, USE-2 at 600 V, RHH/RHW-2, RWU90**

**600 V, UL Type PV, Single Conductor, Copper**

---

**Product Construction:**

**Conductor:**
- 14 AWG thru 2 AWG tinned coated compressed copper. Class C stranding per ASTM B33 and B8.
- 1 AWG thru 1000 kcmil tinned coated compressed copper. Class B stranding per ASTM B33 and B8.

**Insulation:**
- Lead-free Ethylene Propylene Rubber (EPR) colored for contrast with black jacket.

**Jacket:**
- Black, lead-free, flame-retardant, oil-, chemical- and sunlight-resistant Cross-linked Chlorinated Polyethylene (XL-CPE)

**Print:**
- GENERAL CABLE® (PLANT OF MFG) SUNGEN® 600 V PV WIRE KD Bur or RHH or RHW-2 or USE-2 at 600 V, UL Type PV, Single Conductor, Copper.

**Applications:**
- Single conductor, sunlight-resistant, direct burial photovoltaic wire rated 90°C wet or dry, 600 V for interconnection wiring of grounded and ungrounded photovoltaic power systems as described in Section 690.31(A) and other applicable parts of the National Electrical Code® (NEC), NFPA 70.

**Features:**
- Rated 90°C wet and dry.
- Rated for direct burial.
- Deformation-resistant at high temperatures.
- Excellent moisture resistance, exceeds UL 44.
- Stable electrical properties over a broad temperature range.
- Extra tough, mechanically rugged dual-layer construction.
- Increased flexibility.
- Resistant to most oils and chemicals.
- UV/sunlight-resistant.
- Meets cold bend and cold impact tests at -40°C.

**Compliances:**
- UL 4703 Type PV, UL File # E323451.
- National Electrical Code (NEC®).
- ISEA S-95-658/NEMA WC70.
- UL 44 Type RHH or RHW-2, UL File # E90494 or E54260.
- UL 854 Type USE-2 for 600 V, UL File # E90499 or EB6307.
- Limited Smoke-Rating per UL.
- Flame Test Compliances:
  - UL 1581 VW-1.
  - For sizes 1/0 and larger: IEEE 383, IEEE 1202/C R-14.
- Other Compliances:
  - EPA 40 CFR, Part 261 for leachable lead content per TCLP.
  - OSHA Acceptable.
  - RoHS Compliant.

**Packaging:**
- Material cut to length and shipped on non-returnable wood reels.

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**CATALOG NUMBER**

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Dimensions and weights are nominal; subject to industry tolerances.

*Non-stock item; minimum runs apply. Please contact Customer Service for price and delivery.*
SunGen® Photovoltaic Wire
Dual Layer EPR/XL-CPE, USE-2 at 600 V, RHH/RHW-2, RWU90
2000 V, UL Type PV, Single Conductor, Copper

Product Construction:

Conductor:
- 14 AWG thru 2 AWG tinned coated compressed copper, Class C stranding per ASTM B33 and B8
- 1 AWG thru 1000 kcmil tinned coated compressed copper, Class B stranding per ASTM B33 and B8

Insulation:
- Lead-free Ethylene Propylene Rubber (EPR) colored for contrast with black jacket

Jacket:
- Black, lead-free, flame-retardant, oil-, chemical- and sunlight-resistant Cross-linked Chlorinated Polyethylene (XL-CPE)

Print:
- GENERAL CABLE® (PLANT OF MFG) SUNGEN®

Options:
- Bare copper conductors
- Other stranding options are available upon request
- Now available in colors

Applications:
- Single conductor, sunlight-resistant, direct burial photovoltaic wire rated 90°C wet or dry,
- 2000 V for interconnection wiring of grounded and ungrounded photovoltaic power systems as described in Section 690.31(A) and other applicable parts of the National Electrical Code® (NEC), NFPA 70

Features:
- Rated 90°C wet and dry
- Rated for direct burial
- Deformation-resistant at high temperatures
- Excellent moisture resistance, exceeds UL 44
- Stable electrical properties over a broad temperature range
- Extra tough, mechanically rugged dual-layer construction
- Increased flexibility
- Resistant to most oils and chemicals
- UV/sunlight-resistant
- Meets cold bend and cold impact tests at -40°C

Compliances:

Industry Compliances:
- UL 4703 Type PV, UL File # E323451
- National Electrical Code (NEC®)
- ICEA S-95-658/NEMA WC70
- UL 44 Type RHH or RHW-2, UL File # E90494 or E54260
- UL 684 Type USE-2 for 800 V, UL File # E90499 or E86307
- Limited Smoke Rating per UL or E86307

Flame Test Compliances:
- UL 1581 VW-1
- For sizes 1/0 and larger: IEEE 383, IEEE 1202/CESA FT4

Other Compliances:
- EPA 40 CFR, Part 261 for leachable lead content per TCLP
- OSHA Acceptable
- RoHS Compliant

Packaging:
- Material cut to length and shipped on non-returnable wood reels

Dimensions and weights are nominal, subject to industry tolerances.

* Non-stock item; minimum runs apply. Please contact Customer Service for price and delivery.
# Section 5  Technical Information

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</table>
Tools and Applications

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**STABILOY® Brand Aluminum Building Wire Cable Design Software**

General Cable's cable design software for STABILOY Brand aluminum building wire is a proprietary tool specifically designed for electrical engineers and contractors. This valuable tool performs several essential computations, such as:
- Voltage Drop
- Conduit Fill
- Detailed electrical comparison between copper and STABILOY Brand AA8030 series aluminum alloy conductors
- Ability to design and modify circuits using STABILOY Brand per project and generate documentation as needed

**Mobile Product Cross-Reference**

Web, Reference & Catalog Tools

Looking for General Cable products or their equivalents? Check this link out for our interactive catalog site and the Carol® Brand product cross-references.
# Building Wire Types

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<th>WIRE TYPE</th>
<th>DESCRIPTION</th>
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<tr>
<td>AC90</td>
<td>One to Four Insulated, Phase-Identified NUAL® ACM Conductors and One Bare Bonding Conductor Inside Flexible Interlocked Aluminum Armor. Cross-Linked Polyethylene (XPLE) insulated Conductors are Rated for 90°C, Dry Location (CSA Type).</td>
</tr>
<tr>
<td>ACWU90</td>
<td>Interlocked Aluminum Armor and PVC Jacket is Designed for Direct Burial, Wet Locations or Encased in Concrete. The Outer PVC Jacket on ACWU90 Makes this Durable and Rugged Cable Assembly Approved for Use in Class 1, Zones 1 and 2, and Classes 2 and 3, Divisions 1 and 2 Hazardous Locations. Cross-Linked Polyethylene (XLPE) Insulation Conductors are Rated 90°C Dry and Wet Locations (CSA Type).</td>
</tr>
<tr>
<td>MC</td>
<td>Interlocked Aluminum Armor Type Cable with Cross-linked Polyethylene Insulation (XLPE) XHHW-2 600 V or RHW-2 2000 V, High Heat-Resistant, 90°C Dry and Wet Locations 600 V.</td>
</tr>
<tr>
<td>MCJ</td>
<td>Interlocked Aluminum Armor Type Cable with Cross-linked Polyethylene Insulation (XLPE) XHHW-2 600 V or RHW-2 2000 V, High Heat-Resistant, 90°C Dry and Wet Locations with PVC Jacket.</td>
</tr>
<tr>
<td>MHF</td>
<td>Underground Service Entrance, Cross-linked Polyethylene Insulation (XLPE), 90°C Direct Burial 600 V.</td>
</tr>
<tr>
<td>PV</td>
<td>Single Conductor, Insulated and Integral or Non-Integral Jacketed, Sunlight-Resistant, Photovoltaic Wire Rated 90°C Dry and Wet Locations, 600 V, 1 kV, 2 kV, for Interconnection Wiring of Grounded and Ungrounded Photovoltaic Power Systems (Solar).</td>
</tr>
<tr>
<td>RHH</td>
<td>Rubber (Thermoset) Insulation, High Heat Resistant, 90°C Dry and Damp Locations 600 V.</td>
</tr>
<tr>
<td>RHW</td>
<td>Rubber (Thermoset) Insulation, Heat Resistant, 75°C Dry and Wet Locations 600 V.</td>
</tr>
<tr>
<td>RHW-2*</td>
<td>Rubber (Thermoset) Insulation, Heat Resistant, 90°C Dry and Wet Locations 600 V.</td>
</tr>
<tr>
<td>RW90</td>
<td>Cross-linked Polyethylene Insulation (XLPE), 90°C Dry and Wet Locations (CSA Type) 600 V, 1000 V, 2000 V.</td>
</tr>
<tr>
<td>RWU90</td>
<td>Cross-linked Polyethylene Insulation (XLPE), 90°C Direct Burial (CSA Type) 1 kV.</td>
</tr>
<tr>
<td>SE Style R</td>
<td>Service Entrance Round Construction, THHN/THWN or XHHW/XHHW-2 Insulation, 90°C Dry and 75°C Wet Locations 600 V.</td>
</tr>
<tr>
<td>SE Style U</td>
<td>Service Entrance Uninsulated Concentric Neutral, THHN/THWN or XHHW/XHHW-2 Insulation, 90°C Dry and 75°C Wet Locations 600 V.</td>
</tr>
<tr>
<td>T90</td>
<td>Thermoplastic Insulation, Nylon Jacket 90°C Dry and Damp Locations (CSA Type) 600 V.</td>
</tr>
<tr>
<td>TC</td>
<td>Multi-Conductor Tray Cable, Several Combinations of Insulation and Jacketing Compounds, Cable Tray Use 600 V.</td>
</tr>
<tr>
<td>TFFN</td>
<td>Thermoplastic Insulation, Flexible Fixture Wire, Nylon Jacket, 90°C Dry Locations 600 V.</td>
</tr>
<tr>
<td>THHN</td>
<td>Thermoplastic Insulation, High Heat Resistant, Nylon Jacket, 90°C Dry and Damp Locations 600 V.</td>
</tr>
<tr>
<td>THW</td>
<td>Thermoplastic Insulation, Heat Resistant, 75°C Dry and Wet Locations 600 V.</td>
</tr>
<tr>
<td>THW-2*</td>
<td>Thermoplastic Insulation, Heat Resistant, 90°C Dry and Wet Locations 600 V.</td>
</tr>
<tr>
<td>THWN</td>
<td>Thermoplastic Insulation, Heat Resistant, Nylon Jacket, 75°C Dry and Wet Locations 600 V.</td>
</tr>
<tr>
<td>THWN-2*</td>
<td>Thermoplastic Insulation, Heat Resistant, Nylon Jacket, 90°C Dry and Wet Locations 600 V.</td>
</tr>
<tr>
<td>T WN75</td>
<td>Thermoplastic Insulation, Nylon Jacket 75°C Wet Locations (CSA Type) 600 V.</td>
</tr>
<tr>
<td>USE</td>
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</tr>
<tr>
<td>USE-2*</td>
<td>Underground Service Entrance, Cross-linked Polyethylene Insulation (XLPE), 90°C Direct Burial 600 V.</td>
</tr>
<tr>
<td>USE-2/RHH/RHW-2</td>
<td>Underground Service Entrance, Cross-linked Polyethylene Insulation (XLPE), 90°C Direct Burial USE-2 600 V or RHH/RHW-2 600 V/2000 V.</td>
</tr>
<tr>
<td>XHHW</td>
<td>Cross-linked Polyethylene Insulation (XLPE), High Heat-Resistant, 90°C Dry Locations and 75°C Wet Locations 600 V.</td>
</tr>
<tr>
<td>XHHW-2*</td>
<td>Cross-linked Polyethylene Insulation (XLPE), High Heat-Resistant, 90°C Dry and Wet Locations 600 V.</td>
</tr>
</tbody>
</table>

* -2 is the UL designation for 90°C dry and wet locations.

**Dry Location**  
A location not normally subject to dampness or wetness. A location classified as dry may be temporarily subject to dampness or wetness, as in the case of a building under construction.

**Damp Location**  
Locations protected from weather and not subject to saturation with water or other liquids but subject to moderate degrees of moisture. Examples of such locations include partially protected locations under canopies, marquees, roofed open porches, and like locations, and interior locations subject to moderate degrees of moisture, such as basements, some barns, and some cold storage warehouses.

**Wet Location**  
Installations underground or in concrete slabs or masonry in direct contact with the earth; in locations subject to saturation with waters or other liquids, such as vehicle washing areas; and in unprotected locations exposed to weather.

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Location information based on National Electrical Code Book
Glossary

Abrasion Resistance: Ability of material or cable to resist surface wear.

Accelerated Aging: A test performed on material or cable meant to duplicate long-time environmental conditions in a relatively short space of time.

AC90: Single- or multi-conductor insulated cables with metal interlocked armor without an overall jacket.

A.C. Resistance: The total resistance offered by a device in an alternating current circuit due to inductive and capacitive effects, as well as the direct current resistance.

ACWU90: Single- or multi-conductor insulated cables with metal interlocked armor with an overall jacket. AC90 with a jacket.

Adhesion: The state in which two surfaces are held together by interfacial forces which may be chemical or mechanical in nature.

Adjacent Conductor: Any conductor next to another conductor either in the same multi-conductor cable layer or in adjacent layers.

AEIC: Association of Edison Illuminating Companies.

Aging: The change in properties of a material with time under specific conditions.

AIA: Aluminum Interlocked Armor.

Alloy: A combination of two or more metals to form a new or different metal, having specific or desirable qualities.

Alternating Current (A.C.): An electric current that continually reverses its direction, giving a definite plus and minus wave form at fixed intervals.

Alternating Voltage: The voltage developed across a resistance or impedance through which alternating current is flowing.

Ambient Temperature: Any all-encompassing temperature within a given area.

American Wire Gauge: A standard used in the determination of the physical size of a conductor determined by its circular mil area. Usually expressed as AWG. Also referred to as Brown and Sharpe (B&S) wire gauge.

Ampacity: The maximum current an insulated wire or cable can safely carry without exceeding either the insulation or jacket material limitations. (Same as Current Carrying Capacity.)

Ampere: The unit of current. One ampere is the current flowing through one ohm of resistance at one volt potential.

Anneal: To subject to high heat with subsequent cooling. Annealing is the act of softening the metal by means of heat to render it more flexible.


Apparatus Wire and Cable: Apparatus wire is an overall term used to describe a number of specific wire types including non-automotive battery cables, defroster wire, electric furnace cables, and gas tube sign ignition cables. Also included under this heading in AWG sizes 14 and heavier are appliance wire, fixture wire, machine tool wire, motor and transformer lead wire, pump or well cable, and switchboard and control wire. The National Electrical Manufacturers Association states that apparatus wire is “insulated wire and cable used in connecting electrical apparatus to a power source, also including wire and cable used in the apparatus itself.”

Appliance Wire and Cable: Appliance wiring material is a classification of Underwriters’ Laboratories, Inc., covering insulated wire and cable intended for internal wiring of appliances and equipment. Each construction satisfies the requirements for use in particular applications.

Area of Conductor: The size of a conductor cross-section, measured in circular mils, square inches, etc.

Armor: A braid or wrapping of metal, usually steel or aluminum, used for mechanical protection.

Armored Cable: A cable having a metallic covering for protection against mechanical injury. Also a specific cable construction; Type AC defined by UL4 and NEC® Article 333.

ASA: The American Standards Association, former name of ANSI.

ASME: The American Society of Mechanical Engineers.


AWG: Abbreviation for American Wire Gauge.

AWM: Designation for appliance wiring material.

Balanced Circuit: A circuit so arranged that the impressed voltages on each conductor of the pair are equal in magnitude but opposite in polarity with respect to ground.

Bare Conductor: A conductor having no covering. A conductor with no coating or cladding on the copper.

Bedding: A layer of material applied to a cable immediately below the armoring.

Bending Radius: Radius of curvature that a cable can be safely bent without any adverse effects.

Binder: A spirally served tape or thread used for holding assembled cable components in place awaiting subsequent manufacturing operations.

Branch Circuits: The individual circuits are served from the smaller electrical panels by insulated conductors. These conductors are run through ducts, conduits or raceways. These individual circuits are sometimes referred to as branch circuits. The conductors will provide power from the final overcurrent device (fuse or circuit breaker) protecting the load served. General-use branch circuits supply power to a number of outlets for lighting and appliance loads. Branch circuit conductors are usually #14, #12 or #10 AWG.
**Glossary**

**Breakdown of Insulation:** Failure of an insulation resulting in a flow of current through the insulation. It may be caused by the application of too high voltage or by defects or decay.

**Breakdown Voltage:** The voltage at which the insulation between two conductors breaks down.

**Building Wire:** A general term used for light and power wiring products, 1000 volts or less.

**Bunch Strand:** Any number of conductor strands twisted together in one direction with the same lay length.

**Buried Cable:** A cable installed directly in the earth without use of underground conduit. Also called “direct burial cable.”

**Bus:** A conductor which serves as a common connection for the corresponding conductors of two or more circuits.

**Cable:** A group of individually insulated conductors in twisted or parallel configuration, with or without an overall covering.

**Cable Tray:** A raceway consisting of a prefabricated structure of troughing and fittings, formed and constructed so that cables may be readily installed and removed without injury.

**Cabling:** The act of twisting together two or more insulated components by machine to form a cable.

**Capacitance:** Storage of electrically separated charges between two plates having different potentials. The value depends largely on the surface area of the plates and the distance between them.

**CE Code, CEC:** Canadian Electrical Code.

**Certified Test Report (CTR):** A report providing actual test data on a cable. Tests are normally run by a Quality Control Department, which shows that the product being shipped conforms to test specifications.

**Circuit Sizes:** A popular term for building wire sizes 14 through 10 AWG.

**Circular Mil:** A measurement used for the area of wire, calculated by squaring the diameter. 1 circular mil = (.001)² x 10⁶

**Coefficient of Expansion:** The fractional change in dimension of a material given a unit change in temperature.

**Cold Bend:** Test procedure whereby a sample of wire or cable is wound around a mandrel of a specified size within a cold chamber, at a specified temperature for a given number of turns at a given rate of speed. The sample is then removed and examined for defects or deterioration in the materials or construction.

**Cold Flow:** Permanent deformation of a material due to a mechanical force.

**Color Code:** A color system for circuit identification by use of solid colors, colored stripes, tracers, braids, surface printing, etc.

**Compatibility:** The ability of dissimilar materials to exist in mutual proximity or contact without changing their physical or electrical properties.

**Compound:** A term used to designate an insulating and jacketing material made by mixing two or more ingredients. To compound; the mixing together of two or more different materials to make one material.

**Concentric Stranding:** A central wire surrounded by one or more layers of helically wound strands in a fixed round geometric arrangement. The most common fixed installation type conductors are:

1) Round – no diameter reduction
2) Compressed – approximately 3% diameter reduction
3) Compact – approximately 10% diameter reduction

**Conductivity:** A term used in describing the capability of a material to carry an electrical charge. Usually expressed as a percentage of copper conductivity copper being one hundred percent (100%).

**Conductor:** Any material capable of carrying an electrical charge easily.

**Conduit:** A tube or trough for protecting electrical wires and cables. It may be a solid or flexible tube in which insulated electrical wires are run.

**Connector:** A device used to physically and electrically connect two or more conductors.

**Continuity Check:** A test to determine whether electrical current flows continuously throughout the length of a single wire or individual wires in a cable.

**Continuous Vulcanization:** Simultaneous extrusion and vulcanization of wire coating materials in a continuous process.

**Core:** In cables, a term used to denote a component or assembly of components, over which other materials are applied, such as additional components, shield, sheath, or armor.

**Corrosion:** The process or result of a material being eaten or worn away, usually by chemical reaction.

**Counterpoise:** Bare copper, usually soft drawn, buried around the perimeter of a structure for grounding purposes when grounding electrical transmission towers – usually running parallel to the overhead lines along the right-of-way. A grounding installation employed where deep ground rods cannot effectively be used due to dry, rocky, or poor soil.

**Crazing:** The minute cracks on the surface of plastic materials.

**Creep:** The dimensional change with time of a material under a mechanical load.

**Crimp Termination:** A wire termination that is applied by physical pressure of terminal to wire.

**Cross-Linked:** Inter-molecular bonds between long chain thermoplastic polymers by chemical or electron bombardment means. The properties of the resulting thermosetting material are usually improved.
Glossary

Cross-Sectional Area: The area of the cut surface of an object cut at right angles to the length of the object.


Current: The rate of flow of electricity in a circuit, measured in amperes.

Current, Alternating (A.C.): An electric current that periodically reverses direction of electron flow. The number of full cycles occurring in a given unit of time (one second) is called the frequency of the current.

Current Carrying Capacity: The maximum current an insulated conductor or cable can continuously carry without exceeding its temperature rating. It is also called ampacity.

Current, Direct (D.C.): Electrical current whose electrons flow in one direction only; it may be constant or pulsating as long as their movement is in the same direction.

Cut-Through Resistance: The ability of a material to withstand mechanical pressure, usually a sharp edge of prescribed radius, without separation.

Cycle: The complete sequence of alternation or reversal of the flow of an alternating electric current. (See Hertz.)

D.C.: Abbreviation for “Direct Current.”

Derating Factor: A factor used to reduce the current-carrying capacity of a wire when used in environments other than that for which the value was established.

Dielectric: 1) Any insulating medium which intervenes between two conductors and permits electrostatic attraction and repulsion to take place across it. 2) A material having the property that energy required to establish an electric field is recoverable in whole or in part, as electric energy.

Dielectric Breakdown: The voltage at which a dielectric material is punctured, which is divisible by thickness to give dielectric strength.

Dielectric Constant (K): The ratio of the capacitance of a condenser with dielectric between the electrodes to the capacitance when air is between the electrodes. Also called Permittivity and Specific Inductive Capacity.

Dielectric Strength: The voltage which an insulation can withstand before breakdown occurs. Usually expressed as a voltage gradient (such as volts per mil).

Dielectric Test: A test in which a higher than the rated voltage is applied for a specified time to determine the adequacy of the insulation under normal conditions.

Direct Burial Cable: A cable installed directly in the earth.

Direct Current (D.C.): An electric current which flows in only one direction.

Direction of Lay: The direction, either clock-wise or counterclockwise, of a conductor or group of conductors when looking axially down a cable length.

Drawing: In the manufacturing of wire, pulling the metal through a die or series of dies for reduction of diameter to a specified size.

Duct: An underground or overhead tube used for carrying electrical conductors.

Duty: A characteristic of an electrical service that describes the degree of regularity of the load over time. Continuous Duty - A duty of the load which is substantially constant over prolonged time. Short Time Duty - A duty of the load which is substantially constant for a short and defined time. Intermittent Duty - A duty of the load having defined periods of: (a) Load and no-load, (b) Load and rest, and (c) Load, no load, and rest

Elongation: The fractional increase in length of a material stressed in tension.

Emergency Overloads: Loads which occur when larger than normal currents are carried through a cable or wire over a short period of time.

Embossing: A means of marker identification by means of thermal identification leaving raised lettering on the sheath material or cable.

Extrusion: The process of continuously forcing a plastic or elastomer and a conductor core through a die, thereby applying a continuous coating of insulation or jacket to the core or conductor.

FAA: Federal Aviation Administration.

Farad: A unit of electrical capacity.

Feeder Conductors: The power is distributed from the main load center into sub-panels via feeder cables. Each panel contains over-current protection devices for the circuits it serves.

Filler: (1) A material used in the cable to fill large interstices between electrical components; (2) A substance, often inert, added to a compound to improve properties and/or decrease cost.

Flexible Cable: A multiple conductor cable with a single insulating jacket designed to permit flexibility of separate conductors and flexibility as a whole.
**Technical Information**

**Glossary**

**Fixture Wire:** Fixture wires according to the National Electrical Code are designed for installation in lighting fixtures and in similar equipment where enclosed or protected and not subject to bending or twisting in use. They also are used for connecting lighting fixtures to the conductors of the circuit that supplies the fixtures. Fixture wires shall not be smaller than No. 18. Flexible stranding is used for most fixture wire, but solid conductors may be used in some applications.

**Ground Faults:** Those conditions where electric current flows to the earth and thereby creates a neutral-to-earth voltage.

**Grounding Conductor:** A conductor used to connect equipment of the grounded circuit of a wiring system to a grounding electrode or electrodes.

**GSIA:** Galvanized Steel Interlock Armor.

**Hard Drawn Copper Wire:** Copper wire that has been drawn to size and not annealed.

**Heat Distortion:** Distortion or flow of a material or configuration due to application of heat.

**Heat Resistance:** Ability of a substance to maintain physical and chemical identity and electrical integrity under specified temperature conditions.

**Heat Seal:** In cabling, a method of sealing a tape wrap jacket by means of thermal fusion.

**Heat Shock:** A test to determine stability of a material by sudden exposure to high temperature for a short period of time.

**Hertz (Hz):** A term replacing cycles-per-second as a unit of frequency.

**Hi-Pot:** A test designed to determine the highest voltage that can be applied to a conductor without electrically breaking down the insulation.

**High Temperature Wire and Cable:** Those electrical wires and cables having thermal operating characteristics of 150°C and higher.

**Horizontal Stripe:** A colored stripe running horizontally with the axis of a conductor, sometimes called a longitudinal stripe, used as a means of circuit identification.

**Hygroscopic:** Capable of absorbing and retaining moisture.

**Hz:** Abbreviation for Hertz.

**ICEA:** Insulated Cable Engineers Association (formerly IPCEA).

**IEC:** International Electrotechnical Commission, similar to the ISO in structure and scope.

**IEEE:** Institute of Electrical and Electronics Engineers.

**IMSA:** International Municipal Signal Association.

**Induced Current:** An electric current set up in a circuit by cutting lines of force; a current caused by electromagnetic induction.

**Inductance:** The property of a circuit or circuit element that opposes a change in current flow, thus causing current changes to lag behind voltage changes. It is measured in henrys.

**Insulated Wire:** A conductor of electricity covered with a non-conducting material.

**Insulation:** A non-conductive material usually surrounding or separating two conductive materials. Often called the dielectric in a radio frequency cable.

**Insulation Resistance:** That property of an insulating material which resists electrical current flow through the insulating material when a potential difference is applied.

**Insulation Thickness:** The wall thickness of the applied insulation.

**Interstice:** In cable construction, the space, valley or void left between or around the cable's components.

**ISA:** Instrument Society of America.

**ISO:** International Standards Organization.

**Jacket:** A material covering over a wire insulation or an assembly of components. An overall jacket on a complex cable grouping is also often referred to as a sheath.

**kcmmil:** One thousand circular mils (MCM).

**Kilohertz:** 1,000 Hertz (cycles).

**Kilovolt:** A term denoting one thousand volts.

**Kilowatt:** A term denoting one thousand watts.

**Lay:** The axial distance required for one cabled conductor or conductor strand to complete one revolution about the axis around which it is cabled.

**Lay Direction:** The direction in which the strands of a conductor run over the top of the conductor as they recede from an observer looking along the axis of the conductor.
**Leakage Current:** The undesirable flow of current through or over the surface of an insulation.

**Limiting Oxygen Index:** Percentage of oxygen necessary to support combustion of a specified material.

**Line Drop (Voltage Drop):** A voltage loss occurring between any two points in a power circuit. Such loss, or drop, is due to resistance, reactance or leakage of the circuit, type of cable and configuration.

**Line Voltage:** The value of the potential existing on a supply or power line. Rated voltage of the cables.

**Low-Voltage:** 2 kV or less, most applications for low voltage power are 1000 volts or less.

**LS/NH:** Low Smoke/Non Halogen.

**LSZH:** Low Smoke, Zero Halogen.

**Lug:** A term commonly used to describe a terminal, usually crimped or soldered to the conductor, with provision for screwing down to a terminal.

**Marker Tape:** A tape laid parallel to the conductors under the sheath in a cable, imprinted with the manufacturer’s name and the specification to which the cable is made. Other information such as date of manufacture may also be included.

**Marker Thread:** A colored thread laid parallel and adjacent to the strands of an insulated conductor which identifies the cable manufacturer. It may also denote a temperature rating or the specification to which the cable is made.

**MCM:** One thousand circular mils.

**Megohm:** One million ohms.

**Messenger:** The linear supporting member, usually a high strength steel wire, used as the supporting element of a suspended aerial cable. The messenger may be an integral part of the cable or exterior to it.

**Metal Clad (MC) Cable:** Consists of one or more conductors enclosed in a metallic sheath. The sheath may be a smooth or corrugated metal tube or interlocking metal tape.

**Mho:** The unit of conductivity. The reciprocal of an ohm.

**Mil:** A unit used in measuring diameter of a wire or thickness of insulation over a conductor. One one-thousandth of an inch (.001”).

**Moisture Absorption:** The amount of moisture, in percentage, that a material will absorb under specified conditions.

**MTW:** Machine Tool Wire is a stranded flexible hook-up wire used for the internal wiring of appliances, control wiring for machine tools and in various other building applications.

**Multi-Conductor:** More than one conductor within a single cable.

**Multi-Plexed Conductors:** Three or more completed cables together without filler or common jacket.

**National Electrical Code (NEC):** A consensus standard published by the National Fire Protection Association (NFPA) and incorporated in OSHA regulations.

**NBS:** National Bureau of Standards.

**NEMA:** National Electrical Manufacturers Association.

**Neutral Conductor:** The conductor connected to the neutral point of a system that is intended to carry current under normal conditions.

**Neutral Point:** The common point on a wye-connection in a polyphase system or midpoint on a single phase, 3-wire system of midpoint of a single phase portion of a 3-phase delta system or a midpoint of a 3 wire, direct current system.

**NFPA:** National Fire Protection Association.

**NM-B:** Type NM, Non-Metallic Sheathed Cable. A cable assembly consisting of insulated conductors jacketed with a non-metallic material.

**Nylon:** An abrasion-resistant thermoplastic with good chemical resistance used for wire and cable jacketings.

**Ohm:** Unit of resistance such that a constant current of one ampere produces a force of one volt.

**OSHA:** Abbreviation for Occupational Safety and Health Act. Specifically the Williams-Steiger law passed in 1970 covering all factors relating to safety in places of employment.

**Overall Diameter:** Finished diameter over wire or cable.

**Overcurrent:** Any current in excess of the rated current of equipment or the ampacity of a conductor. It may result from overload, short circuit or ground fault.

**Overlap:** The amount the trailing edge laps over the leading edge of a tape wrap.

**Overload:** Operation of equipment in excess of normal, full-load rating or a conductor in excess of rated ampacity that, when it persists for a sufficient length of time, would cause damage or dangerous overheating. A fault, such as a short circuit or ground fault is not an overload.

**Parallel:** A construction in which two or more conductors are laid parallel, separated by an insulating material.

**Parallel Cable:** Two or more cables used to share the current in heavily loaded power circuits which permits the use of smaller conductors.

**Percentage Conductivity:** Conductivity of a material expressed as a percentage of that of copper. Also used to indicate ratio of conductance between phase conductor and neutral in power cables.

**Plastic:** Also called thermoplastic, high polymeric substances, including both natural and synthetic products, but excluding the rubbers, that are capable of flowing under heat and pressure.
Glossary

**Plasticizer**: A chemical agent added in compounding plastics to make them softer and more flexible.

**Polyethylene**: A family of insulating materials derived from polymerization of ethylene gas. They are basically pure hydrocarbon resins, with excellent dielectric properties.

**Polymer**: A substance made of many repeating chemical units or molecules. The term polymer is often used in place of plastic, rubber, or elastomer.

**Polyolefin**: A family of thermoplastics based upon the unsaturated hydrocarbons known as olefins. When combined with butylene or styrene polymers, they form compounds such as polyethylene and polypropylene.

**Polypropylene**: A thermoplastic polymer of propylene.

**Polyvinyl Chloride (PVC)**: A thermoplastic material composed of polymers of vinyl-chloride which may be rigid or elastomeric, depending on specific formulation.

**Porosity**: Multiple air voids in an insulation or jacket wall.

**Power Factor**: The ratio of resistance to impedance. The ratio of the actual power of an alternating current to apparent power. Mathematically, the cosine of the angle between the voltage applied and the current resulting.

**Pulling Eye**: A device which may be fastened to the conductor or conductors of a cable or formed by or fastened to the wire armor and to which a hook or rope may be directly attached in order to pull the cable into or from a duct.

**Put-Up**: Refers to packaging of wire and cable. The term itself refers to the packaged product that is ready to be stored or shipped.

**Quadruplex Cable**: Assembly of four single conductors twisted together.

**Rated Temperature**: The maximum temperature at which an electric component can operate for extended periods without loss of its basic properties.

**Rated Voltage**: The maximum voltage at which an electric component can operate for extended periods without undue degradation or safety hazard.

**REA**: Rural Electrification Administration.

**Reel Drum Diameter**: Diameter of the drum (or hub) of the reel.

**Reel Flange Diameter (Reel Height)**: Diameter of the reel flanges.

**Reel Traverse**: Width of space between reel flanges.

**Reel Width**: Overall width of reel.

**Resistance**: In D.C. circuits, the opposition a material offers to current, measured in ohms. In A.C. circuits, resistance is the real component of impedance and may be higher than the value measured at D.C.

**RHH**: Rubber-insulated building wire, heat- and moisture-resistant, 90°C dry or 75°C wet locations.

**RHH-2**: Rubber-insulated building wire, heat- and moisture-resistant, 90°C wet or dry locations.

**RHW**: Rubber-insulated building wire, heat- and moisture-resistant, 90°C dry or 75°C wet locations.

**RHW-2**: Rubber-insulated building wire, heat- and moisture-resistant, 90°C dry or wet locations.

**Ridge Marker**: One or more ridges running laterally along the outer surface of an insulated wire or cable for purpose of identification.

**Separator**: Pertaining to wire and cable, a layer of insulating material such as textile, paper, etc., which is placed between a conductor and its dielectric, between a cable jacket and the components it covers, or between various components of a multi-conductor cable. It can be utilized to improve stripping qualities and/or flexibility, or can offer additional mechanical or electrical protection to the components it separates.

**Serve**: Any filament or group of filaments, such as wires or fibers helically wound around a central core.

**Service Conductors**: In commercial and industrial applications, power is typically wired into the building to a main load center. Power is carried directly from a step-down transformer by a secondary service cable. Depending on the application, the step-down transformer may be mounted on a utility pole or mounted at ground level in enclosed box.

**Service Drop**: The overhead electric service conductors from the last pole or other aerial support to and including the splices, if any connecting to the service entrance conductors at the building or other structure.
Sheath: The material, usually an extruded plastic or elastomer, applied outermost to a wire or cable. Very often referred to as a jacket.

Short Circuit Current Rating: The prospective symmetrical fault current at a nominal voltage to which an apparatus or system is able to be connected without sustaining damage exceeding defined acceptance criteria.

Shrink Tubing: Tubing which has been extruded, cross-linked and mechanically expanded which, when reheated, will return to its original diameter.

SIA: Steel Interlocked Armor.

SIC: Specific Inductive Capacity.

SIW: Single Input Wire – compressed or compact stranding which may use combinations of a fewer number of individual drawn wire sizes to product finished conductors.

Side Wall Bearing Pressure (SWBP): A term used in reference to the pressure on a cable which is being pulled around a curved surface under tension. If excessive, SWBP can damage cable components and reduce the life of the cable.

Solid Conductor: A conductor consisting of a single wire.

Spark Test: A test designated to locate imperfections (usually pin-holes) in a wire insulation by application of an electrical potential across the material for a very short period of time while the wire is drawn through an electrode field with one end of the wire grounded.

Specific Gravity: The ratio of the weight of any volume of substance to a weight of an equal volume of some substance taken as a standard, usually water for liquids and hydrogen for gases.

Strand: A single uninsulated wire.

Stranded Conductor: A conductor composed of individual groups of wires twisted together to form an entire unit.

Surge: A temporary and relatively large increase in the voltage or current in an electrical circuit or cable. Also called transient.

T90 Nylon: Nylon jacketed thermoplastic insulated conductor, primarily intended for installation in raceways.

Tank Test: A term used to describe a voltage dielectric test where the specimen to be tested is submerged in a liquid (usually water) and a voltage potential applied between the conductor and the liquid as ground.

TECK90: Armored cable characterized by an assembly of insulated conductors covered by an inner jacket, interlocked metallic armor, and outer covering, for use in a wide variety of industrial and other applications.

Temperature Rating: The maximum temperature at which insulating material may be used in continuous operation without loss of its basic properties.

Tensile Strength: A term denoting the greatest longitudinal tensile stress a substance can bear without tearing apart or rupturing.

TFFN: Thermoplastic insulation, flexible fixture wire, nylon jacket, 90°C dry locations 600 V

Thermoplastic: Material that will resoften on heating above a critical temperature peculiar to the material.

Thermosetting: Term describing insulation that will not resoften or distort from its formed shape by heating until a destructive temperature is reached.

THHN: 90°C, 600 volt, nylon jacketed building wire for dry and damp locations.

THHN-2: Incorrect reference commonly misapplied when THWN-2 is called out.

THW: Thermoplastic, vinyl insulated building wire. Flame-retardant, moisture- and heat-resistant, 75°C, dry and wet locations.

THWN: 75°C, 600 volt, nylon jacketed building wire for dry and wet locations.

THWN-2: 90°C, 600 volt, nylon jacketed building wire for dry and wet locations.

Tinned Copper: Tin coating over copper to aid in soldering and inhibit corrosion.

Tinned Wire: Copper wire that has been coated with a layer of tin or solder to simplify soldering.

Tray: A cable tray is a unit or assembly of units or sections and associated fittings, made of noncombustible materials, forming a rigid structural system used to support cables.

Tray Cable: A factory-assembled multi-conductor or multi-pair control, signal or power cable specifically approved under the National Electrical Code for installation in trays.

Triplexed Cable: Three individual cables twisted together without fillers or a common jacket.

UD: Underground Distribution.

UF: Thermoplastic underground feeder and branch circuit cable.

UL: Underwriters Laboratories. An independent organization which operates a listing service for electrical and electronic materials and equipment (Canadian counterpart is CSA).
Glossary

Ungrounded: Not connected to ground or to a conductive body that extends the ground connection.

Unidirectional Concentric Stranding: Consists of a central wire surrounded by one or more layers with lay direction the same for successive layers and with the length of the lay increased for each successive layer. Normal direction of lay of the outer layer is left-hand.

Unidirectional Stranding: A term denoting that, in a stranded conductor, all layers have the same direction of lay.

Unilay: More than one layer of helically laid wires with the direction of lay and length of lay the same for all layers.

Unilay Stranding: A bunched construction having 19, 27, 37, or any number of strands which might be found in a concentric stranding.

URD: Underground Residential Distribution.

USE: NEC Type Underground Service Entrance Cable, 90°C dry or 75°C wet locations.

USE-2: NEC Type Underground Service Entrance Cable, 90°C dry or wet locations.

Valley: Any void between the insulated conductors of a cable or between a cable core and its covering. See also interstice.

Volt: A unit of electrical pressure. One volt is the amount of pressure that will cause one ampere of current in one ohm of resistance.

Voltage: The term most often used in place of electromotive force, potential, potential difference, or voltage drop, to designate electric pressure that exists between two points and is capable of producing a flow of current when a closed circuit is connected between the two points.

Voltage Drop: The amount of voltage loss from original input in a conductor of given size and length or over a connection such as a termination.

Voltage Rating: The highest voltage that may be continuously applied to a wire or cord in conformance with standards or specifications.

VW-1: A flammability rating established by Underwriters’ Laboratories for wires and cables that pass a specially designed vertical flame test, formerly designated FR-1.

Wall Thickness: The thickness of the applied insulation or jacket.

Watt: A unit of electrical power. One watt is equivalent to the power represented by one ampere of current under a pressure of one volt in a D.C. circuit.

Wicking: The longitudinal flow of a liquid in a wire or cable construction due to capillary action.

Wire: (1) A single piece of slender, flexible metal ranging in approximate size from a piece that is difficult to bend by hand to a fine thread; (2) Several wires (as in 1) twisted together; (3) Wires (as in 1 or 2) that are insulated.

Wire Gauge: A measure of the diameter or sizes of wires. The sizes are expressed by numbers.

XHHW: Heat and moisture-resistant Cross-linked Polyethylene insulated building wire, 90°C dry, 75°C wet.

XHHW-2: Ditto, 90°C wet or dry.

XLP: Cross-linked Polyethylene.

XLPE: Also Cross-linked Polyethylene.
## Metric Conversion Factors

<table>
<thead>
<tr>
<th>To Convert From</th>
<th>To</th>
<th>Multiply By</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Millimeters</td>
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<tr>
<td>Meters</td>
<td>Feet</td>
<td>3.2808</td>
</tr>
<tr>
<td>Kilofeet (1000 feet)</td>
<td>Kilometers</td>
<td>0.3048</td>
</tr>
<tr>
<td>Kilometers</td>
<td>Kilofeet (1000 feet)</td>
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<td>Square Inches</td>
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<td>Megohms—Kilofeet</td>
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<td>Kilo Pascal*</td>
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<td>Newtons</td>
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* 1 Pascal = 1 Newton/square meters
## TABLE 1 – Conductor Reference Table – Stranded Bare Copper Conductor and Aluminum (ACM) Conductor

### Stranded Bare Copper Conductor Standards

<table>
<thead>
<tr>
<th>Conforms to</th>
<th>Standards</th>
</tr>
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<tbody>
<tr>
<td>ASTM B3</td>
<td>Soft or annealed copper wire</td>
</tr>
<tr>
<td>ASTM B8</td>
<td>Concentric lay stranded copper conductors Class B, C and D</td>
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<tr>
<td>ASTM B33</td>
<td>Tinned soft or annealed copper wire</td>
</tr>
<tr>
<td>ASTM B172</td>
<td>Rope lay stranded copper conductors having bunch stranded members Classes I, K and M</td>
</tr>
<tr>
<td>ASTM B173</td>
<td>Rope lay stranded copper conductors having concentric stranded members Classes G and H</td>
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<tr>
<td>ASTM B174</td>
<td>Bunch stranded copper conductors</td>
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<tr>
<td>ASTM B496</td>
<td>Compact round concentric lay stranded copper conductors</td>
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### Aluminum (ACM) Conductor Standards

<table>
<thead>
<tr>
<th>Conforms to</th>
<th>Standards</th>
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<tbody>
<tr>
<td>ASTM B800</td>
<td>Standard specification for 8000 Series aluminum alloy wire for electrical purposes— annealed and intermediate tempers</td>
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<tr>
<td>ASTM B801</td>
<td>Standard specification for concentric-lay-stranded conductors of 8000 Series aluminum alloy for subsequent covering or insulation</td>
</tr>
<tr>
<td>ASTM B836</td>
<td>Standard specification for compact round stranded aluminum conductors using single input wire construction</td>
</tr>
<tr>
<td>ASTM B901</td>
<td>Standard specification for compressed round stranded aluminum conductors using single input wire construction</td>
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</table>

### Concentric Stranding

- **Round**: 100%
- **Compressed**: 97%
- **Compact**: 90%
# Class B and Class C Conductors for General Wiring

## Copper and Aluminum Conductors

### ASTM CLASS B and CLASS C

<table>
<thead>
<tr>
<th>SIZE</th>
<th>CLASS B STRANDING</th>
<th>CLASS C STRANDING</th>
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<th>NOMINAL O.D.</th>
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</table>

Adapted from UL 1581 Reference Standard for Electrical Wires, Cables, and Flexible Cords.
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.
- Always load with flanges on edge and chock and block securely.
- 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” page.

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.

<table>
<thead>
<tr>
<th>Minimum Drum Diameters for Packaging Cables</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of Cable</strong></td>
</tr>
<tr>
<td>1. Single and multiple conductor cable - unshielded 0-2000 V</td>
</tr>
<tr>
<td>2. Single and multiple conductor cable - unshielded 2400 V</td>
</tr>
<tr>
<td>3. Single and multiple conductor cable - wire shield (UniShield®) 5-35 kV</td>
</tr>
<tr>
<td>4. Single and multiple conductor cable - helically applied tape shield (Uniblend®) 5-35 kV</td>
</tr>
<tr>
<td>5. Single and multiple conductor cable - longitudinally applied flat tape shield (Type TC)</td>
</tr>
<tr>
<td>6. Single and multiple conductor cable - Interlocked Armor (Duralox®) 600 V-35 kV</td>
</tr>
<tr>
<td>7. Triplexed single conductors cabled together. The circumscribing overall diameter* shall be multiplied by the factor in 1 - 6 and then by the reduction factor.</td>
</tr>
</tbody>
</table>

*Single conductor times 2.155 times
NEMA WC26 EEMAC201-2007 Binational Wire and Cable Packaging Standard
**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 and should be used within two years or less.

Cables should be stored in a sheltered area. The cable conductor should not be exposed to water.

Cables with a cold temperature marking, e.g. –10°C, –25°C, or –40°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
Cable Feed-In Setups

The following diagrams illustrate various cable feed-in setups:

- Reels on truck
- Apply lube here
- Guide-in tube

Setup for duct close to floor

Setup for overhead, into tray

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

Figure 1

Figure 2
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).

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

Multi-Conductor Cables Having Equal-Sized Conductors, in Parallel or as Multiplexed Assemblies

### ALUMINUM CONDUCTOR

<table>
<thead>
<tr>
<th>AWG/kcmil</th>
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</table>

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

\[
T = \begin{cases} 
0.006 \times \text{cmil} \times n, & \text{if } n < 3 \\
0.006 \times \text{cmil} \times 2, & \text{if } n = 3 \\
0.006 \times \text{cmil} \times n \times 0.8, & \text{if } n > 3 
\end{cases}
\]

When more than two conductors are pulled in parallel in an installation containing bends, the maximum allowable pulling tension is limited to the two conductor columns, regardless of the number of conductors that are being pulled.
### COPPER CONDUCTOR

**Installation – Conductor Maximum Pulling Tensions**

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

<table>
<thead>
<tr>
<th>AWG/kcmil</th>
<th>1</th>
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</table>

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

T = 0.008 x cmil x n, if n ≤ 3
T = 0.008 x cmil x n x 0.8, if n > 3

When more than two conductors are pulled in parallel in an installation containing bends, the maximum allowable pulling tension is limited to the two conductor column, regardless of the number of conductors that are being pulled.
### COPPER CONDUCTOR

<table>
<thead>
<tr>
<th>NUMBER OF CONDUCTORS</th>
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</table>

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.

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

\[ T = 0.008 \times cmil \times n \times 0.8, \text{ if } n > 3 \]
Physical Limitations Training and Bending

Overview
Training is the positioning of cable when it is not under tension. Bending is the positioning of cable when it is under tension. When installing cable, the object is to limit the mechanical forces so that the cable’s physical and electrical characteristics are maintained for the expected service life. Bends in conductors, multi-conductor cables or assemblies of conductors shall be made so that the cable will not be damaged.

A nonshielded cable can tolerate a sharper bend than a shielded cable. This is especially true for cables having helically applied metallic shielding tapes which, when bent too sharply, can separate or buckle and cut into the insulation. Remember that offsets are bends.

The problem is compounded by the fact that most tapes are under jackets that conceal such damage. The extruded polymers used for insulation shields have sufficient conductivity and coverage initially to pass acceptance testing, then fail prematurely due to corona at the shield/insulation interface.

### MINIMUM BENDING RADIUS IN ACCORDANCE WITH NATIONAL ELECTRIC CODE

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Conductors</th>
<th>Shielding</th>
<th>Cable Types</th>
<th>Minimum Bending Radius as a Multiple of Conductor/Assembly Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>600 V</td>
<td>Single</td>
<td>Nonshielded</td>
<td>All</td>
<td>5X</td>
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<tr>
<td>601-2000 V</td>
<td></td>
<td>All</td>
<td></td>
<td>8X</td>
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<tr>
<td>600 V or 2000 V</td>
<td>Multi-conductor or Multiplexed</td>
<td>Nonshielded TC or TC-ER</td>
<td>1 in. (25 mm) or less</td>
<td>Over 1 in. to 2 in. (25 mm to 50 mm)</td>
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<td></td>
<td></td>
<td></td>
<td>4X 5X 6X</td>
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<tr>
<td></td>
<td></td>
<td>MC^1</td>
<td></td>
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<td>12X</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TC or TC-ER</td>
<td>12X</td>
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<td>MC</td>
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<td>12X/7X</td>
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<tr>
<td>Over 2000 V</td>
<td>Single</td>
<td>Nonshielded MV</td>
<td>8X</td>
<td></td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td>7X</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shielded MC and MV</td>
<td>12X^2</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Multi-conductor or Multiplexed</td>
<td>Nonshielded MC and MV</td>
<td>8X</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shielded MC and MV</td>
<td>12X/7X^1/2</td>
<td></td>
</tr>
</tbody>
</table>

1 12 times the diameter of an individual shielded conductor or 7 times the overall cable diameter, whichever is greater.
2 Since UniShield® is a unique construction, there are no applicable values for the bending radius in the NEC. However, General Cable recommends 8 times for single conductors, and for multiplexed or multi-conductor cables, it is 8 times the diameter of the individual conductors or 5 times the overall diameter, whichever is greater, in accordance with ANSI/ICEA S-93-639 5-46 kV Shielded Power Cable for Use in the Transmission and Distribution of Electric Energy.

3 Per 330.24B Interlocked-Type Armor or Continuously Corrugated Metallic Sheath.
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.

<table>
<thead>
<tr>
<th>CABLE TYPE</th>
<th>SWBP¹ (LBS/FT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>300 V and 600 V, Shielded and Nonshielded, Control &amp; Instrumentation (≤ 10 AWG)</td>
<td>500</td>
</tr>
<tr>
<td>600 V and 2400 V Nonshielded Power (≥ 8 AWG)</td>
<td>1200</td>
</tr>
<tr>
<td>5 kV - 46 kV Shielded Power</td>
<td></td>
</tr>
<tr>
<td>Concentric Neutral with Extrude-To-Fill (Encapsulating) Jacket</td>
<td>2000</td>
</tr>
<tr>
<td>Concentric Neutral without Jacket</td>
<td>1200²</td>
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<tr>
<td>LACT Shielded with Overlaying (Sleeved) Jacket</td>
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</tr>
<tr>
<td>Helical Tape Shielded with Overlaying (Sleeved) Jacket</td>
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</tr>
<tr>
<td>Wire Shielded with Overlaying (Sleeved) Jacket</td>
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<tr>
<td>TECK90 and HVTECK Cable (All Voltages)</td>
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<tr>
<td>Interlocked Armored Cable (All Voltages)</td>
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<tr>
<td>CCW® MC-HL Armored Cable (All Voltages)</td>
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</tbody>
</table>

¹ When exceeding 1000 lbs/ft SWBP, proceed with caution.
² For a three-cable pull (triplexed or parallel), a maximum SWBP limit of 750 lbs/ft is recommended.

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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.


“Yellow 77 not recommended for use with UniShield® 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.
The maximum short circuit current which is permitted to flow in the insulated conductor, or the metallic shielding and bonding (grounding) components, is dependent on the duration of the short circuit and the material used in the cable.

**Insulated Conductors Formula**

The graphs on the following pages show the short circuit capability of 10 AWG to 1000 kcmil, copper and aluminum, XLPE and EPR insulated conductors for various periods of time. These graphs are in accordance with ICEA publication P-32-382. The equations are based on the assumption that the duration of the short circuit is so short that the heat generated is contained within the conductor, taking into consideration the temperature limit of the insulation.

The graphs are derived from the following formula:

\[
\text{Copper Conductor} \quad \left( \frac{I}{A} \right)^2 t = 0.0297 \log_{10} \left( \frac{T_1 + 234}{T_2 + 234} \right)
\]

\[
\text{Aluminum Conductor} \quad \left( \frac{I}{A} \right)^2 t = 0.0125 \log_{10} \left( \frac{T_1 + 228}{T_2 + 228} \right)
\]

Which simplify to:

\[
\text{Copper Conductor} \quad I = \frac{0.07195 A}{\sqrt{t}} \quad \text{amperes for MV-90}
\]

\[
\text{Copper Conductor} \quad I = \frac{0.06773 A}{\sqrt{t}} \quad \text{amperes for MV-105}
\]

\[
\text{Aluminum Conductor} \quad I = \frac{0.0470 A}{\sqrt{t}} \quad \text{amperes for MV-90}
\]

\[
\text{Aluminum Conductor} \quad I = \frac{0.044 A}{\sqrt{t}} \quad \text{amperes for MV-105}
\]

Where:  
- \( I \) = Short circuit current (amperes)  
- \( A \) = Conductor cross-sectional area (circular mils)  
- \( t \) = Short circuit duration (seconds)  
- \( T_1 \) = Maximum normal operating temperature, 90°C for MV-90 or 105°C for MV-105  
- \( T_2 \) = Maximum short circuit temperature, 250°C
Short Circuit Currents
Allowable Short Circuit Currents For Thermoset Insulated Copper Conductors
Rated For 90°C Maximum Continuous Operation

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### Short Circuit Currents

Allowable Short Circuit Currents For Thermoset Insulated Copper Conductors Rated For 105°C Maximum Continuous Operation

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MILITARY
Markets: On Land, At Sea, In the Air
Products: Communications Wire & Cable (Cu & Fiber), Shore to Ship Power Cable, Wire Harnesses & Assemblies

MINING
Markets: Surface, Underground
Products: Portable & Trailing Mining Cable, Mine Power Feeder Cable, Industrial Cable

RENEWABLE ENERGY
Markets: Solar, Hydro, Wind
Products: Panel Wire, Cu & AL PV Wire, Tower Wire & Cable, Collection System Cable, Industrial Cable, Utility Cable

OIL, GAS & PETROCHEMICAL
Markets: Upstream, Downstream, Midstream
Products: Offshore Cable, Subsea Cable, Onshore Cable

TELCO
Markets: Independent Telephone Operating Companies (ITOCs), Regional Bell Operating Companies (RBOCs)
Products: Air Core Cable, Filled Core Cable, Wire Products, Central Office Cable

TRANSPORTATION
Markets: Automotive, Agricultural Equipment, Rail & Transit, Heavy Duty & Industrial Trucks, Bus
Products: On-Vehicle Data Communications, Control & Power Wire and Cable, Battery Cable, Primary Wire, Electric Vehicle (EV) Products, Wire Harnesses and Assemblies