General Cable

BUILDING WIRE

COPPER

BUILDING WIRE & CABLE FOR COMMERCIAL AND RESIDENTIAL APPLICATIONS

OCTOBER 2012

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General Cable Wire Wizard SM

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Building Wire

Servicing Commercial and Residential Applications

This catalog contains in-depth information on our full line of building wire power cables newly available today. It features the latest information on products, along with detailed technical and specification data in indexed sections — with an easy-to-use "spec-on-a-page" format.

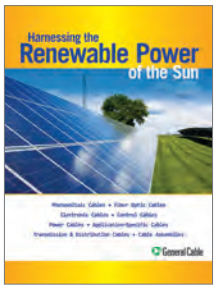
The "spec-on-a-page" format was developed to meet your needs. It features up-to-the-minute product information, from applications and constructions to detailed technical and specification data. There's also a glossary of technical terms for additional assistance.

And, of course, if you need any further data, General Cable's Customer Service staff provides the answers you need quickly and efficiently.

General Cable

What's New?

RENEWABLE POWER OF THE SUN



As a company committed to environmental stewardship and renewable energy, General Cable has specifically designed its SunGen® suite of cabling products to effectively and efficiently link solar PV panels to the grid while being able to withstand the harsh operating environments of solar power applications.

PRODUCT REFERENCE GUIDE

General Cable serves the electrical distribution market with industry-leading brands, including Carol®, BICC® and Brand Rex Brands, for all your industrial, commercial and residential building wire needs. This is a helpful product reference guide which provides additional information on our wide range of functionally equivalent products.

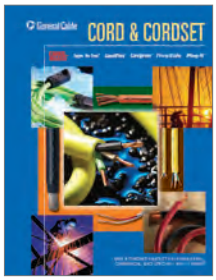
CABLE INSTALLATION MANUAL
NINTH EDITION

General Cable's *Cable Installation Manual for Power and Control Cables* provides installation information for power and control cables for industrial applications. It covers 600 Volts through 46 kV insulated copper conductors. The *Cable Installation Manual* is not a complete representation of the entire line of wire and cable products that General Cable manufactures. General Cable's Customer Service and Technical staff are available to provide answers you need quickly and efficiently.

FULL LINE CATALOGS

Electronics Cables

General Cable's Carol® Brand products fulfill 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 special designs for security systems, fire alarms and audio/video applications.



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 cable for commercial and industrial applications.

General Cable Copper Building Wire

General Cable is pleased to announce its new lineup of Copper Building Wire products. 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 cords, cordsets, and electronics wire and cable that satisfy the fast-changing requirements of the marketplace and communications cables for high-bandwidth voice, data and video applications to General Cable's industrial instrumentation, power and control cables that serve an extensive range of applications and environments. Now add to that a line of Building Wire products.

General Cable has a rich history of experience and innovations with roots dating back to the 1800s. In fact, General Cable invented NM-B at its Rome, New York plant in 1922. As a global leader in the wire and cable industry, General Cable focuses its worldwide resources on providing outstanding quality and delivering maximum value to its customers.

General Cable's reintroduction of a Building Wire product line expands and enhances its current industrial offering with a broader spectrum of copper products that range from 600 to 2,000 volts. Our product portfolio supports both commercial and residential 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 and cable products include copper XHHW-2, tri-rated USE-2, and service entrance products. Canadian constructions such as RW90, RWU90, and T90 are also readily available. Our THHN copper products come in a variety of colors and offer a low-friction jacket designed to improve installation even under the most difficult conditions.

For today's solar energy projects, General Cable offers a complete line of SunGen® solar photovoltaic wire in copper constructions. These specialty products are engineered to meet the rigorous environmental conditions of long-term outdoor exposure to the sun while meeting the needs of this increasingly popular energy source.

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.

General Cable
Phone: 800-243-8020
www.generalcable.com

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Section 2 Technical Information

General Technical Information

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Cable Installation Guidelines

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GREEN INITIATIVE

Our Green Initiative symbol recognizes our role and responsibility in promoting sustainability. The symbol also reflects our commitment to achieving industry-leading standards and responding proactively to environmental global issues.

Look for our products with the RoHS symbol for your green building initiatives.

RoHS Compliant
Directive 2002/95/EC

Visit www.generalcable.com
Select "COMPANY", then select "Corporate Social Responsibility"

General Cable

General Cable

One Company
Connecting the World

General Cable is a leader in the development, design, manufacture, marketing and distribution of copper, aluminum and fiber optic wire and cable for the energy, industrial, specialty and communications markets.

Our products inspire progress worldwide … customers use our value-added products to create global infrastructure that improves the standard of living for people everywhere.

Each day we're building business momentum — developing ideas into innovative solutions and industry-leading products, expanding geographic access and furthering our investment in highly capable associates, Lean Manufacturing, material science and technology resources.

General Cable is influencing the world … with more than two-thirds of our sales generated outside North America, 13,000 associates worldwide and 57 manufacturing facilities throughout 26 countries. As one of the largest wire and cable manufacturers, we are the *One Company Connecting the World.*

Energy Cables

Our cables carry energy across the world — through the air, underground and under the sea. Increasing demand for energy is accelerating investment in exploration, extraction, power generation, transmission and distribution — whether based on coal, natural gas, oil, nuclear, wind, solar or water.

Industrial & Specialty Cables

Our cables channel the power and signals that make equipment hum and engines run. From oil rigs and broadcast studios to cars and trains, and in commercial buildings, public venues, factory floors and special applications such as military, nuclear, marine and mining — we serve an extensive range of markets.

Communications Cables

Our cables keep information flowing — facilitating a non-stop stream of words and images around the world. We meet the high-speed bandwidth needs of global communications networks, from fiber optic submarine communications cables, copper and fiber aerial and underground cables to copper and fiber optic enterprise cables and system solutions.

World Headquarters

General Cable
4 Tesseneer Drive
Highland Heights, KY
41076-9753 U.S.A.

Copper Building Wire

Copper Building Wire is the most frequently specified wiring solution today for commercial and residential construction projects. General Cable offers a complete line of Copper Building Wire to serve virtually all the requirements of the electrical industry.

For commercial projects, General Cable's THHN wire is widely specified for power distribution. Available in a variety of colors to accommodate customers' needs, THHN can handle most electrical wiring applications, from service entrance and feeders to branch circuits.

For harsh industrial environments, Cross-linked Polyethylene (XLPE) insulation is an ideally suited wiring solution. General Cable's Type XHHW-2 is well suited for building wire power distribution, and our Unicon® XLPE wire and cable products can be direct buried in accordance with the National Electric Code (NEC®). Both products offer excellent electrical, thermal and physical properties.

For residential construction, contractors demand non-metallic (NM) sheathed cable. Types NM and UF are very popular for branch wiring. General Cable's NM sheathed cable is lightweight and easy to install, making it the perfect choice for home building and remodeling.

Residential and commercial service entrance cables are also available from General Cable. Type SE is ideal for carrying electric power from service entrance equipment, and it can be used as branch circuits.

General Cable Type TFFN wire can be utilized in a wide array of applications, including fixture wire, machine tool wire and appliance wiring material.

All General Cable's copper building wire products are stocked in our regional distribution centers along with other frequently used Electrical Distribution core items, including portable cord, industrial flex and datacom cabling.

Copper Building Wire 1

PRODUCT DESCRIPTION		SPECIFICATION NUMBER	REVISION DATE	PAGE NUMBER
THHN/THWN-2	PVC, Low-Voltage Power 600 V, UL Type THHN/THWN-2, Single Conductor, Copper LOW FRICTION	5290	Oct. 2012	3-4
T90	PVC, Low-Voltage Power 600 V, CSA Type T90/TWN75, Single Conductor, Copper	5490	Jan. 2012	5
TFFN	PVC, Low-Voltage Power 600 V, UL Type TFFN, Single Conductor, Copper	5280	Oct. 2012	6
XHHW-2 CT	XHHW-2 CT XLPE, Low-Voltage Power 600 V, UL Type XHHW-2, CT Rated, Single Conductor, Copper LOW FRICTION	5175	Jan. 2013	7
XHHW-2 VW-1	XLPE, Control and Low-Voltage Power 600 V, UL Type SIS/XHHW-2, VW-1 Rated, Single Conductor, Copper	5150	Oct. 2012	8
RW90	XLPE, Low-Voltage Power 600 V, CSA Type RW90, Single Conductor, Copper	5500	Jan. 2012	9
RWU90	XLPE, Low-Voltage Power 1000 V, CSA Type RWU90, Single Conductor, Copper	5600	Jan. 2012	10
Unicon® XLPE	XLPE, Low-Voltage Power 600 V, UL Type RHH/RHW-2/USE-2, Single Conductor, Copper	5250	Oct. 2012	11
SunGen® Global	XLPE/LSZH XLPO, Photovoltaic Wire, TÜV 2 pfg 1169/08.2007 PV1-F AC U_0/U 0.6/1 kV, UL 4703, PV Wire 2000 V	5790	May 2012	14
SunGen®	Dual-Layer EPR/XL-CPE, Photovoltaic Wire 600 V, UL Type PV/USE-2/RHH or RHW-2 Single Conductor, Copper	5800	May 2012	15
SunGen®	Dual-Layer EPR/XL-CPE, Photovoltaic Wire 2000 V, UL Type PV/RHH or RHW-2 or 600 V USE-2 Single Conductor, Copper	5810	May 2012	16
SunGen®	XLPE, Photovoltaic Wire 600 V, UL Type PV/USE-2 or 2000 V RHH or RHW-2 or CSA RPVU90, 1000 V Single Conductor, Copper	5840	May 2012	17
SunGen® IC	XLPE, Photovoltaic Wire 600 V, UL Type PV/USE-2 or 2000 V RHH or RHW-2 or CSA RPVU90, 1000 V Single Conductor, Copper	5845	May 2012	18
SunGen®	XLPE, Photovoltaic Wire 2000 V, UL Type PV/RHH or RHW-2 or 600 V USE-2 or CSA RPVU90, 1000 V Single Conductor, Copper	5850	May 2012	19
SunGen® IC	XLPE, Photovoltaic Wire 2000 V, UL Type PV/RHH or RHW-2 or 600 V USE-2 or CSA RPVU90, 1000 V Single Conductor, Copper	5855	May 2012	20
NM-B	PVC, Low-Voltage Power 600 V, UL Type NM-B, Multi-Conductor, Copper	5900	Jan. 2012	21
UF-B and NMC	PVC, Low-Voltage Power 600 V, UL Type UF-B and NMC, Multi-Conductor, Copper	5910	Jan. 2012	22
SE Style U	PVC, Low-Voltage Power 600 V, UL Type SE Style U, Multi-Conductor, Copper	5920	Jan. 2012	23
SE Style R	PVC, Low-Voltage Power 600 V, UL Type SE Style R, Multi-Conductor, Copper	5930	Jan. 2012	24

THHN/THWN-2

PVC, Low-Voltage Power
600 V, Type THHN/THWN-2, Single Conductor, Copper

Ease of Installation LOW FRICTION Reliable Performance

Product Construction:

Conductor:
- 14 AWG thru 750 kcmil bare annealed 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)

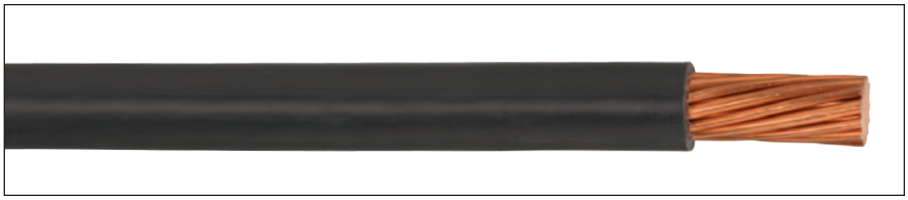
Jacket:
- Tough Polyamide (Nylon)

Print:
For 14 AWG solid thru 10 AWG solid:
- GENERAL CABLE® (PLANT OF MFG) (YEAR OF MFG) THHN/THWN (SIZE) AWG (SIZE mm²) GAS AND OIL RES II 600V VW-1 (UL) E66903 C(UL) T90 NYLON/TWN75 FT1 (-25°C)

For 14 AWG strand thru 10 AWG strand:
- GENERAL CABLE® (PLANT OF MFG) (YEAR OF MFG) THHN/THWN (SIZE) AWG (SIZE mm²) GAS AND OIL RES II 600V VW-1 OR AWM (UL) E66903 C(UL) T90 NYLON/TWN75 FT1 (-25°C)

For 8 AWG thru 1 AWG:
- GENERAL CABLE® (PLANT OF MFG) (YEAR OF MFG) LOW FRICTION THHN/THWN-2 (SIZE) AWG (SIZE mm²) GAS AND OIL RES II 600V VW-1 OR AWM (UL) E66903 C(UL) T90 NYLON/TWN75 FT1 (-25°C)

For 1/0 and larger, black only:
- GENERAL CABLE® (PLANT OF MFG) (YEAR OF MFG) LOW FRICTION THHN/THWN-2 (SIZE) AWG (SIZE mm²) GAS AND OIL RES II OR SUN RES FOR CT USE 600V OR AWM (UL) E66903 C(UL) T90 NYLON/TWN75 FT1 (-25°C)



Print (cont'd.):
For 1/0 and larger, all colors:
- GENERAL CABLE® (PLANT OF MFG) (YEAR OF MFG) LOW FRICTION THHN/THWN-2 (SIZE) AWG (SIZE mm²) CU GAS AND OIL RES II FOR CT USE 600V OR AWM (UL) E66903 C(UL) T90 NYLON/TWN75 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:
- Low Friction Nylon jacket provides easy pulling for 8 AWG and larger
- 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 applications, the conductor is appropriate for use in dry locations not to exceed 90°C
- For THWN-2 applications, the conductor is appropriate for wet or dry locations not to exceed 90°C

Features (cont'd.):
- 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 NFPA79 Electrical Standards for Industrial Machinery
- Sequential foot markings every 2 feet on 8 AWG and larger for easy measuring
- Sunlight-resistant for 1/0 and larger, for black only
- Meets cold bend and cold impact tests at -25°C

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
- RoHS Compliant
- c(UL) – T90 Nylon

Flame Test Compliances:
- UL 2556 VW-1 rated through 1 AWG
- UL 2556 CT USE 1/0 and larger

Packaging:
- Cut-to-length services available for 8 AWG and larger

COLOR CODE CHART

COLOR CODE	COLOR	COLOR CODE	COLOR
1	Black	7	Blue
2	White	8	Orange
3	Red	9	Gray
4	Green	A	Purple
5	Yellow	B	Pink
6	Brown		

PACKAGING CODE CHART

PACKAGING CODE	PACKAGE
10	2x500'
20	4x500'
32	500' Reel
33	1000' Reel
54	2000' Reel
34	2500' Reel
55	5000' Reel
00	Cut to order
XX	Master Reel

THHN/THWN-2

PVC, Low-Voltage Power
600 V, Type THHN/THWN-2, Single Conductor, Copper

Ease of Installation LOW FRICTION Reliable Performance

CATALOG NUMBER	SIZE		NO. OF WIRES	INS. THKN.		JACKET THKN.		NOMINAL CABLE O.D.		COPPER WEIGHT		NET WEIGHT		AMPACITY (1)			PACKAGING PUT-UP CODE
	AWG OR kcmil	mm²		INCHES	mm	INCHES	mm	INCHES	mm	LBS/ 1000 FT	kg/km	LBS/ 1000 FT	kg/km	60°C	75°C	90°C	
TYPE THHN 90°C DRY LOCATIONS/THWN 75°C WET LOCATIONS																	
23014	14	2.08	1	0.015	0.38	0.004	0.10	0.101	2.57	12	18	15	22	15	15	15	20, 34
23012	12	3.31	1	0.015	0.38	0.004	0.10	0.120	3.05	20	29	23	34	20	20	20	20, 34
23010	10	5.26	1	0.020	0.51	0.004	0.10	0.149	3.78	31	47	37	55	20	20	30	10, 34
24014	14	2.08	19	0.015	0.38	0.004	0.10	0.109	2.77	13	19	16	25	15	15	15	20, 34
24012	12	3.31	19	0.015	0.38	0.004	0.10	0.127	3.23	20	30	23	36	20	20	20	20, 34
24010	10	5.26	19	0.020	0.51	0.004	0.10	0.160	4.07	32	48	38	57	30	30	30	10, 34
TYPE THHN/THWN-2 90°C WET OR DRY LOCATIONS																	
25008	8	8.37	19	0.030	0.76	0.005	0.13	0.212	5.39	51	76	62	94	40	50	55	32, 33, XX, 00
25006	6	13.3	19	0.030	0.76	0.005	0.13	0.248	6.30	81	121	94	141	55	65	75	32, 33, XX, 00
25004	4	21.2	19	0.040	1.02	0.006	0.15	0.317	8.06	129	192	153	228	70	85	95	32, 55, XX, 00
25003	3	26.7	19	0.040	1.02	0.006	0.15	0.344	8.74	163	242	189	281	85	100	115	32, 55, XX, 00
25002	2	33.6	19	0.040	1.02	0.006	0.15	0.375	9.53	205	305	233	348	95	115	130	55, XX, 00
25001	1	42.4	19	0.050	1.27	0.007	0.18	0.435	11.05	258	385	298	445	110	130	145	55, XX, 00
26110	1/0	53.5	19	0.050	1.27	0.007	0.18	0.474	12.04	326	485	372	554	125	150	170	55, XX, 00
26210	2/0	67.4	19	0.050	1.27	0.007	0.18	0.518	13.16	411	611	462	687	145	175	195	55, XX, 00
26310	3/0	85	19	0.050	1.27	0.007	0.18	0.568	14.43	518	771	572	851	165	200	225	55, XX, 00
26410	4/0	107	19	0.050	1.27	0.007	0.18	0.624	15.85	653	972	712	1059	195	230	260	55, XX, 00
27250	250	124	37	0.060	1.52	0.008	0.20	0.678	17.23	772	1149	849	1266	215	255	290	55, XX, 00
27300	300	152	37	0.060	1.52	0.008	0.20	0.730	18.54	926	1378	1010	1503	240	285	320	34, XX, 00
27350	350	177	37	0.060	1.52	0.008	0.20	0.777	19.74	1081	1609	1170	1741	260	320	350	34, XX, 00
27400	400	203	37	0.060	1.52	0.008	0.20	0.821	20.85	1235	1838	1330	1979	280	335	380	34, XX, 00
27500	500	253	37	0.060	1.52	0.008	0.20	0.902	22.91	1544	2298	1650	2455	320	380	430	34, XX, 00
27600	600	304	61	0.070	1.78	0.009	0.23	1.051	26.70	1853	2758	2019	3004	350	420	475	54, XX, 00
27750	750	380	61	0.070	1.78	0.009	0.23	1.156	29.36	2316	3447	2466	3670	400	475	535	54, XX, 00

Dimensions and weights are nominal; subject to industry tolerances.

(1) Temperature, size and ampacity per National Electric Code, 2011 NEC sections 110.14(c)(1) (a) & (b).

60°C – When terminated to equipment for circuits rated 100 amperes or less or marked for 14 through 1 AWG conductors.

75°C – When terminated to equipment for circuits rated over 100 amperes or marked for conductors larger than 1 AWG.

90°C – Wet or dry locations. For ampacity derating purposes.

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

UL LISTED c UL RoHS Compliant Directive 2002/95/EC

General Cable
Phone: 800-243-8020
www.generalcable.com

T90

PVC, Low-Voltage Power
600 V, CSA Type T90/TWN75, Single Conductor, Copper

Product Construction:

Conductor:
- 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:
For solids:
- GENERAL CABLE® (PLANT OF MFG) (YEAR OF MFG) THHN/THWN SIZE (AWG OR KCMIL) (MM²) CU GAS AND OIL RES II, 600 VOLTS, VW-1 OR AWM (UL) E-66903 C(UL) T90 NYLON/ TWN75 FT1 (-25°C)

For stranded:
- GENERAL CABLE® (PLANT OF MFG) (YEAR OF MFG) THHN/THWN SIZE (AWG OR KCMIL) (MM²) CU GAS AND OIL RES II, 600 VOLTS, VW-1 OR AWM (UL) E-103886 C(UL) T90 NYLON/TWN75 FT1 (-25°C)

Applications:
- For exposed or concealed wiring in dry or damp locations
- Maximum conductor temperature 90°C dry, 75°C wet and 60°C when exposed to oil
- For use in raceways in dry or damp locations
- Not cable tray rated

Features:
- Rated at 90°C dry or damp locations, 75°C wet
- Rated Gasoline and Oil-Resistant II
- Meets cold bend and cold impact tests at -25°C
- Suitable for installation at –10°C

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

Packaging:
- 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

SIZE		NO. OF WIRES	INSULATION THKN.		JACKET THKN.		NOMINAL CABLE O.D.		COPPER WEIGHT		NET WEIGHT		AMPACITY**	
AWG OR kcmil	mm²		INCHES	mm	INCHES	mm	INCHES	mm	LBS/ 1000 FT	kg/km	LBS/ 1000 FT	kg/km	DAMP OR DRY	WET
14 AWG – 500 kcmil CONDUCTORS														
14	2.08	1	0.015	0.38	0.004	0.10	0.104	2.63	12	18	15	22	25	20
14	2.08	19	0.015	0.38	0.004	0.10	0.112	2.85	12	18	16	23	25	20
12	3.31	1	0.015	0.38	0.004	0.10	0.120	3.06	20	29	23	34	30	25
12	3.31	19	0.015	0.38	0.004	0.10	0.131	3.33	19	29	23	35	30	25
10	5.26	1	0.020	0.51	0.004	0.10	0.152	3.86	31	46	36	54	40	35
10	5.26	19	0.020	0.51	0.004	0.10	0.166	4.21	31	46	37	55	40	35
8	8.37	19	0.030	0.76	0.005	0.13	0.219	5.56	49	73	61	91	55	50
6	13.3	19	0.030	0.76	0.005	0.13	0.257	6.52	78	116	93	138	95	65
4	21.2	13-6	0.040	1.02	0.006	0.15	0.322	8.17	125	186	148	221	95	85
3	26.7	13-6	0.040	1.02	0.006	0.15	0.350	8.88	157	234	184	273	115	100
2	33.6	13-6	0.040	1.02	0.006	0.15	0.382	9.69	198	295	228	339	130	115
1	42.4	13-6	0.050	1.27	0.007	0.18	0.440	11.16	249	371	290	432	145	130
1/0	53.5	13-6	0.050	1.27	0.007	0.18	0.479	12.16	314	468	361	537	170	150
2/0	67.4	13-6	0.050	1.27	0.007	0.18	0.523	13.27	396	590	448	667	195***	175
3/0	85	13-6	0.050	1.27	0.007	0.18	0.573	14.54	499	743	557	829	225	200
4/0	107	13-6	0.050	1.27	0.007	0.18	0.629	15.97	630	938	695	1034	260	230
250	124	37	0.060	1.52	0.008	0.20	0.699	17.77	746	1111	829	1233	290	255
300*	152	3	0.060	1.52	0.008	0.20	0.752	19.11	895	1333	985	1467	320	285
350	177	37	0.060	1.52	0.008	0.20	0.802	20.38	1045	1555	1142	1700	350	310
400*	203	37	0.060	1.52	0.008	0.20	0.847	21.52	1194	1777	1297	1931	380	335
500	253	37	0.060	1.52	0.008	0.20	0.930	23.63	1492	2221	1608	2393	430	380

Dimensions and weights are nominal; subject to industry tolerances.

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

** Based on CEC Part 1 Table 2 Allowable ampacities for not more than three copper conductors in raceway or cable.

*** For 3-wire 120/240 V and 120/208 V service conductors for single dwellings, or for feeder conductors supplying single dwelling units of row housing of apartment and similar buildings, and sized in accordance with Rules 8-200 (1), 8-200 (2) and 8-202 (1), the allowable ampacity for sizes No. 6 and No. 2/0 AWG shall be 60A and 200A, respectively. In this case, the 5% adjustment of Rule 8-106 (1) cannot be applied.

TFFN

PVC, Low-Voltage Power
600 V, 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 TFFN (SIZE) GAS AND OIL RES II 600 V OR MTW OR AWM (UL)

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

Compliances:
- ASTM B3 and B174
- UL Standard 66 for fixture wire
- UL Standard 1063 for machine tool wire (MTW)
- NFPA 70 (NEC® Article 402)
- NFPA 79 as appliance wiring material 600 V

Packaging:
- 4 x 500' in a carton
- 2500' reels

CATALOG NUMBER	SIZE		NO. OF WIRES	INSULATION THKN.		JACKET THKN.		NOMINAL CABLE O.D.		COPPER WEIGHT		NET WEIGHT		AMPACITY (1)
	AWG OR kcmil	mm²		INCHES	mm	INCHES	mm	INCHES	mm	LBS/ 1000 FT	kg/km	LBS/ 1000 FT	kg/km	
18 AWG AND 16 AWG CONDUCTORS														
28018	18	0.82	16	0.015	0.38	0.004	0.10	0.088	2.24	5	7	8	12	6
28016	16	1.31	26	0.015	0.38	0.004	0.10	0.101	2.57	8	12	11	16	8

Dimensions and weights are nominal; subject to industry tolerances.

(1) Allowable ampacities shown are for general use as specified by the 2011 edition of the National Electric Code, section 402, Table 402.5. Adjustments 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

COLOR CODE	COLOR	COLOR CODE	COLOR
1	Black	**7**	Blue
2	White	**8**	Orange
3	Red	**9**	Gray
4	Green	**A**	Purple
5	Yellow	**B**	Pink
6	Brown		

PACKAGING CODE CHART

PACKAGING CODE	PACKAGE
20	4 x 500'
34	2500' Reel

XHHW-2 CT

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

Ease of Installation LOW FRICTION Reliable Performance

Product Construction:

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

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

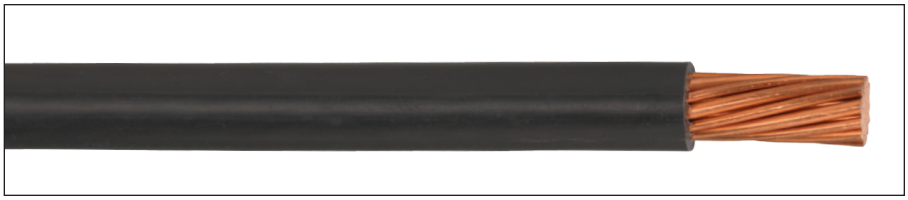
Print:
- GENERAL CABLE® (PLANT OF MFG) AWG/ KCMIL LOW FRICTION* TYPE XHHW-2 (UL) 600 V SUN RES FOR CT USE** MONTH/YEAR OF MFG SEQUENTIAL FOOTAGE MARK

* Sizes 14 AWG - 10 AWG do not include "LOW FRICTION"

** Sizes smaller than 1/0 AWG do not include "SUN RES FOR CT USE"

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
- Industrial environments where superior insulation toughness and chemical resistance are required
- Maximum operating temperature not to exceed 90˚C in dry or wet locations
- In free air, raceways or cable trays in accordance with NEC



Features:
- Low Friction for easy pulling on 8 AWG and larger
- "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

Compliances:
Industry Compliances:
- National Electric Code (NEC)
- UL 44 Standard for Rubber Insulated Wire and Cable
- ICEA S-95-658/NEMA WC70
- UL Listed as Type XHHW-2, UL File # E90494
- OSHA Acceptable

Flame Test Compliances:
- UL 1685, 1/0 AWG and larger

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

XHHW-2

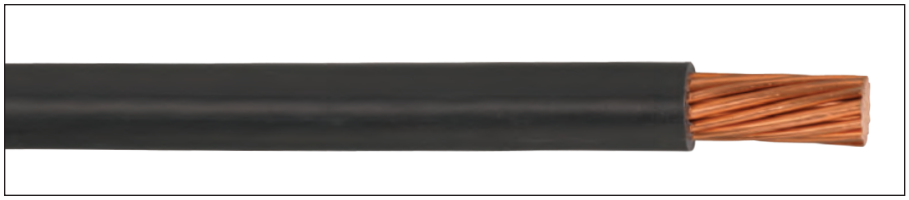
CATALOG NUMBER	COND. SIZE (AWG/ kcmil)	COND. STRAND	NOMINAL COND. DIAMETER		MINIMUM AVG. INSULATION THICKNESS		NOMINAL CABLE O.D.		COPPER WEIGHT		NET WEIGHT		AMPACITY (1)		
			INCHES	mm	INCHES	mm	INCHES	mm	LBS/ 1000 FT	kg/km	LBS/ 1000 FT	kg/km	60°C	75°C	90°C
14 AWG - 750 kcmil CONDUCTORS															
391070	14	7/.0240	0.07	1.80	0.030	0.76	0.13	3.38	12	18	17	25	15	15	15
391080	12	7/.0305	0.09	2.26	0.030	0.76	0.15	3.84	20	30	26	39	20	20	20
391090	10	7/.0385	0.11	2.87	0.030	0.76	0.18	4.57	32	48	38	57	30	30	30
5175.008	8	7/.0486	0.14	3.56	0.045	1.14	0.24	6.10	51	76	65	97	40	50	55
5175.006	6	7/.0612	0.18	4.57	0.045	1.14	0.28	7.11	81	121	99	147	55	65	75
5175.004	4	7/.0772	0.23	5.84	0.045	1.14	0.33	8.38	129	192	152	226	70	85	95
5175.002	2	7/.0974	0.29	7.37	0.045	1.14	0.39	9.91	205	305	233	347	95	115	130
5175.001	1	19/.0664	0.32	8.13	0.055	1.40	0.44	11.18	256	381	293	437	110	130	145
5175.110	1/0	19/.0740	0.36	9.14	0.055	1.40	0.48	12.19	326	485	364	572	125	150	170
5175.210	2/0	19/.0837	0.41	10.41	0.055	1.40	0.53	13.46	411	612	453	674	145	175	195
5175.310	3/0	19/.0940	0.46	11.68	0.055	1.40	0.58	14.73	518	772	565	842	165	200	225
5175.410	4/0	19/.1055	0.51	12.95	0.055	1.40	0.63	16.00	653	972	706	1051	195	230	260
5175.250	250	37/.0822	0.56	14.22	0.065	1.65	0.70	17.78	722	1074	837	1246	215	255	290
5175.350	350	37/.0973	0.66	16.76	0.065	1.65	0.80	20.32	1081	1609	1157	1722	260	310	350
5175.500	500	37/.1162	0.79	20.07	0.065	1.65	0.93	23.62	1544	2298	1634	2432	320	380	430
5175.600	600	37/.1109	0.87	22.10	0.080	2.03	1.04	26.42	1853	2758	1972	2935	350	420	475
5175.750	750	61/.1280	0.98	24.89	0.080	2.03	1.15	29.21	2316	3447	2448	3643	400	475	535

Dimensions and weights are nominal; subject to industry tolerances.

(1) Allowable ampacities shown are for general use as specified by the National Electric Code, 2011 Edition, section 310.15(B)(16). Adjustments and corrections may apply:
60°C – When terminated to equipment for circuits rated 100 amperes or less or marked for 14 through 1 AWG conductors.
75°C – When terminated to equipment for circuits rated over 100 amperes or marked for conductors larger than 1 AWG.
90°C – Wet or dry locations. For ampacity derating purposes.
Dwelling – For dwelling units, conductors shall be permitted as listed ampacities at 120/240-volt, 3-wire, single-phase services and feeders.

XHHW-2 VW-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 XXAWG COPPER XLPE SIS TYPE 600V 90C YEAR OF MFG

For 14 AWG thru 4 AWG:
- GENERAL CABLE® (PLANT OF MFG) 1C XXAWG COPPER XLPE TYPE SIS/XHHW-2 VW-1 (UL) 600V 90C YEAR OF MFG

Print (cont'd.):

For 2 AWG and larger:
- GENERAL CABLE® (PLANT OF MFG) 1C XXAWG COPPER XLPE TYPE XHHW-2 VW-1 SUN RES FOR CT USE (UL) YEAR OF MFG SEQUENTIAL FOOTAGE MARK

* 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 for CT use

Features (cont'd.):
- Excellent flame resistance
- Sunlight-resistant
- Excellent physical, thermal and electrical properties

Compliances:

Industry Compliances:
- 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 CFR, Part 261 for leachable lead content per TCLP method
- OSHA Acceptable

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

¥ UL Type SIS/XHHW-2 for sizes 14 AWG thru 4 AWG

¥¥ UL Type XHHW-2 for sizes 2 AWG thru 1000 kcmil

CATALOG NUMBER	COND. SIZE (AWG/ kcmil)	COND. STRAND	NOMINAL COND. DIAMETER		MINIMUM AVG. INSULATION THICKNESS		NOMINAL CABLE O.D.		COPPER WEIGHT		NET WEIGHT		AMPACITY (1)		
			INCHES	mm	INCHES	mm	INCHES	mm	LBS/ 1000 FT	kg/km	LBS/ 1000 FT	kg/km	60°C	75°C	90°C
18 AWG - 1000 kcmil CONDUCTORS															
381500	18	7/.0152	0.05	1.27	0.030	0.76	0.11	2.74	5	8	9	14	—	—	—
381510	16	7/.0192	0.06	1.47	0.030	0.76	0.12	3.05	8	12	13	20	—	—	—
381520	14	7/.0242	0.07	1.80	0.030	0.76	0.13	3.38	13	19	19	28	15	15	15
381530	12	7/.0305	0.09	2.29	0.030	0.76	0.15	3.86	20	30	27	41	20	20	20
381540	10	7/.0385	0.11	2.87	0.030	0.76	0.18	4.45	32	48	41	61	30	30	30
381550	8	7/.0486	0.14	3.56	0.045	1.14	0.24	6.05	51	76	69	102	40	50	55
381560	6	7/.0612	0.18	4.57	0.045	1.14	0.28	6.99	81	121	103	153	55	65	75
381570	4	7/.0772	0.23	5.84	0.045	1.14	0.32	8.18	129	192	156	232	70	85	95
06591.210200	2	7/.0974	0.29	7.37	0.045	1.14	0.38	9.68	205	305	239	355	95	115	130
06591.215100	1/0	19/.0745	0.36	9.14	0.055	1.40	0.48	12.14	326	485	373	556	125	150	170
06591.215200	2/0	19/.0837	0.41	10.41	0.055	1.40	0.52	13.28	411	612	464	691	145	175	195
06591.215300	3/0	19/.0940	0.46	11.68	0.055	1.40	0.57	14.55	518	771	579	862	165	200	225
06591.215400	4/0	19/.1055	0.51	12.95	0.055	1.40	0.63	15.98	653	972	722	1075	195	230	260
06591.216000	250	37/.0822	0.56	14.22	0.065	1.65	0.70	17.75	772	1149	860	1280	215	255	290
06591.216200	350	37/.0973	0.66	16.76	0.065	1.65	0.80	20.37	1081	1609	1185	1764	260	310	350
06591.216500	500	37/.1162	0.79	20.07	0.065	1.65	0.93	23.65	1544	2298	1669	2484	320	380	430
06591.217000	750	61/.1109	0.97	24.64	0.080	2.03	1.14	29.03	2316	3447	2520	3750	400	475	535
06591.217500	1000	61/.1280	1.13	28.70	0.080	2.03	1.30	33.02	3086	4593	3283	4886	445	545	615

Dimensions and weights are nominal; subject to industry tolerances.

(1) Temperature, size and ampacity per National Electric Code, 2011 NEC sections 110.14(c)(1) (a) & (b).
60°C – When terminated to equipment for circuits rated 100 amperes or less or marked for 14 through 1 AWG conductors.
75°C – When terminated to equipment for circuits rated over 100 amperes or marked for conductors larger than 1 AWG.
90°C – Wet or dry locations. For ampacity derating purposes.
Dwelling – For dwelling units, conductors shall be permitted as listed ampacities at 120/240-volt, 3-wire, single-phase services and feeders.

RW90

XLPE, Low-Voltage Power
600 V, CSA Type RW90, Single Conductor, Copper

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:
- GENERAL CABLE® (PLANT OF MFG) CSA RW90 XLPE SIZE (AWG OR KCMIL) CU 600V (-40°C) YEAR OF MFG SEQUENTIAL METER MARKING NOTE: For black insulation, add – SR

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

Compliances:
- CSA Standard C22.2 No. 38
- CSA Approval 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

COND. SIZE (AWG/ kcmil)	COND.** STRAND	NOMINAL COND. O.D.		MIN. AVG. INS. THICKNESS		NOMINAL DIAMETER (OVER) INSULATION		COPPER WEIGHT		NET WEIGHT		AMPACITY*** 30°C AMBIENT
		INCHES	mm	INCHES	mm	INCHES	mm	LBS/1000 FT	kg/km	LBS/1000 FT	kg/km	
14 AWG - 1000 kcmil CONDUCTORS												
14	1	0.06	1.52	0.030	0.76	0.12	3.05	12	18	16	23	25
14	7/.0240	0.07	1.78	0.030	0.76	0.13	3.30	12	18	16	24	25
12	1	0.08	2.03	0.030	0.76	0.14	3.56	20	30	24	36	30
12	7/.0302	0.09	2.29	0.030	0.76	0.15	3.81	20	30	25	38	30
10	1	0.10	2.54	0.030	0.76	0.16	4.06	31	46	36	54	40
10	7/.0381	0.11	2.79	0.030	0.76	0.17	4.32	32	48	38	57	40
8	7/.0481	0.14	3.56	0.045	1.14	0.23	5.84	50	74	62	93	55
6	7/.0606	0.18	4.57	0.045	1.14	0.27	6.86	78	116	93	139	75
4	7/.0772	0.23	5.84	0.045	1.14	0.32	8.13	129	192	149	221	95
3	7/.0867	0.25	6.35	0.045	1.14	0.34	8.64	163	243	184	274	115
2	7/.0974	0.28	7.11	0.045	1.14	0.37	9.40	200	298	224	334	130
1	19/.0664	0.32	8.13	0.055	1.40	0.43	10.92	258	384	289	430	145
1/0	19/.0745	0.36	9.14	0.055	1.40	0.47	11.94	326	485	361	538	170
2/0	19/.0837	0.41	10.41	0.055	1.40	0.52	13.21	411	612	451	672	195****
3/0	19/.0940	0.46	11.68	0.055	1.40	0.57	14.48	507	754	553	823	225
4/0	19/.1055	0.51	12.95	0.055	1.40	0.62	15.75	635	945	686	1021	260
250	37/.0822	0.56	14.22	0.065	1.65	0.69	17.53	772	1149	836	1244	290
300	37/.0900	0.61	15.49	0.065	1.65	0.74	18.80	926	1378	996	1483	320
350	37/.0972	0.66	16.76	0.065	1.65	0.79	20.07	1063	1582	1140	1696	350
400*	37/.1040	0.71	17.93	0.065	1.65	0.84	21.23	1235	1838	1318	1961	380
500	37/.1162	0.79	20.07	0.065	1.65	0.92	23.37	1509	2245	1603	2386	430
600	61/.0992	0.87	22.10	0.080	2.03	1.03	26.16	1883	2802	2004	2982	425
750	61/.1109	0.97	24.64	0.080	2.03	1.13	28.70	2316	3446	2453	3650	535
1000*	61/.1280	1.12	28.45	0.080	2.03	1.28	32.51	3088	4595	3250	4835	615

Dimensions and weights are nominal; subject to industry tolerances.

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

**For compact-stranded constructions, the number of wires may be reduced as follows:
19-Wire Constructions - 18 Wires Minimum
37-Wire Constructions - 35 Wires Minimum
61-Wire Constructions - 58 Wires Minimum

***Based on CEC Part 1, Table 2 for three conductors in raceway (conduit). For underground installations, refer to CEC, Rule 4-004 for ampacity rating.

****For 3 wires, 120/240 V and 120/208 V residential services or subservices, the allowable ampacity for 2/0 AWG shall be 200A. In this case, the 5% adjustment of Rule 8-106(1) cannot be applied.

RWU90

XLPE, Low-Voltage Power
1000 V, CSA Type RWU90, Single Conductor, Copper

Product Construction:

Conductor:
- 14 AWG thru 1000 kcmil annealed Class B compressed stranded plain copper

Insulation:
- Heat- and moisture-resistant, low-temperature Cross-linked Polyethylene (XLPE), Type RWU90, -40°C
- Color code: 14 AWG – black; 12 AWG thru 10 AWG – black, white, red, blue, green; 8 AWG thru 2 AWG – black, green, black with white stripe, black with red stripe, black with blue stripe; 1 AWG and larger – black (other colors available subject to minimum order quantity)

Print:
- GENERAL CABLE® (PLANT OF MFG) CSA RWU90 XLPE SIZE (AWG OR KCMIL) CU 1000 V (-40°C) YEAR OF MFG SEQUENTIAL METER MARKING
  NOTE: For black insulation and black with colored stripes, add – SR

Option:
- PVC jacket (FT1 rating)

Applications:
- In accordance with Canadian Electrical Code (CEC), Part 1
- For wiring exposed to the weather (black or black with colored stripes)

Applications (cont'd):
- 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

Compliances:
- CSA Standard C22.2 No. 38
- CSA certification (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 or 1200 m reels

COND. SIZE (AWG/ kcmil)	COND.** STRAND	NOMINAL COND. O.D.		MIN. AVG. INS. THICKNESS		NOMINAL DIAMETER (OVER) INSULATION		COPPER WEIGHT		NET WEIGHT		AMPACITY*** 30°C AMBIENT
		INCHES	mm	INCHES	mm	INCHES	mm	LBS/1000 FT	kg/km	LBS/1000 FT	kg/km	
14 AWG - 1000 kcmil CONDUCTORS												
14	7/.0240	0.07	1.78	0.060	1.52	0.19	4.83	12	18	23	34	25
12	7/.0302	0.09	2.29	0.060	1.52	0.21	5.33	20	30	32	48	30
10	7/.0381	0.11	2.79	0.060	1.52	0.23	5.84	32	48	46	69	40
8	7/.0481	0.14	3.56	0.080	2.03	0.30	7.62	50	74	74	111	55
6	7/.0606	0.18	4.57	0.080	2.03	0.34	8.64	78	116	107	160	75
4	7/.0772	0.23	5.84	0.080	2.03	0.39	9.91	129	192	165	246	95
3	7/.0867	0.25	6.35	0.080	2.03	0.41	10.41	163	243	202	300	115
2	7/.0974	0.28	7.11	0.080	2.03	0.44	11.18	200	298	243	361	130
1	19/.0664	0.32	8.13	0.095	2.41	0.51	12.95	258	384	314	467	145
1/0	19/.0745	0.36	9.14	0.095	2.41	0.55	13.97	326	485	388	577	170
2/0	19/.0837	0.41	10.41	0.095	2.41	0.60	15.24	411	612	481	716	195****
3/0	19/.0940	0.46	11.68	0.095	2.41	0.65	16.51	507	754	585	870	225
4/0	19/.1055	0.51	12.95	0.095	2.41	0.70	17.78	635	945	721	1073	260
250	37/.0822	0.56	14.22	0.110	2.79	0.78	19.81	772	1149	880	1309	290
300	37/.0900	0.61	15.49	0.110	2.79	0.83	21.08	926	1378	1043	1552	320
350	37/.0972	0.66	16.76	0.110	2.79	0.88	22.35	1063	1582	1189	1770	350
400*	37/.1040	0.71	17.93	0.110	2.79	0.93	23.52	1235	1838	1370	2039	380
500	37/.1162	0.79	20.07	0.110	2.79	1.01	25.65	1509	2245	1661	2471	430
600	61/.0992	0.87	22.10	0.110	2.79	1.09	27.69	1883	2802	2046	3045	425
750	61/.1109	0.97	24.64	0.125	3.18	1.22	30.99	2316	3446	2522	3753	535
1000*	61/.1280	1.12	28.45	0.125	3.18	1.37	34.80	3088	4595	3328	4952	615

Dimensions and weights are nominal; subject to industry tolerances.

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

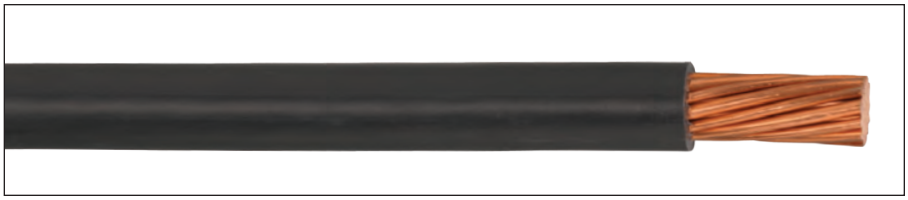
**For compact-stranded constructions, the number of wires may be reduced as follows:
37-Wire Constructions - 35 Wires Minimum
61-Wire Constructions - 58 Wires Minimum

***Based on CEC Part 1, Table 2 for three conductors in raceway (conduit). For underground installations, refer to CEC, Rule 4-004 for ampacity rating.

****For 3 wires, 120/240 V and 120/208 V residential services or subservices, the allowable ampacity for 2/0 AWG shall be 200A. In this case, the 5% adjustment of Rule 8-106(1) cannot be applied.

Unicon® XLPE

XLPE, Low-Voltage Power
600 V, UL Type RHH/RHW-2/USE-2, Single Conductor, Copper



Product Construction:

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

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

Print:
For 14 AWG – 4 AWG:
- GENERAL CABLE® (PLANT OF MFG) UNICON®-XLP TYPE USE-2 OR RHH OR RHW-2 VW-1 SIZE (AWG OR KCMIL) 600 VOLTS SUN RES (UL) DAY/MONTH/YEAR OF MFG SEQUENTIAL FOOTAGE MARK

For 2 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) DAY/MONTH/YEAR OF MFG SEQUENTIAL FOOTAGE MARK

* Sizes smaller than 1/0 AWG do not include "FOR CT USE"

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 temperture cold bend characteristics
- Meets cold bend test at -25˚C

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 # E90494
- 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

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

CATALOG NUMBER	COND. SIZE (AWG/ kcmil)	COND. STRAND	NOMINAL COND. DIAMETER		MINIMUM AVG. INSULATION THICKNESS		NOMINAL CABLE O.D.		COPPER WEIGHT		NET WEIGHT		AMPACITY (1)		
			INCHES	mm	INCHES	mm	INCHES	mm	LBS/ 1000 FT	kg/km	LBS/ 1000 FT	kg/km	60°C	75°C	90°C
14 AWG - 1000 kcmil CONDUCTORS															
364830*	14	7/.0242	0.07	1.78	0.045	1.14	0.17	4.32	13	19	24	36	15	15	15
364840*	12	7/.0305	0.09	2.29	0.045	1.14	0.19	4.83	20	30	33	49	20	20	20
364850*	10	7/.0385	0.12	3.05	0.045	1.14	0.21	5.33	32	48	48	71	30	30	30
16602.210800	8	7/.0486	0.15	3.81	0.060	1.52	0.27	6.86	50	75	78	116	40	50	55
16602.210600	6	7/.0612	0.18	4.57	0.060	1.52	0.31	7.87	81	121	114	170	55	65	75
16602.210400	4	7/.0772	0.23	5.84	0.060	1.52	0.36	9.14	129	192	169	252	70	85	95
16602.210200	2	7/.0974	0.29	7.37	0.060	1.52	0.42	10.67	205	305	254	378	95	115	130
16602.215100	1/0	19/.0740	0.37	9.40	0.080	2.03	0.53	13.46	326	485	403	600	125	150	170
16602.215200	2/0	19/.0837	0.41	10.41	0.080	2.03	0.58	14.73	411	612	501	746	145	175	195
16602.215400	4/0	19/.1055	0.52	13.21	0.080	2.03	0.69	17.53	653	972	760	1131	195	230	260
16602.216000	250	37/.0822	0.56	14.22	0.095	2.41	0.77	19.56	772	1149	906	1349	215	255	290
16602.216200	350	37/.0973	0.67	17.02	0.095	2.41	0.87	22.10	1081	1609	1237	1841	260	310	350
16602.216500	500	37/.1162	0.80	20.32	0.095	2.41	1.00	25.40	1542	2295	1730	2575	320	380	430
16602.217000	750	61/.1109	0.98	24.89	0.110	2.79	1.22	30.99	2316	3447	2576	3834	400	475	535
16602.217500*	1000	61/.1280	1.13	28.70	0.110	2.79	1.37	34.80	3086	4593	3405	5068	445	545	615

Dimensions and weights are nominal; subject to industry tolerances.
* Non-stock item; minimum runs apply. Please consult Customer Service for price and delivery.
(1) Temperature, size and ampacity per National Electric Code, 2011 NEC sections 110.14(c)(1) (a) & (b).
60°C – When terminated to equipment for circuits rated 100 amperes or less or marked for 14 through 1 AWG conductors.
75°C – When terminated to equipment for circuits rated over 100 amperes or marked for conductors larger than 1 AWG.
90°C – Wet or dry locations. For ampacity derating purposes.
Dwelling – For dwelling units, conductors shall be permitted as listed ampacities at 120/240-volt, 3-wire, single-phase services and feeders.

NOW AVAILABLE IN SUN-RESISTANT COLORS

SunGen®

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 120°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 RPVU90 listed
- TÜV certified, halogen-free, fire-retardant and low corrosive gas emission provide added degree of safety
- Single and multi-conductor cable constructions
- 18 AWG – 1000 kcmil stranded copper and 8 AWG – 1000 kcmil aluminum conductors

Per NEC Article 690, single conductor cable listed and labeled as photovoltaic (PV) wire and single conductor cable Type USE-2 shall be permitted in exposed outdoor locations in photovoltaic source circuits for photovoltaic module interconnections within the photovoltaic array. 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 carries a quad rating and 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. See for yourself.

Key Performance Differences Between UL Type PV and UL Type USE-2 Wire

PV Wire Applications/Compliances	SunGen® PV Wire - UL Type PV/RHH/RHW-2/USE-2	UL Type USE-2
Voltage: 600, 1000 and 2000 Volts	✓	
Direct Buried: 600, 1000 and 2000 Volts	✓	
Conduit/Duct/Raceway	✓	✓
NEC Article 690 – PV Systems	✓	✓
UL 4703 PV Wire	✓	
UL 854 USE-2	✓	✓
Flame Test Requirements: FT1 & VW-1	✓	
Maximum Operating Temperature: 90°C Wet or Dry	✓	✓
Cold Bend: -40°C	✓	
Weatherometer Sunlight Resistance: 720 Hour	✓	

- DEFORMATION-RESISTANT
- DIRECT BURIAL
- FLEXIBLE
- MOISTURE-RESISTANT
- COLD IMPACT
- OIL-RESISTANT
- UV/SUNLIGHT-RESISTANT
- MECHANICALLY RUGGED
- LOW SMOKE EMISSIONS

General Cable
Phone: 800-243-8020
www.generalcable.com

NOW AVAILABLE IN SUN-RESISTANT COLORS

SunGen®

The SunGen® Difference

Add true COLORS to your solar installations with General Cable's UL 4703 SunGen® Brand of photovoltaic (PV) copper products — now in UV/sunlight-resistant solid colors, available in-stock or by special order and all manufactured with the latest technical knowledge and to meet all relevant UL requirements.

When you specify General Cable's SunGen® PV Wire, we deliver a product engineered with excellent flexibility and toughness to withstand the harsh operating environment of solar power applications and provide high levels of performance over the entire lifetime of the installation.

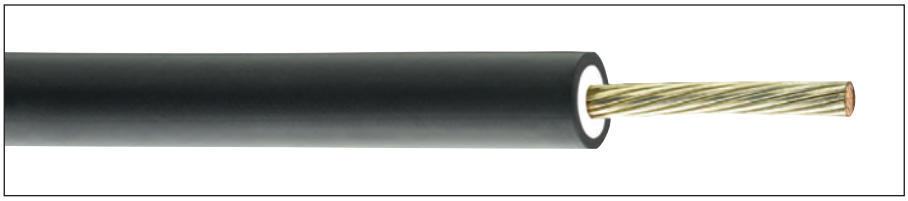
New SunGen® UL 4703 PV Wire in true COLORS is the perfect choice for critical PV source, output and inverter circuit identification as required by the NEC. Selecting a unique color further ensures a standard-compliant system.

Ask your General Cable representative today about our network of regional distribution centers across the country ready to service your order!

CATALOG NUMBER	AWG SIZE	COLOR	PUT-UP
SPEC 5800 — 600 V SunGen® UL 4703 PV Wire - EPR/XL-CPE, 19 Strand Tinned Copper			
12211.711400	14 AWG	Black	Long Length
12211.711200	12 AWG	Black	Long Length
12211.711100	10 AWG	Black	Long Length
SPEC 5810 — 2000 V SunGen® UL 4703 PV Wire - EPR/XL-CPE, 19 Strand Tinned Copper			
12221.711400	14 AWG	Black	Long Length
12221.711200	12 AWG	Black	Long Length
12221.711100	10 AWG	Black	Long Length
12221.710800	8 AWG	Black	Long Length
SPEC 5840 — 600 V SunGen® UL 4703 PV Wire or 1 kV CSA RPVU90 - XLPE, 19 Strand Tinned Copper			
12411.711400	14 AWG	Black	Long Length
12411.711200	12 AWG	Black	Long Length
12411.711100	10 AWG	Black	Long Length
SPEC 5840 — 600 V SunGen® UL 4703 PV Wire or 1 kV CSA RPVU90 - XLPE, 19 Strand Bare Copper			
12411.711100B06	10 AWG	Black	500 ft
12411.711100B08	10 AWG	Black	2500 ft
12411.711109B06	10 AWG	White	500 ft
12411.711109B08	10 AWG	White	2500 ft
SPEC 5845 — 600 V SunGen® UL 4703 PV Wire or 1 kV CSA RPVU90 - XLPE, 7 Strand Bare Copper			
12431.711100.06	10 AWG	Black	500 ft
12431.711100.07	10 AWG	Black	1000 ft
12431.711100.08	10 AWG	Black	2500 ft
12431.711109.06	10 AWG	White	500 ft
12431.711109.07	10 AWG	White	1000 ft
12431.711109.08	10 AWG	White	2500 ft
12431.711102.06	10 AWG	Red	500 ft
12431.711102.07	10 AWG	Red	1000 ft
12431.711102.08	10 AWG	Red	2500 ft
12431.711106.06	10 AWG	Blue	500 ft
12431.711106.07	10 AWG	Blue	1000 ft
12431.711106.08	10 AWG	Blue	2500 ft
SPEC 5850 — 2000 V SunGen® UL 4703 PV Wire or 1 kV CSA RPVU90 - XLPE, 19 Strand Tinned Copper			
12421.711400	14 AWG	Black	Long Length
12421.711200	12 AWG	Black	Long Length
12421.711100	10 AWG	Black	Long Length
SPEC 5850 —2000 V SunGen® UL 4703 PV Wire or 1 kV CSA RPVU90 - XLPE, 19 Strand Bare Copper			
12421.711100B	10 AWG	Black	Long Length
SPEC 5855 — 2000 V SunGen® UL 4703 PV Wire or 1 kV CSA RPVU90 - XLPE, 7 Strand Bare Copper			
12441.711400.07	14 AWG	Black	1000 ft
12441.711409.07	14 AWG	White	1000 ft
12441.711200.07	12 AWG	Black	1000 ft
12441.711209.07	12 AWG	White	1000 ft
12441.711100	10 AWG	Black	Long Length
12441.711100.07	10 AWG	Black	1000 ft
12441.711109.07	10 AWG	White	1000 ft

SunGen® Global XLPE/LSZH XLPO, Photovoltaic Wire, TÜV 2 pfg

1169/08.2007 PV1-F AC U_o/U 0.6/1 kV, UL 4703, PV Wire 2000 V



Product Construction:

Conductor:

- 1,5 mm² (16 AWG) thru 6,0 mm² (10 AWG) fully annealed flexible stranded tinned copper with Class 5 stranding per EN 60228 (IEC 60228)

Composite Insulation/Jacket (Sheath):

- Zero-Halogen Cross-linked Polyethylene (ZH XLPE) with black Low-Smoke, Zero-Halogen Cross-linked Polyolefin (LSZH XLPO)

Print

- GENERAL CABLE® (PLANT OF MFG) SUNGEN® GLOBAL XX MM² (XX AWG) TÜV PV1-F 600/1000 VAC (UL) PV WIRE 2000 V DIR BUR 90°C WET OR DRY VW-1 SUN RES -40°C ROHS MONTH/YEAR SEQ MARKING

Applications:

- TÜV 2 pfg 1169/08.2007: Single conductor, sunlight-resistant photovoltaic wire -40°C to +90°C, max temperature of conductor 120°C for 20,000 hours
- Rated Voltage: AC U_o/U 0,6/1 kV max voltage 1.8 kV DC (conductor – conductor, non-earthed system, circuit not under load)
- UL 4703: Photovoltaic wire rated 90°C wet or dry, 2000 V for use in photovoltaic system

Features:

- Rated 90°C wet and dry
- UV/sunlight-resistant
- Meets cold bend and cold impact tests at -40°C
- Direct burial

Compliances:

Industry Compliances:

- UL 4703 PV Wire
- TÜV 2 pfg 1169/08.2007 PV1-F for use in photovoltaic systems
- RoHS Compliant

Flame Test Compliances:

- UL 2556 VW-1
- EN 60332-1-2 vertical flame

Packaging:

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

CATALOG NUMBER	COND. SIZE (mm²)	COND. STRAND COUNT	MINIMUM AVG. INSULATION THICKNESS		MINIMUM AVG. JACKET (SHEATH) THICKNESS		NOMINAL CABLE DIAMETER		COPPER WEIGHT		NET WEIGHT	
			INCHES	mm	INCHES	mm	INCHES	mm	LBS/ 1000 FT	kg/km	LBS/ 1000 FT	kg/km
1,5 mm² (16 AWG) - 6,0 mm² (10 AWG) CONDUCTORS												
395400	1.5	28	0.045	1.14	0.030	0.76	0.216	5.49	9	13	28	42
395390	2.5	46	0.045	1.14	0.030	0.76	0.234	5.94	14	21	35	52
395380	4.0	56	0.045	1.14	0.030	0.76	0.263	6.68	24	36	49	73
395370	6.0	84	0.045	1.14	0.030	0.76	0.277	7.04	36	54	63	94

Dimensions and weights are nominal; subject to industry tolerances.

SunGen® Dual-Layer EPR/XL-CPE, Photovoltaic Wire, 600 V, UL Type PV/USE-2/RHH or RHW-2 Single Conductor, Copper

Product Construction:

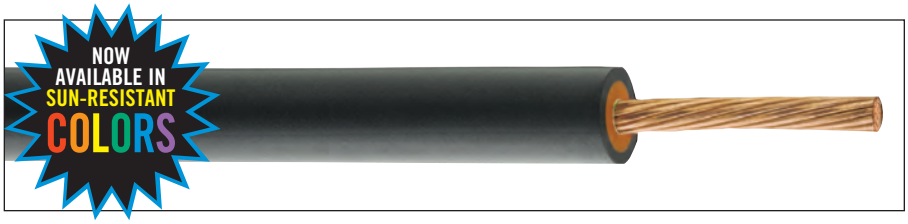
Conductor:
- 14 AWG thru 2 AWG tinned coated compressed copper. Class C stranding per ASTM B33 and B8
- 1 AWG thru 1000 kcmil tinned coated compressed copper. Class B stranding per ASTM B33 and B8

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 DIR BUR OR RHH OR RHW-2 OR USE-2 (SIZE) 90°C WET OR DRY SUN RES (UL) -40°C VW-1 MONTH/YEAR OF MFG SEQUENTIAL FOOTAGE MARK

Options:
- Bare copper conductor
- 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, 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:
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 854 Type USE-2, UL File # E90499 or E86307
- Limited Smoke Rating per UL
- RoHS Compliant

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

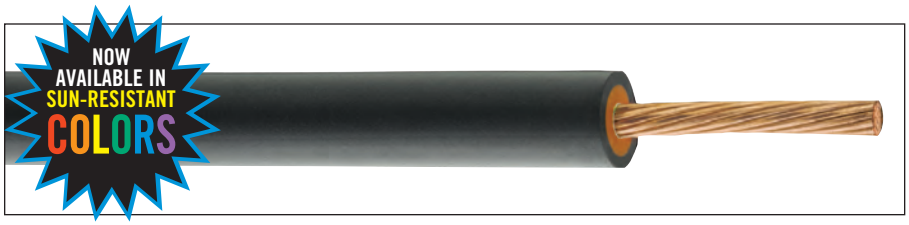
Other Compliances:
- EPA 40 CFR, Part 261 for leachable lead content per TCLP
- OSHA Acceptable

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

CATALOG NUMBER	COND. SIZE (AWG/ kcmil)	COND. STRAND	NOMINAL COND. O.D.		MINIMUM AVG. INSULATION THICKNESS		MINIMUM AVG. JACKET THICKNESS		NOMINAL CABLE DIAMETER		COPPER WEIGHT		NET WEIGHT	
			INCHES	mm	INCHES	mm	INCHES	mm	INCHES	mm	LBS/ 1000 FT	kg/km	LBS/ 1000 FT	kg/km
14 AWG - 1000 kcmil CONDUCTORS														
12211.711400	14	19/.0142	0.070	1.78	0.030	0.76	0.030	0.76	0.201	5.10	13	19	32	48
12211.711200	12	19/.0185	0.088	2.23	0.030	0.76	0.030	0.76	0.219	5.56	20	30	42	62
12211.711100	10	19/.0234	0.112	2.84	0.030	0.76	0.030	0.76	0.242	6.15	32	48	59	88
12211.710800*	8	19/.0295	0.143	3.63	0.045	1.14	0.030	0.76	0.310	7.87	50	74	89	132
12211.710600*	6	19/.0372	0.184	4.67	0.045	1.14	0.045	1.14	0.376	9.55	81	121	141	210
12211.710400*	4	19/.0469	0.234	5.94	0.045	1.14	0.045	1.14	0.420	10.67	129	192	202	301
12211.710200*	2	19/.0526	0.296	7.52	0.045	1.14	0.045	1.14	0.487	12.37	205	305	292	434
12211.710100*	1	19/.0664	0.323	8.20	0.055	1.40	0.060	1.52	0.539	13.69	258	384	408	607
12211.715100*	1/0	19/.0740	0.370	9.40	0.055	1.40	0.060	1.52	0.587	14.91	326	485	478	711
12211.715200*	2/0	19/.0837	0.410	10.41	0.055	1.40	0.060	1.52	0.632	16.05	411	611	590	878
12211.715300*	3/0	19/.0940	0.460	11.68	0.055	1.40	0.060	1.52	0.678	17.22	518	771	734	1092
12211.715400*	4/0	19/.1055	0.520	13.21	0.055	1.40	0.060	1.52	0.738	18.74	653	972	865	1287
12211.716250*	250	37/.0822	0.558	14.17	0.065	1.65	0.080	2.03	0.862	21.89	772	1149	995	1481
12211.716300*	300	37/.0900	0.611	15.52	0.065	1.65	0.080	2.03	0.915	23.24	926	1378	1167	1737
12211.716350*	350	37/.0972	0.661	16.79	0.065	1.65	0.080	2.03	0.965	24.51	1063	1582	1321	1966
12211.716400*	400	37/.1040	0.706	17.93	0.065	1.65	0.080	2.03	1.010	25.65	1235	1838	1508	2244
12211.716500*	500	37/.1159	0.789	20.04	0.065	1.65	0.080	2.03	1.093	27.76	1509	2246	1810	2694
12211.716600*	600	61/.0992	0.866	22.00	0.080	2.03	0.080	2.03	1.200	30.48	1883	2802	2237	3329
12211.716750*	750	61/.1109	0.968	24.59	0.080	2.03	0.080	2.03	1.302	33.07	2316	3447	2707	4028
12211.717000*	1000	61/.1280	1.117	28.37	0.080	2.03	0.080	2.03	1.451	36.86	3088	4595	3534	5259

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

SunGen® Dual-Layer EPR/XL-CPE, Photovoltaic Wire, 2000 V, UL Type PV/RHH or RHW-2 or 600 V USE-2 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® 2000 V PV WIRE DIR BUR OR RHH OR RHW-2 OR 600 V USE-2 (SIZE) 90°C WET OR DRY SUN RES (UL) -40°C VW-1 c(UL) RWU90 1000 V MONTH/YEAR OF MFG SEQUENTIAL FOOTAGE MARK

Options:
- Bare copper conductor
- 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

Features (cont'd.):
- 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 854 Type USE-2 for 600 V, UL File # E90499 or E86307
- Limited Smoke Rating per UL
- RoHS Compliant

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

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

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

CATALOG NUMBER	COND. SIZE (AWG/ kcmil)	COND. STRAND	NOMINAL COND. O.D.		MINIMUM AVG. INSULATION THICKNESS		MINIMUM AVG. JACKET THICKNESS		NOMINAL CABLE DIAMETER		COPPER WEIGHT		NET WEIGHT	
			INCHES	mm	INCHES	mm	INCHES	mm	INCHES	mm	LBS/ 1000 FT	kg/km	LBS/ 1000 FT	kg/km
14 AWG - 1000 kcmil CONDUCTORS														
12221.711400	14	19/.0142	0.070	1.78	0.045	1.14	0.030	0.76	0.232	5.89	13	19	36	54
12221.711200	12	19/.0185	0.088	2.23	0.045	1.14	0.030	0.76	0.250	6.35	20	30	46	68
12221.711100	10	19/.0234	0.112	2.84	0.045	1.14	0.030	0.76	0.273	6.93	32	48	64	95
12221.710800*	8	19/.0295	0.143	3.63	0.055	1.40	0.030	0.76	0.332	8.43	50	74	95	141
12221.710600*	6	19/.0372	0.184	4.67	0.055	1.40	0.045	1.14	0.398	10.11	81	121	148	220
12221.710400*	4	19/.0469	0.234	5.94	0.055	1.40	0.045	1.14	0.442	11.23	129	192	208	309
12221.710200*	2	19/.0526	0.296	7.52	0.055	1.40	0.045	1.14	0.507	12.88	205	305	306	455
12221.710100*	1	19/.0664	0.323	8.20	0.065	1.65	0.060	1.52	0.561	14.25	258	384	440	655
12221.715100*	1/0	19/.0740	0.370	9.40	0.065	1.65	0.060	1.52	0.607	15.42	326	485	505	751
12221.715200*	2/0	19/.0837	0.410	10.41	0.065	1.65	0.060	1.52	0.652	16.56	411	611	615	915
12221.715300*	3/0	19/.0940	0.460	11.68	0.065	1.65	0.060	1.52	0.700	17.78	518	771	747	1111
12221.715400*	4/0	19/.1055	0.520	13.21	0.065	1.65	0.060	1.52	0.760	19.30	653	972	891	1326
12221.716250*	250	37/.0822	0.558	14.17	0.075	1.91	0.080	2.03	0.882	22.40	772	1149	1012	1506
12221.716300*	300	37/.0900	0.611	15.52	0.075	1.91	0.080	2.03	0.935	23.75	926	1378	1184	1763
12221.716350*	350	37/.0972	0.661	16.79	0.075	1.91	0.080	2.03	0.985	25.02	1063	1582	1339	1993
12221.716400*	400	37/.1040	0.706	17.93	0.075	1.91	0.080	2.03	1.030	26.16	1235	1838	1527	2273
12221.716500*	500	37/.1159	0.789	20.04	0.075	1.91	0.080	2.03	1.113	28.27	1509	2246	1831	2725
12221.716600*	600	61/.0992	0.866	22.00	0.090	2.29	0.080	2.03	1.222	31.04	1883	2802	2262	3367
12221.716750*	750	61/.1109	0.968	24.59	0.090	2.29	0.080	2.03	1.324	33.63	2316	3447	2734	4069
12221.717000*	1000	61/.1280	1.117	28.37	0.090	2.29	0.080	2.03	1.473	37.41	3088	4595	3564	5303

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

SunGen® UL LISTED RoHS Compliant Directive 2002/95/EC

General Cable
Phone: 800-243-8020
www.generalcable.com

SunGen® XLPE, Photovoltaic Wire, 600 V, UL Type PV/USE-2 or 2000 V RHH or RHW-2 or CSA RPVU90, 1000 V Single Conductor, Copper

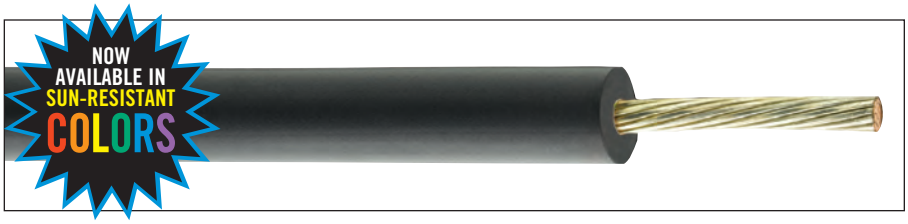
Product Construction:

Conductor:
- 18 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:
- Flame-retardant Cross-linked Polyethylene (XLPE), black

Print:
- 18 AWG and 16 AWG: GENERAL CABLE® (PLANT OF MFG) SUNGEN® 600 V PV WIRE DIR BUR 90°C WET OR DRY SUN RES (UL) -40°C VW-1 MONTH/YEAR OF MFG SEQUENTIAL FOOTAGE MARK
- 14 AWG thru 1000 kcmil: GENERAL CABLE® (PLANT OF MFG) SUNGEN® 600 V PV WIRE DIR BUR OR 2000 V RHH OR RHW-2 OR 600 V USE-2 (SIZE) 90°C WET OR DRY SUN RES (UL) -40°C VW-1 (CSA) RPVU90 1000 V MONTH/YEAR OF MFG SEQUENTIAL FOOTAGE MARK

Options:
- Bare copper conductor
- 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, 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
- Excellent resistance to crush and compression cuts
- 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
- UL 854 Type USE-2, UL File # E90499
- CSA C22.2 No. 271 RPVU90

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

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

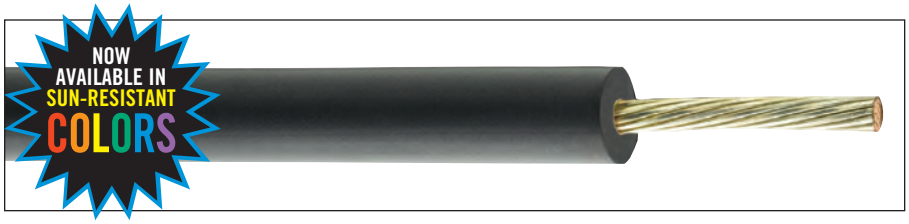
Packaging:
- Material cut to length and shipped on non-returnable wood reels

CATALOG NUMBER	COND. SIZE (AWG/ kcmil)	COND. STRAND	NOMINAL COND. O.D.		MINIMUM AVG. INSULATION THICKNESS		NOMINAL CABLE DIAMETER		COPPER WEIGHT		NET WEIGHT	
			INCHES	mm	INCHES	mm	INCHES	mm	LBS/ 1000 FT	kg/km	LBS/ 1000 FT	kg/km
18 AWG - 1000 kcmil CONDUCTORS												
12411.711800*	18	19/.0092	0.045	1.14	0.060	1.52	0.169	4.29	5	7	14	21
12411.711600*	16	19/.0117	0.056	1.42	0.060	1.52	0.180	4.57	8	12	18	27
12411.711400	14	19/.0142	0.070	1.78	0.060	1.52	0.194	4.93	13	19	27	40
12411.711200	12	19/.0185	0.088	2.23	0.060	1.52	0.214	5.43	20	30	36	54
12411.711100	10	19/.0234	0.112	2.84	0.060	1.52	0.238	6.04	32	48	51	76
12411.710800*	8	19/.0295	0.143	3.63	0.080	2.03	0.307	7.80	50	74	85	126
12411.710600*	6	19/.0372	0.184	4.67	0.080	2.03	0.348	8.84	81	121	123	183
12411.710400*	4	19/.0469	0.234	5.94	0.080	2.03	0.398	10.11	129	192	180	268
12411.710200*	2	19/.0526	0.296	7.52	0.080	2.03	0.460	11.68	205	305	267	397
12411.710100*	1	19/.0664	0.323	8.20	0.095	2.41	0.515	13.08	258	384	333	495
12411.715100*	1/0	19/.0740	0.370	9.40	0.095	2.41	0.563	14.30	326	485	410	610
12411.715200*	2/0	19/.0837	0.410	10.41	0.095	2.41	0.608	15.44	411	611	502	747
12411.715300*	3/0	19/.0940	0.460	11.68	0.095	2.41	0.658	16.71	518	771	620	922
12411.715400*	4/0	19/.1055	0.520	13.21	0.095	2.41	0.714	18.13	653	972	767	1141
12411.716250*	250	37/.0822	0.558	14.17	0.110	2.79	0.784	19.91	772	1149	923	1374
12411.716300*	300	37/.0900	0.611	15.52	0.110	2.79	0.837	21.26	926	1378	1090	1622
12411.716350*	350	37/.0972	0.661	16.79	0.110	2.79	0.887	22.53	1063	1582	1240	1845
12411.716400*	400	37/.1040	0.706	17.93	0.110	2.79	0.932	23.67	1235	1838	1423	2117
12411.716500*	500	37/.1159	0.789	20.04	0.110	2.79	1.015	25.78	1509	2246	1718	2557
12411.716600*	600	61/.0992	0.866	22.00	0.125	3.18	1.122	28.50	1883	2802	2136	3179
12411.716750*	750	61/.1109	0.968	24.59	0.125	3.18	1.224	31.09	2316	3447	2597	3865
12411.717000*	1000	61/.1280	1.117	28.37	0.125	3.18	1.373	34.87	3088	4595	3411	5076

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

General Cable
Phone: 800-243-8020
www.generalcable.com

SunGen® IC XLPE, Photovoltaic Wire, 600 V, UL Type PV/USE-2 or 2000 V RHH or RHW-2 or CSA RPVU90 1000 V, Single Conductor, Copper



Product Construction:

Conductor:
- 18 AWG thru 1000 kcmil bare compressed copper. Class B per ASTM B8

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

Print:
- 18 AWG and 16 AWG: GENERAL CABLE® (PLANT OF MFG) SUNGEN® 600 V PV WIRE DIR BUR 90°C WET OR DRY SUN RES (UL) -40°C VW-1 MONTH/YEAR OF MFG SEQUENTIAL FOOTAGE MARK
- 14 AWG thru 1000 kcmil: GENERAL CABLE® (PLANT OF MFG) SUNGEN® 600 V PV WIRE DIR BUR OR 2000 V RHH OR RHW-2 OR 600 V USE-2 (SIZE) 90°C WET OR DRY SUN RES (UL) -40°C VW-1 (CSA) RPVU90 1000 V MONTH/YEAR OF MFG SEQUENTIAL FOOTAGE MARK

Options:
- Tinned copper conductor
- 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, 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

Features (cont'd.):
- Excellent resistance to crush and compression cuts
- 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
- UL 854 Type USE-2, UL File # E90499
- CSA C22.2 No. 271 RPVU90

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

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

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

CATALOG NUMBER	COND. SIZE (AWG/ kcmil)	COND. STRAND	NOMINAL COND. O.D.		MINIMUM AVG. INSULATION THICKNESS		NOMINAL CABLE DIAMETER		COPPER WEIGHT		NET WEIGHT	
			INCHES	mm	INCHES	mm	INCHES	mm	LBS/ 1000 FT	kg/km	LBS/ 1000 FT	kg/km
18 AWG - 1000 kcmil CONDUCTORS												
12431.711800*	18	7/.0152	0.045	1.14	0.060	1.52	0.169	4.29	5	7	14	21
12431.711600*	16	7/.0192	0.056	1.42	0.060	1.52	0.180	4.57	8	12	18	27
12431.711400*	14	7/.0240	0.070	1.78	0.060	1.52	0.194	4.93	13	19	27	40
12431.711200	12	7/.0305	0.088	2.23	0.060	1.52	0.214	5.43	20	30	36	54
12431.711100	10	7/.0385	0.112	2.84	0.060	1.52	0.238	6.04	32	48	51	76
12431.710800	8	7/.0486	0.143	3.63	0.080	2.02	0.313	7.95	50	74	88	131
12431.710600*	6	7/.0612	0.184	4.67	0.080	2.02	0.356	9.04	81	121	126	186
12431.710400*	4	7/.0772	0.234	5.94	0.080	2.02	0.405	10.29	129	192	183	272
12431.710200*	2	7/.0974	0.296	7.52	0.080	2.02	0.466	11.84	205	305	269	401
12431.710100*	1	19/.0664	0.323	8.20	0.095	2.41	0.515	13.08	258	384	333	495
12431.715100*	1/0	19/.0740	0.370	9.40	0.095	2.41	0.563	14.30	326	485	410	610
12431.715200*	2/0	19/.0837	0.410	10.41	0.095	2.41	0.608	15.44	411	611	502	747
12431.715300*	3/0	19/.0940	0.460	11.68	0.095	2.41	0.658	16.71	518	771	620	922
12431.715400*	4/0	19/.1055	0.520	13.21	0.095	2.41	0.714	18.13	653	972	767	1141
12431.716250*	250	37/.0822	0.558	14.17	0.110	2.79	0.784	19.91	772	1149	923	1374
12431.716300*	300	37/.0900	0.611	15.52	0.110	2.79	0.837	21.26	926	1378	1090	1622
12431.716350*	350	37/.0972	0.661	16.79	0.110	2.79	0.887	22.53	1063	1582	1240	1845
12431.716400*	400	37/.1040	0.706	17.93	0.110	2.79	0.932	23.67	1235	1838	1423	2117
12431.716500*	500	37/.1159	0.789	20.04	0.110	2.79	1.015	25.78	1509	2246	1718	2557
12431.716600*	600	61/.0992	0.866	22.00	0.125	3.18	1.122	28.50	1883	2802	2136	3179
12431.716750*	750	61/.1109	0.968	24.59	0.125	3.18	1.224	31.09	2316	3447	2597	3865
12431.717000*	1000	61/.1280	1.117	28.37	0.125	3.18	1.373	34.87	3088	4595	3411	5076

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

SunGen®

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Canadian Standard Association

General Cable

Phone: 800-243-8020
www.generalcable.com

SunGen® XLPE, Photovoltaic Wire, 2000 V, UL Type PV/RHH or RHW-2 or 600 V USE-2 or CSA RPVU90, 1000 V Single Conductor, Copper

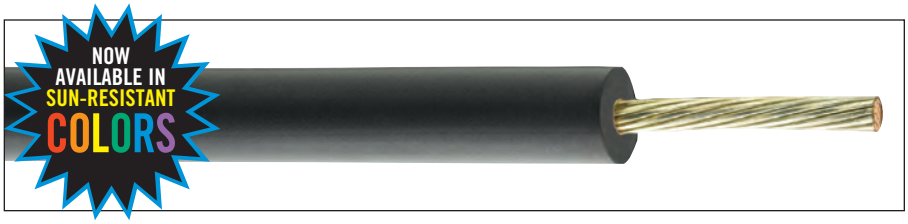
Product Construction:

Conductor:
- 18 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:
- Flame-retardant Cross-linked Polyethylene (XLPE), black

Print:
- 18 AWG and 16 AWG: GENERAL CABLE® (PLANT OF MFG) SUNGEN® 2000 V PV WIRE DIR BUR 90°C WET OR DRY SUN RES (UL) -40°C VW-1 MONTH/YEAR OF MFG SEQUENTIAL FOOTAGE MARK
- 14 AWG thru 1000 kcmil: GENERAL CABLE® (PLANT OF MFG) SUNGEN® 2000 V PV WIRE DIR BUR OR RHH OR RHW-2 OR 600 V USE-2 (SIZE) 90°C WET OR DRY SUN RES (UL) -40°C VW-1 (CSA) RPVU90 1000 V MONTH/YEAR OF MFG SEQUENTIAL FOOTAGE MARK

Options:
- Bare copper conductor
- 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
- Increased flexibility
- Excellent resistance to crush and compression cuts
- 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
- UL 854 Type USE-2 for 600 V, UL File # E90499
- CSA C22.2 No. 271 RPVU90

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

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

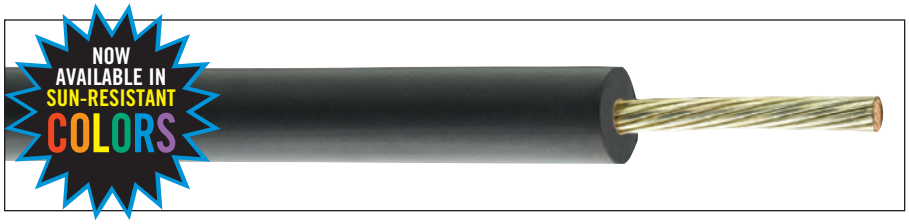
Packaging:
- Material cut to length and shipped on non-returnable wood reels

CATALOG NUMBER	COND. SIZE (AWG/ kcmil)	COND. STRAND	NOMINAL COND. O.D.		MINIMUM AVG. INSULATION THICKNESS		NOMINAL CABLE DIAMETER		COPPER WEIGHT		NET WEIGHT	
			INCHES	mm	INCHES	mm	INCHES	mm	LBS/ 1000 FT	kg/km	LBS/ 1000 FT	kg/km
18 AWG - 1000 kcmil CONDUCTORS												
12421.711800*	18	19/.0092	0.045	1.14	0.075	1.90	0.199	5.05	5	7	16	24
12421.711600*	16	19/.0117	0.056	1.42	0.075	1.90	0.210	5.33	8	12	21	31
12421.711400	14	19/.0142	0.070	1.78	0.075	1.90	0.224	5.69	13	19	32	48
12421.711200	12	19/.0185	0.088	2.23	0.075	1.90	0.244	6.20	20	30	42	62
12421.711100	10	19/.0234	0.112	2.84	0.075	1.90	0.268	6.81	32	48	57	85
12421.710800*	8	19/.0295	0.143	3.63	0.085	2.16	0.326	8.28	50	74	87	129
12421.710600*	6	19/.0372	0.184	4.67	0.085	2.16	0.363	9.22	81	121	123	183
12421.710400*	4	19/.0469	0.234	5.94	0.085	2.16	0.406	10.31	129	192	181	269
12421.710200*	2	19/.0526	0.296	7.52	0.085	2.16	0.474	12.04	205	305	266	396
12421.710100*	1	19/.0664	0.323	8.20	0.105	2.67	0.538	13.66	258	384	350	521
12421.715100*	1/0	19/.0740	0.370	9.40	0.105	2.67	0.586	14.88	326	485	429	638
12421.715200*	2/0	19/.0837	0.410	10.41	0.105	2.67	0.631	16.03	411	611	527	784
12421.715300*	3/0	19/.0940	0.460	11.68	0.105	2.67	0.674	17.12	518	771	647	963
12421.715400*	4/0	19/.1055	0.520	13.21	0.105	2.67	0.737	18.72	653	972	796	1184
12421.716250*	250	37/.0822	0.558	14.17	0.120	3.05	0.804	20.42	772	1149	938	1396
12421.716300*	300	37/.0900	0.611	15.52	0.120	3.05	0.857	21.77	926	1378	1106	1646
12421.716350*	350	37/.0972	0.661	16.79	0.120	3.05	0.907	23.04	1063	1582	1257	1870
12421.716400*	400	37/.1040	0.706	17.93	0.120	3.05	0.952	24.18	1235	1838	1441	2144
12421.716500*	500	37/.1159	0.789	20.04	0.120	3.05	1.035	26.29	1509	2246	1737	2585
12421.716600*	600	61/.0992	0.866	22.00	0.135	3.43	1.142	29.01	1883	2802	2157	3211
12421.716750*	750	61/.1109	0.968	24.59	0.135	3.43	1.244	31.60	2316	3447	2620	3900
12421.717000*	1000	61/.1280	1.117	28.37	0.135	3.43	1.393	35.38	3088	4595	3437	5115

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

General Cable
Phone: 800-243-8020
www.generalcable.com

SunGen® IC XLPE, Photovoltaic Wire, 2000 V, UL Type PV/RHH or RHW-2 or 600 V USE-2 or CSA RPVU90 1000 V, Single Conductor, Copper



Product Construction:

Conductor:
- 18 AWG thru 1000 kcmil bare compressed copper. Class B per ASTM B8

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

Print:
- 18 AWG and 16 AWG: GENERAL CABLE® (PLANT OF MFG) SUNGEN® 2000 V PV WIRE DIR BUR 90°C WET OR DRY SUN RES (UL) -40°C VW-1 MONTH/YEAR OF MFG SEQUENTIAL FOOTAGE MARK
- 14 AWG thru 1000 kcmil: GENERAL CABLE® (PLANT OF MFG) SUNGEN® 2000 V PV WIRE DIR BUR OR RHH OR RHW-2 OR 600 V USE-2 (SIZE) 90°C WET OR DRY SUN RES (UL) -40°C VW-1 (CSA) RPVU90 1000 V MONTH/YEAR OF MFG SEQUENTIAL FOOTAGE MARK

Options:
- Tinned copper conductor
- 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

Features (cont'd.):
- Excellent resistance to crush and compression cuts
- 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 854 Type USE-2 for 600 V, UL File # E90499 or E86307
- CSA C22.2 No. 271 RPVU90

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

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

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

CATALOG NUMBER	COND. SIZE (AWG/ kcmil)	COND. STRAND	NOMINAL COND. O.D.		MINIMUM AVG. INSULATION THICKNESS		NOMINAL CABLE DIAMETER		COPPER WEIGHT		NET WEIGHT	
			INCHES	mm	INCHES	mm	INCHES	mm	LBS/ 1000 FT	kg/km	LBS/ 1000 FT	kg/km
18 AWG - 1000 kcmil CONDUCTORS												
12441.711800*	18	7/.0152	0.045	1.14	0.075	1.90	0.199	5.05	5	7	16	24
12441.711600*	16	7/.0192	0.056	1.42	0.075	1.90	0.210	5.33	8	12	21	31
12441.711400*	14	7/.0240	0.070	1.78	0.075	1.90	0.224	5.69	13	19	32	48
12441.711200	12	7/.0305	0.088	2.23	0.075	1.90	0.244	6.20	20	30	42	62
12441.711100	10	7/.0385	0.112	2.84	0.075	1.90	0.268	6.81	32	48	57	85
12441.710800	8	7/.0486	0.143	3.63	0.085	2.16	0.326	8.28	50	74	87	129
12441.710600*	6	7/.0612	0.184	4.67	0.085	2.16	0.363	9.22	81	121	123	183
12441.710400*	4	7/.0772	0.234	5.94	0.085	2.16	0.406	10.31	129	192	181	269
12441.710200*	2	7/.0974	0.296	7.52	0.085	2.16	0.474	12.04	205	305	266	396
12441.710100*	1	19/.0664	0.323	8.20	0.105	2.67	0.538	13.66	258	384	350	521
12441.715100*	1/0	19/.0740	0.370	9.40	0.105	2.67	0.586	14.88	326	485	429	638
12441.715200*	2/0	19/.0837	0.410	10.41	0.105	2.67	0.631	16.03	411	611	527	784
12441.715300*	3/0	19/.0940	0.460	11.68	0.105	2.67	0.674	17.12	518	771	647	963
12441.715400*	4/0	19/.1055	0.520	13.21	0.105	2.67	0.737	18.72	653	972	796	1184
12441.716250*	250	37/.0822	0.558	14.17	0.120	3.05	0.804	20.42	772	1149	938	1396
12441.716300*	300	37/.0900	0.611	15.52	0.120	3.05	0.857	21.77	926	1378	1106	1646
12441.716350*	350	37/.0972	0.661	16.79	0.120	3.05	0.907	23.04	1063	1582	1257	1870
12441.716400*	400	37/.1040	0.706	17.93	0.120	3.05	0.952	24.18	1235	1838	1441	2144
12441.716500*	500	37/.1159	0.789	20.04	0.120	3.05	1.035	26.29	1509	2246	1737	2585
12441.716600*	600	61/.0992	0.866	22.00	0.135	3.43	1.142	29.01	1883	2802	2157	3211
12441.716750*	750	61/.1109	0.968	24.59	0.135	3.43	1.244	31.60	2316	3447	2620	3900
12441.717000*	1000	61/.1280	1.117	28.37	0.135	3.43	1.393	35.38	3088	4595	3437	5115

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

SunGen® LISTED Canadian Standard Association

General Cable
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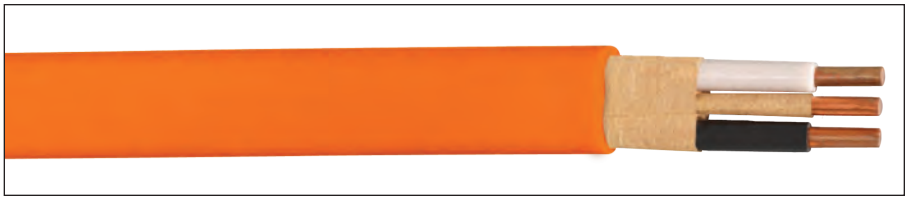
www.generalcable.com

NM-B

PVC, Low-Voltage Power
600 V, Type NM-B, Multi-Conductor, Copper



Product Construction:

Conductor:
- 14 AWG thru 10 AWG bare annealed solid copper per ASTM B3
- 8 AWG and larger stranded bare annealed copper per ASTM B8

Insulation:
- Premium-grade Polyvinyl Chloride (PVC) with a Nylon jacket
- Color-coded: 2 conductor - black, white; 3 conductor - black, white, red

Grounding Conductor:
- Bare annealed copper per ASTM B3 or ASTM B8

Assembly:
- Type THHN inners, rated 90°C in dry locations(1)
- 2-conductor – insulated conductors laid parallel with a bare copper grounding conductor wrapped in paper and laid parallel between the insulated conductors
- 3-conductor – insulated conductors laid parallel or twisted together with bare copper grounding conductor wrapped in paper
- The entire assembly is wrapped with a paper separator prior to applying the Polyvinyl Chloride (PVC) outer jacket

Outer Jacket:
- Polyvinyl Chloride (PVC)
- Color-coded: 14 AWG – white; 12 AWG – yellow; 10 AWG – orange; 8 AWG – black; 6 AWG - black

Print:
- GENERAL CABLE® (SIZE) WITH GROUND TYPE NM-B 600 VOLTS (UL) MONTH/YEAR OF MFG

Applications:
- Residential wiring as branch circuits for outlets, switches, and other loads
- Exposed or concealed wiring
- May be run through walls, ceilings and masonry blocks
- New wiring or replacement wiring
- Only for use in normally dry locations

Features:
- Color-coded inners for circuit identification
- Available with and without ground
- Rated for 90°C in dry locations(1)
- Ampacity is limited to that for 60°C conductors per NEC® Article 334

Compliances:
- UL Standard 83
- UL Standard 719
- ASTM B3 and B8
- NEC® Article 334
- Federal Specification A-A-59544

Packaging:
- 250' or 125' coils or 1000' reels

CATALOG NUMBER	SIZE		NO. OF WIRES	INSULATION THICKNESS		JACKET THICKNESS		NOMINAL CABLE O.D.		COPPER WEIGHT		TOTAL WEIGHT		AMPACITY (1)
	AWG OR kcmil	mm²		INCHES	mm	INCHES	mm	INCHES	mm	LBS/ 1000 FT	kg/km	LBS/ 1000 FT	kg/km	
TYPE NM-B COPPER CONDUCTOR WITH GROUND														
311422	14/2G	2.08	Solid	0.015	0.38	0.004	0.10	0.170 x 0.390	4.318 x 9.906	38	57	56	83	15
311222	12/2G	3.31	Solid	0.015	0.38	0.004	0.10	0.160 x 0.450	4.064 x 11.430	60	90	82	122	20
311022	10/2G	5.26	Solid	0.020	0.51	0.004	0.10	0.210 x 0.493	5.334 x 12.522	96	143	123	183	30
320822	8/2G	8.37	7	0.030	0.76	0.005	0.13	0.290 x 0.580	7.366 x 14.732	133	199	185	275	40
320622	6/2G	13.3	7	0.030	0.76	0.005	0.13	0.330 x 0.695	8.382 x 17.653	193	288	256	381	55
321432	14/3G	2.08	Solid	0.015	0.38	0.004	0.10	0.170 x 0.450	4.318 x 11.430	51	76	74	110	15
321232	12/3G	3.31	Solid	0.015	0.38	0.004	0.10	0.345	8.76	81	121	107	159	20
321032	10/3G	5.26	Solid	0.020	0.51	0.004	0.10	0.430	10.92	127	189	165	246	30
320832	8/3G	8.37	7	0.030	0.76	0.005	0.13	0.555	14.10	187	278	251	374	40
320632	6/3G	13.3	7	0.030	0.76	0.005	0.13	0.612	15.54	277	412	352	524	55
320432	4/3G	21.2	7	0.040	1.02	0.006	0.15	0.820	20.83	442	658	565	841	70
320232	2/3G	33.6	7	0.040	1.02	0.006	0.15	0.945	24.00	672	1001	841	1252	95

Dimensions and weights are nominal; subject to industry tolerances.

(1) May be installed in dry locations with temperatures up to 90°C, but with the ampacity limited to that of 60°C conductors. The 90°C rating shall be permitted to be used for ampacity adjustments and correction calculations, provided the final derating ampacity does not exceed that of a 60°C rated conductor (NEC® Article 334). Allowable ampacities shown are for general use as specified by the National Electric Code, section 310.15, Table 310.15(B)(16). Adjustments and corrections may apply.

UF-B and NMC

PVC, Low-Voltage Power
600 V, Type UF-B and NMC, Multi-Conductor, Copper

Product Construction:

Conductor:
- 14 AWG thru 10 AWG solid bare annealed copper per ASTM B3
- 8 AWG and larger stranded bare annealed copper per ASTM B8

Insulation:
- Premium-grade Polyvinyl Chloride (PVC) with Nylon jacket
- Color-coded: 2 conductor - black, white; 3 conductor - black, white, red

Grounding Conductor:
- Bare annealed copper per ASTM B3 or B8

Assembly:
- Type THHN or THWN inners, rated 90°C in dry or 75°C in wet locations(1)
- 2 and 3 conductor – insulated conductors laid parallel
- With grounding conductor - laid in a valley between the insulated conductors

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

Print:
- GENERAL CABLE® (SIZE) WITH GROUND TYPE UF-B OR NMC SUNLIGHT RESISTANT 600 VOLTS (UL) MONTH/YEAR OF MFG

Applications:
- Where exposed to direct rays of sun or underground, including direct burial
- Underground feeder to outdoor lighting or apparatus
- Exposed or concealed wiring in damp, moist, wet, dry, and corrosive locations
- NMC applications as specified in Article 334.10B of the NEC

Features:
- Color-coded inners for circuit identification
- Available with ground and without ground
- Sunlight-resistant jacket
- Suitable for direct burial
- Rated for 90°C in dry or 75°C in wet locations(1)
- Ampacity is limited to that for 60°C conductors per NEC® Article 340

Compliances:
- UL Standard 83
- UL Standard 493
- ASTM B3 and B8
- NEC® Article 340 Type UF-B
- NEC® Article 334 Type NMC
- Federal Specification A-A-59544

CATALOG NUMBER	SIZE		NO. OF WIRES	INSULATION THICKNESS		JACKET THICKNESS		NOMINAL CABLE O.D.		COPPER WEIGHT		TOTAL WEIGHT		AMPACITY (1)
	AWG OR kcmil	mm²		INCHES	mm	INCHES	mm	INCHES	mm	LBS/ 1000 FT	kg/km	LBS/ 1000 FT	kg/km	
TYPE UF-B AND NMC COPPER CONDUCTOR WITH GROUND														
341429	14/2	2.08	Solid	0.015	0.38	0.004	0.10	0.185 x 0.385	4.699 x 9.779	38	57	53	79	15
341229	12/2	3.31	Solid	0.015	0.38	0.004	0.10	0.195 x 0.415	4.953 x 10.541	60	90	75	112	20
341029	10/2	5.26	Solid	0.020	0.51	0.004	0.10	0.230 x 0.460	5.842 x 11.684	96	143	140	208	30
340829	8/2	8.37	7	0.030	0.76	0.005	0.13	0.320 x 0.620	8.128 x 15.748	133	199	213	317	40
340629	6/2	13.3	7	0.030	0.76	0.005	0.13	0.385 x 0.800	9.779 x 20.32	193	288	305	454	55
341439	14/3	2.08	Solid	0.015	0.38	0.004	0.10	0.185 x 0.575	4.699 x 14.605	51	76	93	138	15
341239	12/3	3.31	Solid	0.015	0.38	0.004	0.10	0.195 x 0.620	4.953 x 15.748	81	121	134	199	20
341039	10/3	5.26	Solid	0.020	0.51	0.004	0.10	0.230 x 0.690	5.842 x 17.526	127	189	194	289	30
340839	8/3	8.37	7	0.030	0.76	0.005	0.13	0.320 x 0.990	8.128 x 25.146	187	278	330	491	40
340639	6/3	13.3	7	0.030	0.76	0.005	0.13	0.385 x 1.200	9.779 x 30.48	277	412	449	668	55

Dimensions and weights are nominal; subject to industry tolerances.

(1) May be installed in dry locations with temperatures up to 90°C, or in wet locations with temperatures up to 75°C but with the ampacity limited to that of 60°C conductors. The 90°C dry or 75°C rating shall be permitted to be used for ampacity adjustments and correction calculations, provided the final derating ampacity does not exceed that of a 60°C rated conductor (NEC® Article 334 Type NMC or NEC® Article 340 Type UF-B). Allowable ampacities shown are for general use as specified by the National Electric Code, section 310.15, Table 310.15(B)(16). Adjustments and corrections may apply.

SE Style U

PVC, Low-Voltage Power
600 V, Type SE Style U, Multi-Conductor, Copper

Product Construction:

Conductor:
- Solid bare annealed copper per ASTM B3
- 7-strand Class B concentrically stranded per ASTM B8
- 19-strand combination unilay conductors per ASTM B787

Insulation:
- Premium-grade Polyvinyl Chloride (PVC) with a Nylon jacket
- Color-coded: black and red

Grounding Conductor:
- Bare annealed copper, evenly distributed and helically applied over the insulated conductors so as to produce the equivalent AWG size required by UL 854

Assembly:
- THHN or THWN inner conductors meeting the requirements of UL 83
- Insulated conductors laid parallel with bare grounding conductors helically wound around core
- Glass-reinforced tape is applied over the cable core

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

Print:
- GENERAL CABLE® TYPE SE STYLE U THHN OR THWN CDRS, 600 VOLTS 2 CDRS (SIZE) CU 1CDR (SIZE) CU (UL) MONTH/YEAR

Applications:
- Above-ground service entrance and branch circuit
- Maximum operating temperature of phase conductors not to exceed 90˚C for dry locations or 75˚C for wet locations

Features:
- Color-coded phase conductors
- Full or reduced neutral constructions

Compliances:
- UL Standard 83
- UL Standard 854
- Federal Specification AA59544
- NEC® Articles 338 and 230
- NEMA RV4 2009

	PHASE CONDUCTORS					BARE GROUND			OVERALL						AMPACITY(1)			
	SIZE			INSULATION THKN.		SIZE			NOMINAL CABLE O.D.		COPPER WEIGHT		NET WEIGHT					
CATALOG NUMBER	AWG OR kcmil	mm²	NO. OF WIRES	INCHES	mm	AWG OR kcmil	mm²	NO. OF WIRES (1)	INCHES	mm	LBS/ 1000 FT	kg/km	LBS/ 1000 FT	kg/km	60°C	75°C	90°C	DWELLING
TYPE SE STYLE U COPPER CONDUCTOR WITH GROUND																		
371039	10/2	5.26	Solid	0.020	0.51	10	5.26	Solid	0.295 x 0.455	7.493 x 11.557	94	140	142	211	30	30	30	—
370839	8/2	8.37	7	0.030	0.76	8	8.37	7	0.400 x 0.625	10.16 x 15.875	153	228	219	326	40	50	55	—
376289	6/2	13.30	7	0.030	0.76	8	8.4	7	0.440 x 0.700	11.176 x 17.78	213	317	290	432	55	65	75	—
370639	6/2	13.30	7	0.030	0.76	6	13.3	7	0.445 x 0.705	11.303 x 17.907	243	362	319	475	55	65	75	—
374269	4/2	21.15	7	0.040	1.02	6	13.3	7	0.515 x 0.850	13.081 x 21.59	339	504	445	662	70	85	95	100
370439	4/2	21.15	7	0.040	1.02	4	21.15	7	0.540 x 0.870	13.716 x 22.098	387	575	494	735	70	85	95	100
373259	3/2	26.67	7	0.040	1.02	5	16.77	12	0.570 x 0.930	14.478 x 23.622	428	636	547	814	85	100	110	110
370339	3/2	26.67	7	0.040	1.02	3	26.67	12	0.605 x 0.970	15.367 x 24.638	488	725	609	906	85	100	110	110
372249	2/2	33.63	7	0.040	1.02	4	21.15	12	0.600 x 1.000	15.24 x 25.4	539	802	668	994	95	115	130	125
370239	2/2	33.63	7	0.040	1.02	2	33.63	12	0.640 x 1.030	16.256 x 26.162	615	915	745	1109	95	115	130	125
370139	1/1	42.41	19	0.050	1.27	1	42.41	12	0.720 x 1.180	18.288 x 29.972	775	1154	941	1400	110	130	150	150
37A309	1/0-2	53.48	19	0.050	1.27	1/0	53.48	18	0.740 x 1.240	18.796 x 31.496	977	1455	1157	1722	125	150	170	175
37B309	2/0-2	67.43	19	0.050	1.27	2/0	67.43	18	0.810 x 1.350	20.574 x 34.29	1233	1834	1431	2130	145	175	195	200
37C309	3/0-2	85.03	19	0.050	1.27	3/0	107.22	18	0.890 x 1.480	22.606 x 37.592	1554	2313	1775	2641	165	200	225	225

Dimensions and weights are nominal; subject to industry tolerances.
(1) Allowable ampacities shown are for general use as specified by the 2011 edition of the National Electric Code, section 310.15, Table 310.15(B)(16). Adjustments and corrections may apply:
60°C - When terminated to equipment for circuits rated 100 amperes or less or marked for 14 through 1 AWG conductors.
75°C - When terminated to equipment for circuits rated over 100 amperes or marked for conductors larger than 1 AWG.
90°C - Wet or dry locations. For ampacity derating purposes.
Dwelling - For dwelling units, conductors shall be permitted at listed ampacities as 120/240-volt, 3-wire, single-phase services and feeders.

General Cable
Phone: 800-243-8020
www.generalcable.com

UL LISTED

SE Style R

PVC, Low-Voltage Power
600 V, Type SE Style R, Multi-Conductor, Copper

Product Construction:

Conductor:
- 7-strand Class B concentrically stranded per ASTM B8
- 19-strand combination unilay conductors per ASTM B787

Insulation:
- Polyvinyl Chloride PVC with a Nylon jacket
- Color-coded: black, white, red

Grounding Conductor:
- Bare annealed copper per ASTM B3, ASTM B8 or ASTM B787

Assembly:
- THHN or THWN inner conductors meeting the requirements of UL 83
- Conductors are twisted together with the bare copper grounding conductor in one interstice
- Glass-reinforced tape is applied over the cabled core

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

Print:
- GENERAL CABLE® TYPE SE STYLE R THHN OR THWN CDRS 600 VOLTS 3 CDRS (SIZE) CU 1 CDR (SIZE) CU (UL) MONTH/YEAR

Applications:
- Above-ground service entrance, panel feeder in multiple dwellings, range, dryer and other branch circuits
- Maximum operating temperature of phase conductors not to exceed 90˚C for dry locations or 75˚C for wet locations

Features:
- Color-coded phase conductors

Compliances:
- UL Standard 83
- UL Standard 854
- Federal Specification AA59544
- NEC® Articles 338 and 230
- NEMA RV4 2009

	PHASE CONDUCTORS					BARE GROUND			OVERALL						AMPACITY(1)			
	SIZE			INSULATION THKN.		SIZE			NOMINAL CABLE O.D.		COPPER WEIGHT		NET WEIGHT					
CATALOG NUMBER	AWG OR kcmil	mm²	NO. OF WIRES	INCHES	mm	AWG OR kcmil	mm²	NO. OF WIRES (1)	INCHES	mm	LBS/ 1000 FT	kg/km	LBS/ 1000 FT	kg/km	60°C	75°C	90°C	DWELLING
TYPE SE STYLE R COPPER CONDUCTOR WITH GROUND																		
388389	8/3	8.37	7	0.030	0.76	8	8.4	7	0.570	14.48	206	307	290	432	40	50	55	—
386369	6/3	13.30	7	0.030	0.76	8	8.4	7	0.665	16.89	288	429	432	643	55	65	75	—
384369	4/3	21.15	7	0.040	1.02	6	13.3	7	0.830	21.08	473	703	601	894	70	85	95	100
383359	3/3	26.67	7	0.040	1.02	5	16.8	7	0.895	22.73	596	886	737	1097	85	100	110	110
382349	2/3	33.63	7	0.040	1.02	4	21.1	7	0.970	24.64	751	1118	911	1356	95	115	130	125
381339	1/3	42.41	19	0.050	1.27	3	26.6	7	1.100	27.94	947	1409	1151	1713	110	130	150	150
38A329	1/0-3	53.58	19	0.050	1.27	2	33.6	7	1.200	30.48	1194	1777	1417	2109	125	150	170	175
38B319	2/0-3	67.43	19	0.050	1.27	1	42.4	19	1.310	33.27	1506	2241	1768	2631	145	175	195	200
38C309	3/0-3	85.03	19	0.050	1.27	1/0	53.6	19	1.430	36.32	1886	2807	2186	3253	165	200	225	225
38D300	4/0-3	107.22	19	0.050	1.27	2/0	67.4	19	1.610	40.89	2378	3539	2729	4061	195	230	260	250

Dimensions and weights are nominal; subject to industry tolerances.

(1) Allowable ampacities shown are for general use as specified by the 2011 edition of the National Electric Code, section 310.15, Table 310.15(B)(16). Adjustments and corrections may apply:
60°C - When terminated to equipment for circuits rated 100 amperes or less or marked for 14 through 1 AWG conductors.
75°C - When terminated to equipment for circuits rated over 100 amperes or marked for conductors larger than 1 AWG.
90°C - Wet or dry locations. For ampacity derating purposes.
Dwelling - For dwelling units, conductors shall be permitted at listed ampacities as 120/240-volt, 3-wire, single-phase services and feeders.

Technical Information 2

General Technical Information

Conductor Data

Handling and Storage Recommendations

Cable Installation Guidelines

Catalog Number Index

Building Wire Types

WIRE TYPE	DESCRIPTION
NM-B	Non-Metallic Sheathed Cable, THHN Individual Conductors 90°C Overall PVC Jacket, Dry Locations only (Indoor) 600 V
NMC	Non-Metallic Sheathed Cable, THHN Individual Conductors 90°C Overall PVC Jacket, Dry, Damp and Corrosive Locations (Indoor or Outdoor) 600 V
PV	Single Conductor, Insulated and Integrally or Non-Integrally 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)
RHH	Rubber (Thermoset) Insulation, High Heat Resistant, 90°C Dry and Damp Locations 600 V
RHW	Rubber (Thermoset) Insulation, Heat Resistant, 75°C Dry and Wet Locations 600 V
RHW-2*	Rubber (Thermoset) Insulation, Heat Resistant, 90°C Dry and Wet Locations 600 V
RW90	Cross-Linked Polyethylene Insulation (XLPE), 90°C Dry and Wet Locations (CSA Type) 600 V
RWU90	Cross-Linked Polyethylene Insulation (XLPE), 90°C Direct Burial (CSA Type) 1 kV
SE-R	Service Entrance Round Construction, THHN/THWN or XHHW Insulation, 90°C Dry and 75°Wet Locations 600 V
SE-U	Service Entrance Uninsulated Concentric Neutral, THHN/THWN or XHHW Insulation, 90°C Dry and 75°Wet Locations 600 V
T90	Thermoplastic Insulation, Nylon Jacket 90° Dry and Damp Locations (CSA Type) 600 V
TC	Multi-Conductor Tray Cable, Several Combinations of Insulation and Jacketing Compounds, Cable Tray Use 600 V
TFN	Thermoplastic Insulation, Fixture Wire, Nylon Jacket, 90° Dry Locations 600 V
TFFN	Thermoplastic Insulation, Flexible Fixture Wire, Nylon Jacket, 90° Dry Locations 600 V
THHN	Thermoplastic Insulation, High Heat Resistant, Nylon Jacket, 90°C Dry and Damp Locations 600 V
THW	Thermoplastic Insulation, Heat Resistant, 75°C Dry and Wet Locations 600V
THW-2*	Thermoplastic Insulation, Heat Resistant, 90°C Dry and Wet Locations 600V
THWN	Thermoplastic Insulation, Heat Resistant, Nylon Jacket, 75°C Dry and Wet Locations 600 V
THWN-2*	Thermoplastic Insulation, Heat Resistant, Nylon Jacket, 90°C Dry and Wet Locations 600 V
TWN75	Thermoplastic Insulation, Nylon Jacket 75°C Wet Locations (CSA Type) 600 V
UF-B	Underground Feeder, THHN or THWN Insulation, Overall PVC Jacket, 90°C Dry and 75°C Wet Locations and Corrosive Locations 600 V
USE	Underground Service Entrance, Cross-Linked Polyethylene Insulation (XLPE), 75°C Direct Burial 600 V
USE-2*	Underground Service Entrance, Cross-Linked Polyethylene Insulation (XLPE), 90°C Direct Burial 600 V
XHHW	Cross-Linked Polyethylene Insulation (XLPE), High Heat Resistant, 90° Dry Locations and 75°C Wet Locations 600 V
XHHW-2*	Cross-Linked Polyethylene Insulation (XLPE), High Heat Resistant, 90° Dry and Wet Locations 600 V

* -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.

Location information based on National Electrical Code Book 2011, Article 100 Definitions

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.

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.

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. When annealing copper, the act of softening the metal by means of heat to render it less brittle.

ANSI: The American National Standards Institute.

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.

ASTM: The American Society for Testing and Materials.

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.

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.

Glossary

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

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

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

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.

Color Code: A color system for circuit identification by use of solid colors, 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.

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.

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

C.S.A.: Abbreviation for Canadian Standards Association. The Canadian counterpart of Underwriters’ Laboratories.

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.”

Glossary

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.

EEMAC: Electrical and Electronic Manufacturers Association of Canada (U.S. counterpart is NEMA).

EIA: Abbreviation for Electronic Industries Association.

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

Elongation at Break: The tensile strain in a test piece stretched to breaking point, the conditions being such that the stress is substantially uniform over the cross-section.

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

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

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.

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.

Flame Resistance: Ability of the material to extinguish flame once the source of heat is removed.

Flame Retardance: Ability of a material to prevent the spread of combustion by a low rate of travel so the flame will not be conveyed.

Flexibility: The ease with which a cable may be bent.

FR-1: A flammability rating established by Underwriters' Laboratories for wires and cables that pass a specially designed vertical flame test. This designation has been replaced by VW-1.

FT1: One of several CSA flame test designations for wires and cables which pass the C22.2 No. 0.3 test requirements (other designations include FT2, FT4, etc.).

Gauge: A term used to denote the physical size of a wire.

Ground: a) An electrical term meaning to connect to the earth or other large conducting body to serve as a ground, thus making a complete electrical circuit. b) A wire intended to be used for grounding (also called grounding conductor).

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.

Glossary

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.

kcmil: 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.

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.

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.

Glossary

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 2 or more conductors are laid parallel and surrounded and 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.

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 temper-ature 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: Ditto, 90°C, wet or dry.

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.

Glossary

Ringing Out: The process of locating or identifying specific conductive paths by means of passing current through selected conductors.

Rip Cord: Two or more insulated conductors in a parallel configuration which may be easily separated, leaving the insulation of each conductor intact.

Rope Strand: A conductor composed of a center group of twisted strands surrounded by one or more layers of similar groups of twisted strands.

Rubber: A general term used to describe wire insulation and jackets made of thermosetting elastomers, such as natural or synthetic rubbers, EPR, neoprenes, Hypalon, butyl rubber and others.

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.

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*.

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.

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.

Thermoplastic: Material that will resoften and distort from its formed shape by 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.

Glossary

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. A non-profit independent organization which operates a listing service for electrical and electronic materials and equipment (Canadian counterpart is CSA).

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

Unidirectional Concentric Stranding: Stranding where each successive layer has a different lay length, thereby retaining a circular form without migration of strands from one layer to another.

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

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

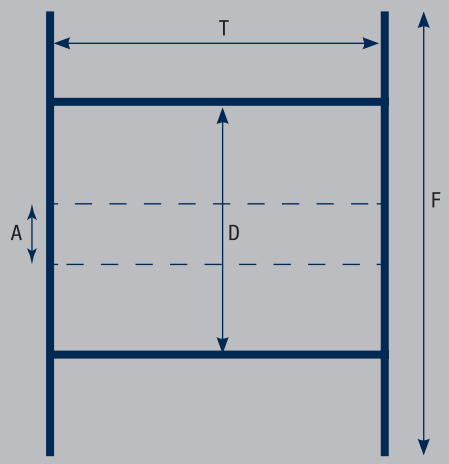
* 1 Pascal = 1 Newton/square meters

Reel Capacity Chart

General Cable
Phone: 800-243-8020
www.generalcable.com

WOOD REELS

Reel (FxTxD)	30x18x12	36x24x17	40x24x17	45x28x21	50x32x24	58x32x28	72x36x36	84x36x48	90x36x48
RM Code	61-1215	61-1659	61-1808	61-2056	61-2253	61-2764	61-3655	61-4265	61-4366
Arbor Hole	2.75	3.06	3.06	3.06	3.06	3.06	3.06	3.5	3.5
Drive Hole	1	1	1	1.5	1.5	1.5	1.5	1.5	1.5
Drive Hole Radius	4.5	6	6	8.5	10	10	10	10	10
Clearance	1.5	2	2	2	2	2	2	2	3
Factor	509.3	1155.4	1582.8	2274.2	3227.7	4468.6	7847.4	9658.4	11205.2
Max Weight	750	1500	2000	3000	4800	6500	8000	9000	10,000
Net Weight	47	91	110	142	208	271	513	744	821
Cable OD									
.241 - .250	11040								
.251 - .260	10200								
.261 - .270	9460								
.271 - .280	8800								
.281 - .290	8200								
.291 - .300	7660								
.301 - .310	7180								
.311 - .320	6740	10790							
.321 - .330	6330	10110							
.331 - .340	5970	9610							
.341 - .350	5630	9030							
.351 - .360	6320	8490							
.361 - .370	5040	8100							
.371 - .380	4780	7620	10520						
.381 - .390	4530	7300	9940						
.391 - .400	4310	6880	9540						
.401 - .410	4100	6600	9030						
.411 - .420	3910	6230	8550	12580					
.421 - .430	3730	6000	8220	11940					
.431 - .440	3560	5660	7790	11330					
.441 - .450	3410	5450	7510	10910					
.451 - .460	3260	5250	7120	10370	15010				
.461 - .470	3120	4970	6880	10000	14290				
.471 - .480	2990	4700	6530	9510	13790				
.481 - .490	2870	4630	6310	9180	13150				
.491 - .500	2760	4390	6110	8880	12700				
.501 - .525	2500	4040	5530	8050	11540				
.526 - .550	2280	3650	5030	7330	10510				
.551 - .575	2090	3310	4580	6680	9610				
.576 - .600	1920	3080	4180	6110	8800				
.601 - .625	1770	2810	3910	5590	8050				
.626 - .650	1630	2630	3580	5240	7430	10420			
.651 - .675	1510	2400	3280	4820	6970	9630			
.676 - .700	1410	2260	3090	4530	6430	8900			
.701 - .725	1310	2070	2840	4180	5940	8260			
.726 - .750	1230	1950	2690	3950	5610	7800			
.751 - .775	1150	1840	2480	3650	5190	7250			
.776 - .800	1080	1690	2350	3460	4920	6870			
.801 - .825	1010	1610	2230	3200	4670	6400	11530		
.826 - .850	950	1530	2060	3040	4340	6090	10860		
.851 - .875	900	1450	1970	2900	4130	5680	10250		
.876 - .900	850	1340	1880	2690	3850	5420	9690		
.901 - .925	810	1280	1735	2570	3670	5060	9170	11290	
.926 - .950	760	1220	1660	2460	3510	4840	8700	10700	
.951 - .975	730	1170	1590	2280	3270	4630	8250	10160	
.976 - 1.000	690	1075	1525	2190	3130	4340	7850	9660	11210
1.001 - 1.050	630	990	1360	2010	2880	3990	7120	8760	10160
1.051 - 1.100	570	910	1260	1800	2590	3600	6490	7980	9260
1.101 - 1.150	520	810	1120	1670	2400	3250	5930	7300	8470
1.151 - 1.200	480	750	1040	1500	2160	3030	5450	6710	7780
1.201 - 1.250	440	700	980	1400	2020	2740	5020	6180	7170
1.251 - 1.300	410	650	870	1310	1820	2570	4640	5720	6630
1.301 - 1.350	380	580	820	1180	1710	2410	4320	5300	6150
1.351 - 1.400	350	550	770	1110	1610	2190	4000	4930	5720
1.401 - 1.450	330	520	690	1040	1460	2070	3730	4590	5330
1.451 - 1.500	310	490	650	990	1370	1950	3490	4290	4980
1.501 - 1.600	270	410	590	840	1230	1690	3070	3770	4380
1.601 - 1.700	240	370	500	760	1060	1520	2720	3340	3880
1.701 - 1.800		330	450	650	960	1325	2420	2980	3460
1.801 - 1.900			420	600	880	1210	2170	2680	3100
1.091 - 2.000				540	760	1060	1960	2410	2800
2.001 - 2.100				500	700	970	1740	2190	2540
2.101 - 2.200					650	900	1620	2000	2320
2.201 - 2.300					600	790	1480	1830	2120
2.301 - 2.400					520	740	1360	1680	1950
2.401 - 2.500					490	690	1260	1550	1790
2.501 - 2.600					460	640	1160	1430	1660
2.601 - 2.700					430	600	1080	1320	1540
2.701 - 2.800						530	1000	1230	1430
2.801 - 2.900						500	930	1150	1330
2.901 - 3.000						470	870	1070	1250
3.001 - 3.100						440	820	1010	1170
3.101 - 3.200						420	770	940	1090
3.201 - 3.300						400	720	890	1030
3.301 - 3.400						380	680	840	970
3.401 - 3.500							640	790	910



F = Flange Diameter
T = Traverse Width
D = Drum Diameter
A = Arbor Hole

Class B and Class C Conductors for General Wiring

Copper and Aluminum Conductors

ASTM CLASS B and CLASS C

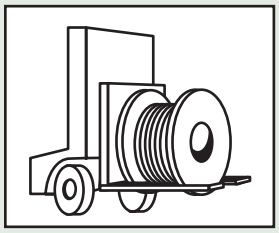
SIZE	CLASS B STRANDING	CLASS C STRANDING	NOMINAL AREA		NOMINAL O.D.							
					CLASS B CONCENTRIC		CLASS C CONCENTRIC		COMPRESSED		COMPACT	
AWG/kcmil	INCHES	INCHES	CIRCULAR MILS	mm²	INCHES	mm	INCHES	mm	INCHES	mm	INCHES	mm
22	7/.0096	19/.0058	640	0.324	0.0287	0.729	0.0290	0.737	—	—	—	—
20	7/.0121	19/.0073	1,020	0.519	0.0362	0.919	0.0365	0.927	—	—	—	—
18	7/.0152	19/.0092	1,620	0.823	0.0456	1.16	0.0460	1.168	—	—	—	—
16	7/.0192	19/.0117	2,580	1.31	0.0576	1.46	0.0585	1.486	—	—	—	—
14	7/.0242	19/.0147	4,110	2.08	0.0727	1.85	0.0735	1.867	0.071	1.80	—	—
12	7/.0305	19/.0185	6,530	3.31	0.0915	2.32	0.0925	2.350	0.089	2.26	0.085	2.16
10	7/.0385	19/.0234	10,380	5.261	0.116	2.95	0.116	2.95	0.113	2.87	0.107	2.72
8	7/.0486	19/.0295	16,510	8.367	0.146	3.71	0.146	3.71	0.142	3.61	0.134	3.40
6	7/.0612	19/.0372	26,240	13.30	0.184	4.67	0.184	4.67	0.178	4.52	0.169	4.29
4	7/.0772	19/.0469	41,740	21.15	0.232	5.89	0.232	5.89	0.225	5.72	0.213	5.41
2	7/.0974	19/.0591	66,360	33.62	0.292	7.42	0.292	7.42	0.283	7.19	0.268	6.81
1	19/.0664	37/.0476	83,690	42.41	0.332	8.43	0.332	8.43	0.322	8.18	0.299	7.59
1/0	19/.0745	37/.0534	105,600	53.49	0.372	9.45	0.372	9.45	0.362	9.19	0.336	8.53
2/0	19/.0837	37/.0600	133,100	67.43	0.418	10.62	0.418	10.62	0.405	10.0	0.376	9.55
3/0	19/.0940	37/.0673	167,800	85.01	0.470	11.94	0.470	11.94	0.456	11.6	0.423	10.74
4/0	19/.1055	37/.0756	211,600	107.2	0.528	13.41	0.528	13.41	0.512	13.0	0.475	12.07
250	37/.0822	37/.0640	250,000	127	0.575	14.61	0.575	14.61	0.558	14.2	0.520	13.21
300	37/.0900	61/.0701	300,000	152	0.630	16.00	0.630	16.00	0.611	15.5	0.570	14.48
350	37/.0973	61/.0757	350,000	177	0.681	17.30	0.681	17.30	0.661	16.8	0.616	15.65
400	37/.1040	61/.0810	400,000	203	0.728	18.49	0.728	18.49	0.706	17.9	0.659	16.74
500	37/.1162	61/.0905	500,000	253	0.813	20.65	0.813	20.65	0.789	20.0	0.736	18.69
600	61/.0992	91/.0812	600,000	304	0.893	22.68	0.893	22.68	0.866	22.0	0.813	20.65
750	61/.1109	91/.0908	750,000	380	0.998	25.35	0.998	25.35	0.968	24.6	0.908	23.06
1000	61/.1280	91/.1048	1,000,000	507	1.152	29.26	1.152	29.26	1.117	28.4	1.060	26.92

Adapted from UL 1581 Reference Standard for Eletrical Wires, Cables, and Flexible Cords.

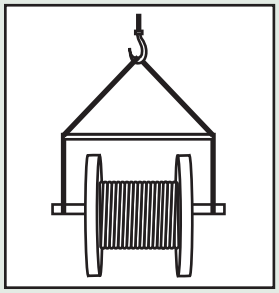
Recommended Reel Handling Practices

How to Handle Cable Reels

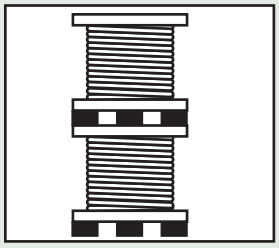
YES



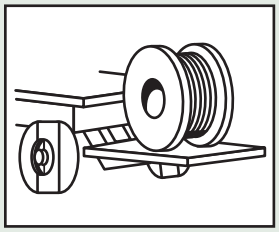
Cradle both reel flanges between forks.



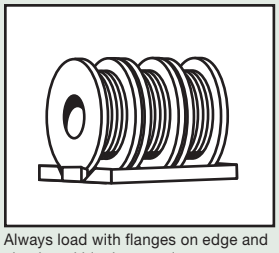
Reels can be hoisted with a shaft extended through both flanges.



Place spacers under the bottom flange and between reels to create a space to insert the forks. (36” reels max.)

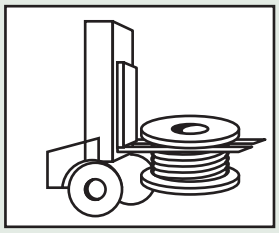


Lower reels from truck using hydraulic gate, hoist or fork lift. LOWER CAREFULLY.

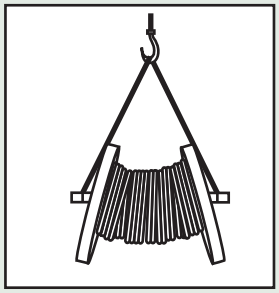


Always load with flanges on edge and chock and block securely.

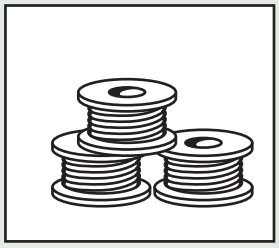
NO



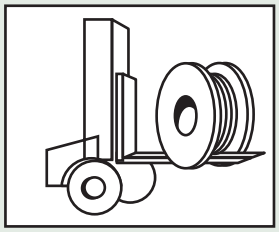
Do not lift by top flange. Cable or reel will be damaged.



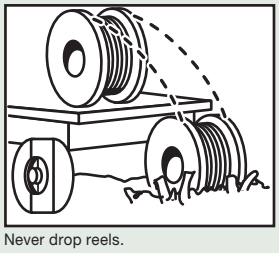
Use a spreader bar to prevent bending the reel flanges and mashing the cable.



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.

Minimum Drum Diameters for Packaging Cables	
Type of Cable	**Minimum Drum Diameter as a Multiple of Outside Diameter of Cable**
1. Single and multiple conductor cable - unshielded 0-2000 V	10
2. Single and multiple conductor cable - unshielded 2400 V	12
3. Single and multiple conductor cable - wire shield (UniShield®) 5-35 kV	12
4. Single and multiple conductor cable - helically applied tape shield (Uniblend®) 5-35 kV	14
5. Single and multiple conductor cable - longitudinally applied flat tape shield (Type TC)	20
6. Single and multiple conductor cable - Interlocked Armor (Duralox®) 600 V-35 kV	14
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.	.75

*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.

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

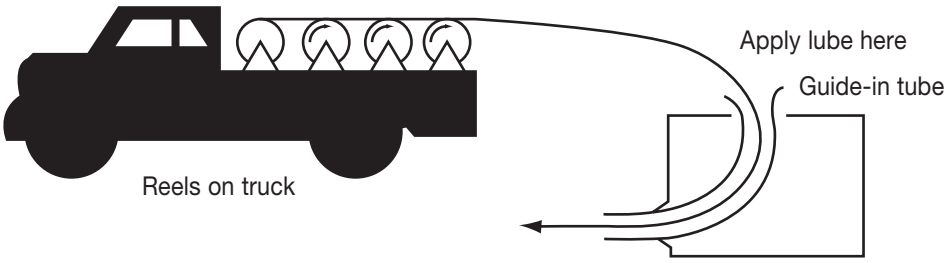
The proper use of appropriate equipment is crucial to a successful cable installation. The equipment needed for most installations is detailed in the following checklist:

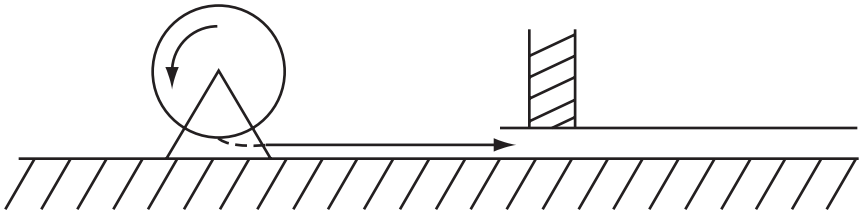
- ❑ 0-1/5/10 kip dynamometer
- ❑ basket grip pullers
- ❑ cable cutter
- ❑ cable end seals
- ❑ cable pulling lubricant
- ❑ cable tray bend sheaves
- ❑ cable tray rollers
- ❑ capstan-type puller
- ❑ diameter tape
- ❑ duct cleaning mandrels
- ❑ electric safety blankets and clamps
- ❑ extension cords and 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

Installation—Feed-In Setups

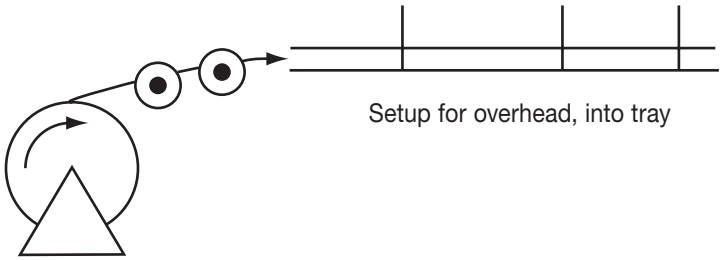
Cable Feed-In Setups

The following diagrams illustrate various cable feed-in setups:





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).

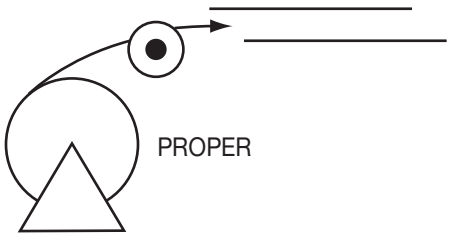


Figure 1

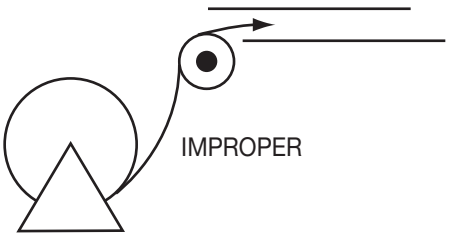


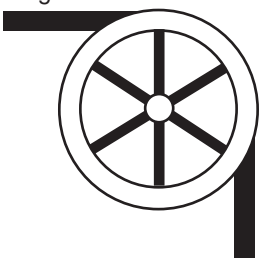
Figure 2

Installation—Feed-In Setups

Cable Feed-In Setups (continued)

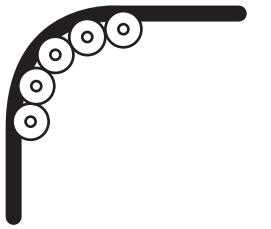
Single sheaves should only be used for GUIDING cables. Arrange multiple blocks to maintain bending radii whenever cable changes direction or elevation.

Single Sheave



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

Sheave Assembly



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

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

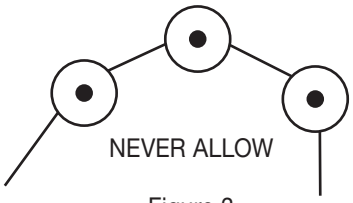
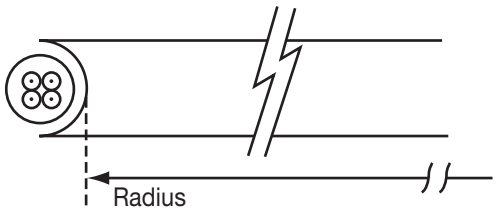


Figure 3

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



Installation – Conductor Maximum Pulling Tensions

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

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

The maximum allowable pulling tensions are for direct attachment to the conductor.
$T = 0.008 \times cmil \times n$, if $n \leq 3$
$T = 0.008 \times cmil \times n \times 0.8$, 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.

Installation – Conductor Maximum Pulling Tensions

Multi-Conductor Cables Having Equal-Sized Conductors, without Subassemblies

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

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

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

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

Installation—Training and Bending Limitations

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

Voltage	Conductors	Shielding	Cable Types	Minimum Bending Radius as a Multiple of Conductor/Assembly Diameter		
600 V	Single	Nonshielded	All	5X		
601-2000 V			All	8X		
600 V or 2000 V	Multi-conductor or Multiplexed	Nonshielded	TC or TC-ER	1 in. (25 mm) or less	Over 1 in. to 2 in. (>25 mm to 50 mm)	Over 2 in. (>50 mm)
				4X	5X	6X
			MC[3]	7X		
		Shielded	All	12X		
			TC or TC-ER	12X		
			MC	12X/7X[1]		
Over 2000 V	Single	Nonshielded	MV	8X		
			MC[3]	7X		
		Shielded	MC and MV	12X[2]		
	Multi-conductor or Multiplexed	Nonshielded	MC and MV	8X		
		Shielded	MC and MV	12X/7X[1,2]		

[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.

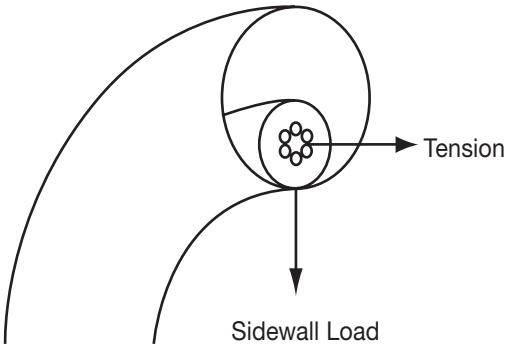
Installation—Maximum Sidewall Pressure

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.



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

General Cable's Approval List of Cable Pulling Lubricants

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

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

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

3M Company
American Bentonite International Inc.
American Polywater Corp.
Arnco Corp.
Dura-Line Corp.
Greenlee Textron
Ideal Industries Inc.*
J.C. Whitlam Mfg. Co.
Klein Tools Inc.
Madison Electric Products Inc.
Rainbow Technology Corp.
Rectorseal
Thomas & Betts Corp.

*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.

Catalog Number Index

Catalog Number Index

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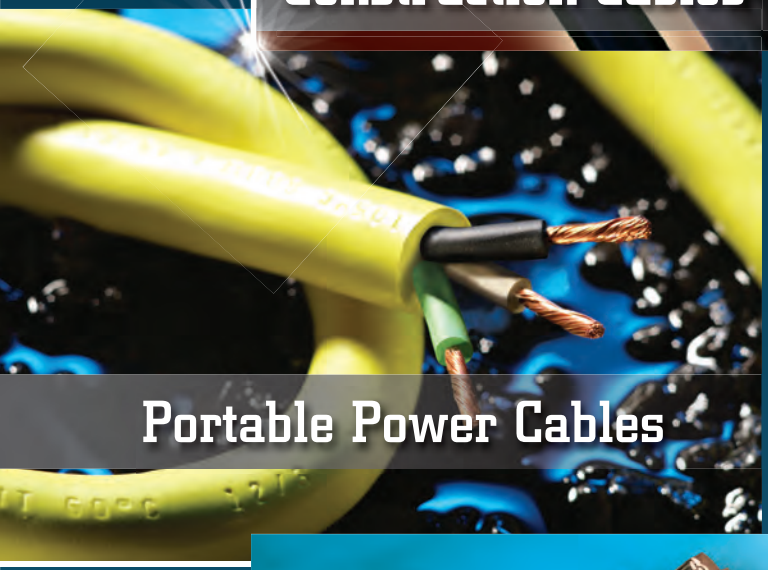
Industrial and Construction Cables



Portable Power Cables

Renewable Energy Cables

General Cable is a global manufacturer of power, control and instrumentation cable products.

At General Cable, we offer a full line of low- and medium-voltage instrumentation, power and control cables engineered to serve a wide range of industrial, commercial and residential applications. Products such as **FREP®, UniShield®, Uniblend® LF, Unicon®** and **DuraSheath®** have consistently demonstrated their design integrity in the most performance-demanding environments.

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With over three decades of collective renewables market experience, General Cable offers a broad range of **SunGen®** and **WindGen®** cables for the generation of electricity from wind and solar energy technology.

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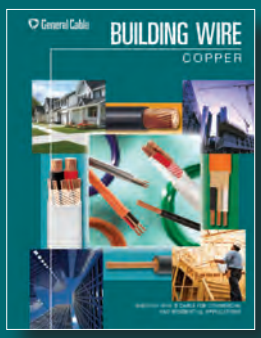
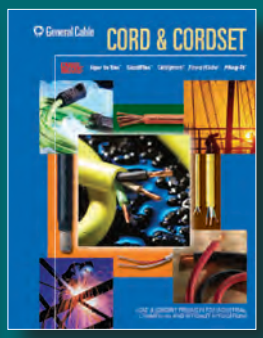
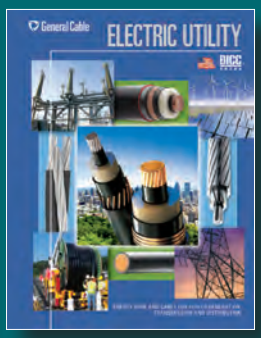
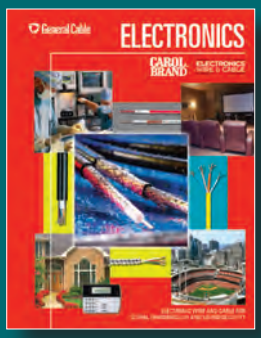
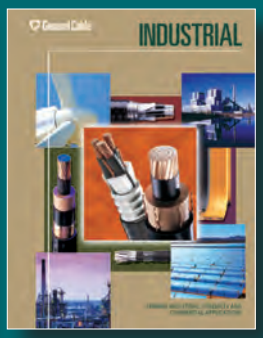
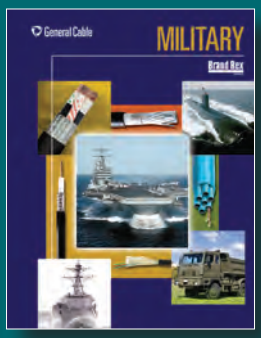


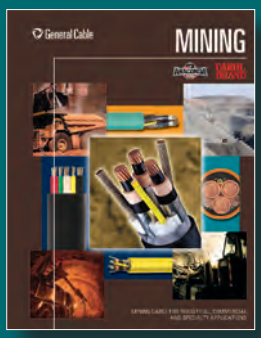


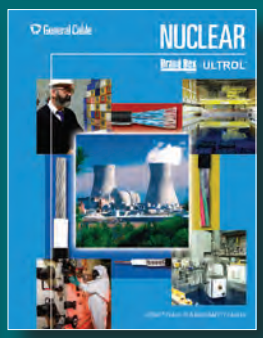


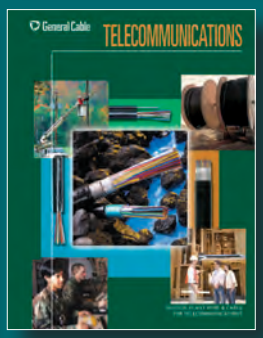


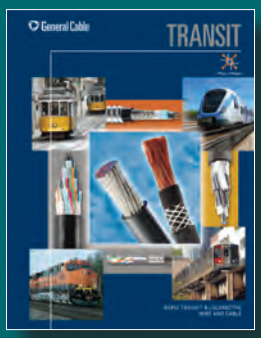




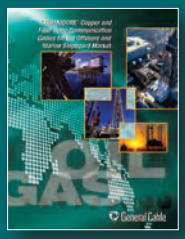








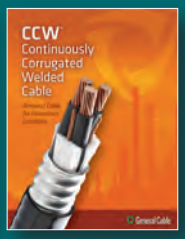
Other General Cable Products Offered



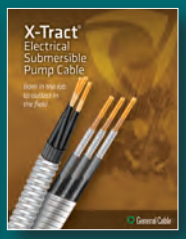
COMMODORE® CATALOG

MOR® POLYRAD® CATALOG

MV-RIG® CATALOG



CCW® CATALOG



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