



EmPowr[®] Fill

EmPowr[®] Fill
Medium-Voltage EPR Cables
From The Industry Leader

General Cable's EmPowr Fill technology has one of the industry's most comprehensive warranties. One reason we have been servicing the utilities market for nearly 60 years.





The performance requirements

for medium- and high-voltage cables are becoming more demanding each year. Because of a growing population and increased individual energy consumption, existing power delivery systems are overburdened. In addition to the alarming increase in demand, energy suppliers are facing unparalleled pressure to reduce installation and maintenance costs. General Cable has invested heavily in formulation technologies to provide cable compound solutions to meet the rigorous underground cable installations of today and the future.

EmPowr® Fill is the trade name for our filled insulation. The **EmPowr Fill** formulation is based upon historically proven resin technology with low catalyst residues. These innovations have expanded the number of polymer architectures available to General Cable, making it possible to economically optimize the formulation for the most demanding underground cable applications.

Our **EmPowr Fill** cable features:

- > Excellent AC breakdown strength retention during ICEA AWTT
- > Cleaner base resins and compounds
- > Continuously mixed compounds
- > Class 10000 clean room packaging and compound transfer at the plant
- > Triple extrusion
- > Low dissipation factor
- > Low insulation shield adhesion and clean stripping
- > Meets ICEA Class III Insulation 105°C/140°C Conductor Temperature Rating
- > Over 4 years under ACLT testing at 4Vg without a failure

General Cable is committed to its R&D efforts and stands behind our **EmPowr Fill** technology with one of the industry's most comprehensive warranties. This product offering is part of our near-60-year history of providing high performance medium-voltage cables with filled insulation to the utility industry.

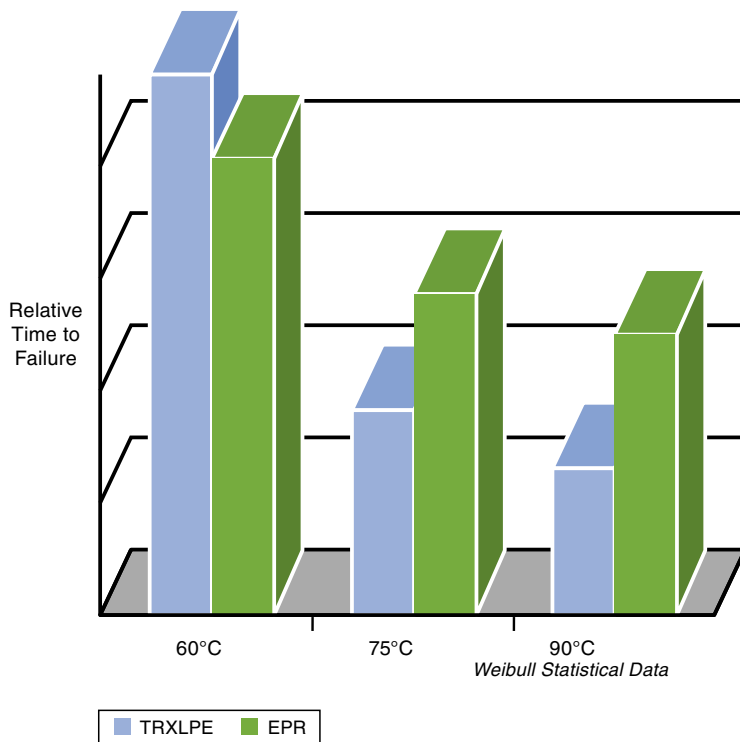
EmPowr Fill is formulated for High Operating Temperature applications such as:

- > Urban underground network systems installed in conduit or duct banks (ask about our PowrPak® cable, specifically designed for PILC replacement)
- > Underground primary feeders and substation getaways
- > Larger conductor sizes where added flexibility may be desirable
- > Large commercial and industrial medium-voltage service feeders

...Anywhere cables are heavily loaded.

Research data has shown that cable life is directly related to operating temperature – *high operating temperatures shorten cable life*. The amount of cable life lost differs between unfilled and filled insulations. Shown to the right are compelling test results that support our position that filled insulations perform better in high- temperature applications.

Operating Temperature versus Cable Life



As demonstrated by the test data above, TRXPLE insulation performs as well as EPR insulation at lower operating temperatures. However, filled insulation outperforms unfilled insulation on cables tested at higher temperatures.

For Lead-Free cables operating at high temperatures and where superior flexibility is desired, General Cable recommends its **EmPowr® Fill LF** medium-voltage EAM cables. See our **EmPowr Fill LF** brochure for details.

For cables operating at lower temperatures, General Cable recommends the **EmPowr® Link+** medium-voltage TRXLPE insulated product line. See our **EmPowr Link+** brochure for details.

We “**EmPowr**” you to work with our Engineering and Technology staff to provide a cable design for your specific need – be part of the “**EmPowr**” generation.

EmPowr[®] Fill Underground Distribution Cable 15-35 kV

Al Conductor EPR Insulation Concentric Neutral LLDPE Jacket

Product Construction:

Complete Cable:

Cross-linked semi-conducting conductor shield, insulation and semi-conducting insulation shield are extruded over a solid or stranded aluminum conductor and cured in a single operation. Uncoated copper neutral wires (helicly applied) and extruded-to-fill black jacket are applied over the cable core. These products meet the latest requirements of ANSI/ICEA S-94-649, AEIC CS8 and RUS U1 as applicable for Ethylene Propylene Rubber (EPR) insulated concentric neutral cable.

Conductor:

Solid or Class B compressed concentric lay stranded 1350 aluminum.

Conductor Shield:

Extruded semi-conducting thermosetting polymeric stress control layer.

Insulation:

Extruded Ethylene Propylene Rubber (EPR) Class II and III.

Insulation Shield:

Extruded semi-conducting thermosetting layer, clean and free stripping from insulation.

Concentric Neutral:

Helicly applied, annealed, solid bare copper wires.

Jacket:

Black, non-conducting, sunlight-resistant, Linear Low-Density Polyethylene (LLDPE) extruded to fill spaces between neutral wires.

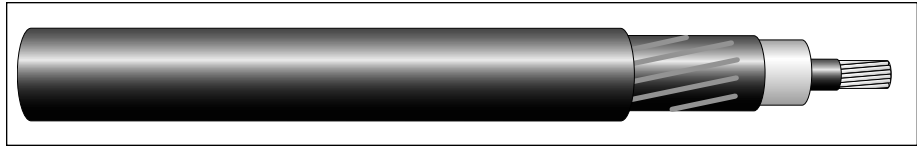
Features and Benefits:

- Triple extruded for clean interfaces
- Class 10,000 environment utilized for cable core material handling
- Flexibility for easy handling
- Excellent moisture resistance
- Deformation-resistant
- High dielectric strength
- Low dielectric loss
- Excellent resistance to water treeing
- Clean-stripping insulation shield without the use of a release agent
- Sunlight-resistant

Temperature Rating:

- Normal 105°C
- Emergency* 140°C
- Short Circuit 250°C

* Operation at the emergency overload temperature shall not exceed 1500 hours cumulative during the lifetime of the cable.



UNDERGROUND DISTRIBUTION CABLE – 15 kV – TYPE URD – FULL NEUTRAL

COMPRESSED CONDUCTOR		COPPER NEUTRAL		DIAMETER (1) INCHES			NOMINAL JACKET THKN. INCHES (1)	APPROX. WEIGHT (1) LB/1000 FT			AMPACITY (2)	
AL AWG OR kcmil	NO. OF WIRES	NO. OF WIRES	WIRE SIZE AWG	INSULATION		ENCAP LLDPE JACKET		AL COND.	CU NEUT. WIRES	TOTAL	DIRECT BURIED	IN DUCT
				MIN.	MAX.							

175 mils NOMINAL EPR INSULATION – 100% INSULATION LEVEL (3)

2	1	16	16	0.610	0.695	0.914	0.055	61	134	461	190	130
2	7	16	16	0.635	0.720	0.939	0.055	62	134	479	190	130
1	1	20	16	0.645	0.725	0.945	0.055	77	168	522	215	150
1	19	20	16	0.675	0.760	0.978	0.055	78	168	543	215	150
1/0	1	16	14	0.680	0.760	1.007	0.055	97	213	617	240	170
1/0	19	16	14	0.715	0.800	1.044	0.055	99	213	641	240	170
2/0	19	20	14	0.760	0.845	1.088	0.055	125	266	738	275	195
3/0	19	16	12	0.810	0.895	1.172	0.055	157	338	886	315	220
4/0	19	20	12	0.865	0.950	1.228	0.055	198	423	1034	360	250

220 mils NOMINAL EPR INSULATION – 133% INSULATION LEVEL

2	1	16	16	0.700	0.790	1.004	0.055	61	134	527	190	130
2	7	16	16	0.725	0.815	1.029	0.055	62	134	547	190	130
1	1	20	16	0.735	0.820	1.035	0.055	77	168	590	215	150
1	19	20	16	0.765	0.855	1.068	0.055	78	168	613	215	150
1/0	1	16	14	0.770	0.855	1.097	0.055	97	213	689	240	170
1/0	19	16	14	0.805	0.895	1.134	0.055	99	213	716	240	170
2/0	19	20	14	0.850	0.935	1.178	0.055	125	267	816	275	195
3/0	19	16	12	0.900	0.985	1.262	0.055	158	338	970	315	220
4/0	19	20	12	0.955	1.045	1.318	0.055	199	423	1121	360	250

(1) Extruded layer thicknesses and insulation and insulation shield diameters are in accordance with ANSI/ICEA S-94-649 for Concentric Neutral Cables Rated 5 through 46 kV and also meet the requirements of the latest revisions of AEIC CS8.

(2) Ampacity based on earth thermal resistivity of 90°C-cm/watt, 90°C conductor temp., 20°C earth ambient temperature, 75% load factor and 36" depth of burial. Values based on single phase operation, with full current return in the neutral wires. For specific ampacities, contact your General Cable sales representative.

(3) RUS Bulletin 1728F (U1) dated 4/2/12 requires, at minimum, 220 mil insulation thickness for 15 kV cable, 260 mil insulation thickness for 25 kV cable, and 345 mil insulation thickness for 35 kV cable.

Dimensions and weights not designated minimum or maximum are nominal values and subject to manufacturing tolerances. In this context, weight means mass.

EmPowr® Fill Underground Distribution Cable 15-35 kV

Al Conductor EPR Insulation Concentric Neutral LLDPE Jacket

UNDERGROUND DISTRIBUTION CABLE – 15 kV – TYPE UD – 1/3 NEUTRAL

COMPRESSED CONDUCTOR		COPPER NEUTRAL		DIAMETER (1) INCHES			NOMINAL JACKET THKN. INCHES (1)	APPROX. WEIGHT (1) LB/1000 FT			AMPACITY (2)	
AL AWG OR kcmil	NO. OF WIRES	NO. OF WIRES	WIRE SIZE AWG	INSULATION		ENCAP LLDPE JACKET		AL COND.	CU NEUT. WIRES	TOTAL	DIRECT BURIED	IN DUCT
				MIN.	MAX.							

175 mils NOMINAL EPR INSULATION - 100% INSULATION LEVEL (3)

2	1	6	16	0.610	0.695	0.914	0.055	61	50	386	170	130
2	7	6	16	0.635	0.720	0.939	0.055	62	50	404	170	130
1	1	7	16	0.645	0.725	0.945	0.055	77	59	424	195	150
1	19	7	16	0.675	0.760	0.978	0.055	78	59	445	195	150
1/0	1	9	16	0.680	0.760	0.981	0.055	97	76	477	225	170
1/0	19	9	16	0.715	0.800	1.018	0.055	99	76	501	225	170
2/0	19	11	16	0.760	0.845	1.062	0.055	125	92	564	255	200
3/0	19	14	16	0.810	0.895	1.112	0.055	158	118	646	290	225
4/0	19	17	16	0.865	0.950	1.168	0.055	199	143	738	330	255
250	37	20	16	0.920	1.005	1.224	0.055	234	168	826	365	280
350	37	18	14	1.025	1.110	1.373	0.055	329	240	1082	440	340
500	37	25	14	1.150	1.235	1.501	0.055	468	334	1377	530	420
750	61	24	12	1.340	1.425	1.772	0.080	703	508	1966	640	510
1000	61	20	10	1.485	1.575	1.963	0.080	937	673	2491	730	595

220 mils NOMINAL EPR INSULATION – 133% INSULATION LEVEL (3)

2	1	6	16	0.700	0.790	1.004	0.055	61	51	452	170	130
2	7	6	16	0.725	0.815	1.029	0.055	62	51	472	170	130
1	1	7	16	0.735	0.820	1.035	0.055	77	59	493	195	150
1	19	7	16	0.765	0.855	1.068	0.055	78	59	515	195	150
1/0	1	9	16	0.770	0.855	1.071	0.055	97	76	548	225	170
1/0	19	9	16	0.805	0.895	1.108	0.055	99	76	574	225	170
2/0	19	11	16	0.850	0.935	1.152	0.055	125	92	641	255	200
3/0	19	14	16	0.900	0.985	1.202	0.055	158	118	726	290	225
4/0	19	17	16	0.955	1.045	1.258	0.055	199	143	822	330	255
250	37	20	16	1.010	1.100	1.334	0.055	234	168	935	365	280
350	37	18	14	1.115	1.200	1.463	0.055	329	240	1181	440	340
500	37	25	14	1.240	1.330	1.591	0.055	468	334	1484	530	420
750	61	24	12	1.430	1.520	1.862	0.080	703	508	2092	640	510
1000	61	20	10	1.575	1.670	2.083	0.080	937	673	2678	730	595

(1) Extruded layer thicknesses and insulation and insulation shield diameters are in accordance with ANSI/ICEA S-94-649 for Concentric Neutral Cables Rated 5 through 46 kV and also meet the requirements of the latest revisions of AEIC CS8.
 (2) Ampacity based on earth thermal resistivity of 90°C-cm/watt, 90°C conductor temp., 20°C earth ambient temperature, 75% load factor and 36" depth of burial. Values are based on one three-phase circuit, one conductor per phase, in flat adjacent configuration with neutral wires bonded at each end. For specific ampacities, contact your General Cable sales representative.
 (3) RUS Bulletin 1728F (U1) dated 4/2/12 requires, at minimum, 220 mil insulation thickness for 15 kV cable, 260 mil insulation thickness for 25 kV cable, and 345 mil insulation thickness for 35 kV cable.

Dimensions and weights not designated minimum or maximum are nominal values and subject to manufacturing tolerances. In this context, weight means mass.

Applications:

EmPowr® Fill cables are intended for use in dry or wet locations for distribution of single or three phase medium-voltage power. Cables with a full neutral are designed for use on single phase underground distribution (UD) applications. Cables with a 1/3 neutral are designed for use in three phase UD applications. The full neutral cable is sometimes referred to as an underground residential distribution (URD) cable. These cables may be installed in ducts or direct buried.

Options:

- Copper conductors
- EmPowr® Fill LF Lead-Free EAM
- STRANDFILL® blocked conductor. Tested in accordance with ICEA T-31-610
- BIFILL® blocked conductor and cable core/jacket. Tested in accordance with ICEA T-34-664
- Dry nitrogen cure
- True Triple Extrusion
- Flat strap concentric neutral
- Red stripes on jacket
- Semi-conducting thermoplastic jacket
- Overlaying PVC jacket with separator tape
- Deformation-resistant polypropylene jacket
- CDC® Combined Duct & Cable
- 3 X 1/C triplex or parallel
- Type MV-90 UL 1072
- Type MV-105 UL 1072 (PVC jacket only)
- UL Listed
- Alternative neutral configurations

For more information, or information on conductor sizes or voltage ratings not shown in the tables, contact your General Cable sales representative or e-mail info@generalcable.com.

EmPowr® Fill Underground Distribution Cable 15-35 kV

Al Conductor EPR Insulation Concentric Neutral LLDPE Jacket

UNDERGROUND DISTRIBUTION CABLE – 25 kV – TYPE URD – FULL NEUTRAL

COMPRESSED CONDUCTOR		COPPER NEUTRAL		DIAMETER (1) INCHES			NOMINAL JACKET THKN. INCHES (1)	APPROX. WEIGHT (1) LB/1000 FT			AMPACITY (2)	
AL AWG OR kcmil	NO. OF WIRES	NO. OF WIRES	WIRE SIZE AWG	INSULATION		ENCAP LLDPE JACKET		AL COND.	CU NEUT. WIRES	TOTAL	DIRECT BURIED	IN DUCT
				MIN.	MAX.							

260 mils NOMINAL EPR INSULATION – 100% INSULATION LEVEL (4)

1	1	20	16	0.805	0.895	1.115	0.055	77	168	656	215	150
1	19	20	16	0.835	0.925	1.148	0.055	78	168	681	215	150
1/0	1	16	14	0.840	0.930	1.177	0.055	97	213	759	240	170
1/0	19	16	14	0.875	0.965	1.214	0.055	99	214	788	240	170
2/0	19	20	14	0.920	1.010	1.258	0.055	125	267	891	275	195
3/0	19	16	12	0.970	1.060	1.342	0.055	158	339	1050	315	220
4/0	19	20	12	1.025	1.115	1.418	0.055	199	423	1227	360	250

UNDERGROUND DISTRIBUTION CABLE – 25 kV – TYPE UD – 1/3 NEUTRAL

COMPRESSED CONDUCTOR		COPPER NEUTRAL		DIAMETER (1) INCHES			NOMINAL JACKET THKN. INCHES (1)	APPROX. WEIGHT (1) LB/1000 FT			AMPACITY (3)	
AL AWG OR kcmil	NO. OF WIRES	NO. OF WIRES	WIRE SIZE AWG	INSULATION		ENCAP LLDPE JACKET		AL COND.	CU NEUT. WIRES	TOTAL	DIRECT BURIED	IN DUCT
				MIN.	MAX.							

260 mils NOMINAL EPR INSULATION – 100% INSULATION LEVEL (4)

1	1	7	16	0.805	0.895	1.115	0.055	77	59	559	195	150
1	19	7	16	0.835	0.925	1.148	0.055	78	59	584	195	150
1/0	1	9	16	0.840	0.930	1.151	0.055	97	76	616	220	170
1/0	19	9	16	0.875	0.965	1.188	0.055	99	76	645	220	170
2/0	19	11	16	0.920	1.010	1.232	0.055	125	92	714	250	200
3/0	19	14	16	0.970	1.060	1.282	0.055	158	118	802	290	225
4/0	19	17	16	1.025	1.115	1.358	0.055	199	143	923	330	255
250	37	20	16	1.080	1.175	1.414	0.055	234	168	1020	360	280
350	37	18	14	1.185	1.275	1.543	0.055	329	240	1274	435	340
500	37	25	14	1.310	1.405	1.721	0.080	468	334	1639	525	420
750	61	24	12	1.500	1.595	1.942	0.080	703	508	2210	640	510
1000	61	20	10	1.645	1.740	2.163	0.080	937	673	2809	730	595

(1) Extruded layer thicknesses and insulation and insulation shield diameters are in accordance with ANSI/ICEA S-94-649 for Concentric Neutral Cables Rated 5 through 46 kV and also meet the requirements of the latest revisions of AEIC CS8.

(2) Ampacity based on earth thermal resistivity of 90°C-cm/watt, 90°C conductor temp., 20°C earth ambient temperature, 75% load factor and 36" depth of burial. Values based on single phase operation, with full current return in the neutral wires. For specific ampacities, contact your General Cable sales representative.

(3) Ampacity based on earth thermal resistivity of 90°C-cm/watt, 90°C conductor temp., 20°C earth ambient temperature, 75% load factor and 36" depth of burial. Values based on a three phase circuit, one conductor per phase, in flat adjacent configuration, with neutral wires bonded at each end. For specific ampacities, contact your General Cable sales representative.

(4) RUS Bulletin 1728F (U1) dated 4/2/12 requires, at minimum, 220 mil insulation thickness for 15 kV cable, 260 mil insulation thickness for 25 kV cable, and 345 mil insulation thickness for 35 kV cable.

Dimensions and weights not designated minimum or maximum are nominal values and subject to manufacturing tolerances. In this context, weight means mass.

EmPowr® Fill Underground Distribution Cable 15-35 kV

Al Conductor EPR Insulation Concentric Neutral LLDPE Jacket

UNDERGROUND DISTRIBUTION CABLE – 28 kV – TYPE URD – FULL NEUTRAL												
COMPRESSED CONDUCTOR		COPPER NEUTRAL		DIAMETER (1) INCHES			NOMINAL JACKET THKN. INCHES (1)	APPROX. WEIGHT (1) LB/1000 FT			AMPACITY (2)	
AL AWG OR kcmil	NO. OF WIRES	NO. OF WIRES	WIRE SIZE AWG	INSULATION		ENCAP LLDPE JACKET		AL COND.	CU NEUT. WIRES	TOTAL	DIRECT BURIED	IN DUCT
				MIN.	MAX.							
280 mils NOMINAL EPR INSULATION – 100% INSULATION LEVEL												
1	1	20	16	0.845	0.935	1.155	0.055	77	171	694	215	150
1	19	20	16	0.875	0.970	1.188	0.055	78	171	720	215	150
1/0	1	16	14	0.880	0.970	1.217	0.055	97	214	795	240	170
1/0	19	16	14	0.915	1.010	1.254	0.055	99	214	826	240	170
2/0	19	20	14	0.960	1.055	1.298	0.055	125	267	930	275	195
3/0	19	16	12	1.010	1.105	1.402	0.055	158	339	1113	315	220
4/0	19	20	12	1.065	1.160	1.458	0.055	199	423	1271	360	250

UNDERGROUND DISTRIBUTION CABLE – 28 kV – TYPE UD – 1/3 NEUTRAL												
COMPRESSED CONDUCTOR		COPPER NEUTRAL		DIAMETER (1) INCHES			NOMINAL JACKET THKN. INCHES (1)	APPROX. WEIGHT (1) LB/1000 FT			AMPACITY (3)	
AL AWG OR kcmil	NO. OF WIRES	NO. OF WIRES	WIRE SIZE AWG	INSULATION		ENCAP LLDPE JACKET		AL COND.	CU NEUT. WIRES	TOTAL	DIRECT BURIED	IN DUCT
				MIN.	MAX.							
280 mils NOMINAL EPR INSULATION – 100% INSULATION LEVEL												
1	1	7	16	0.845	0.935	1.155	0.055	77	60	595	195	150
1	19	7	16	0.875	0.970	1.188	0.055	78	60	621	195	150
1/0	1	9	16	0.880	0.970	1.191	0.055	97	77	654	220	170
1/0	19	9	16	0.915	1.010	1.228	0.055	99	77	684	220	170
2/0	19	11	16	0.960	1.055	1.272	0.055	125	94	755	250	200
3/0	19	14	16	1.010	1.105	1.342	0.055	158	120	865	290	225
4/0	19	17	16	1.065	1.160	1.398	0.055	199	146	968	330	255
250	37	20	16	1.120	1.215	1.454	0.055	234	172	1068	360	280
350	37	18	14	1.225	1.320	1.583	0.055	329	240	1322	435	340
500	37	25	14	1.350	1.445	1.761	0.080	468	341	1699	525	420
750	61	24	12	1.540	1.635	2.012	0.080	703	508	2317	640	510
1000	61	20	10	1.685	1.785	2.203	0.080	937	673	2877	730	595

(1) Extruded layer thicknesses and insulation and insulation shield diameters are in accordance with ANSI/ICEA S-94-649 for Concentric Neutral Cables Rated 5 through 46 kV and also meet the requirements of the latest revisions of AEIC CS8.

(2) Ampacity based on earth thermal resistivity of 90°C-cm/watt, 90°C conductor temp., 20°C earth ambient temperature, 75% load factor and 36" depth of burial. Values based on single phase operation, with full current return in the neutral wires. For specific ampacities, contact your General Cable sales representative.

(3) Ampacity based on earth thermal resistivity of 90°C-cm/watt, 90°C conductor temp., 20°C earth ambient temperature, 75% load factor and 36" depth of burial. Values based on a three phase circuit, one conductor per phase, in flat adjacent configuration, with neutral wires bonded at each end. For specific ampacities, contact your General Cable sales representative.

Dimensions and weights not designated minimum or maximum are nominal values and subject to manufacturing tolerances. In this context, weight means mass.

EmPowr® Fill Underground Distribution Cable 15-35 kV

Al Conductor EPR Insulation Concentric Neutral LLDPE Jacket

UNDERGROUND DISTRIBUTION CABLE – 35 kV – TYPE URD – FULL NEUTRAL

COMPRESSED CONDUCTOR		COPPER NEUTRAL		DIAMETER (1) INCHES			NOMINAL JACKET THKN. INCHES (1)	APPROX. WEIGHT (1) LB/1000 FT			AMPACITY (2)	
AL AWG OR kcmil	NO. OF WIRES	NO. OF WIRES	WIRE SIZE AWG	INSULATION		ENCAP LLDPE JACKET		AL COND.	CU NEUT. WIRES	TOTAL	DIRECT BURIED	IN DUCT
				MIN.	MAX.							

345 mils NOMINAL EPR INSULATION – 100% INSULATION LEVEL (4)

1/0	1	16	14	1.010	1.105	1.367	0.055	97	214	944	240	170
1/0	19	16	14	1.045	1.145	1.404	0.055	99	214	979	240	170
2/0	19	20	14	1.090	1.190	1.448	0.055	125	267	1089	275	195
3/0	19	16	12	1.140	1.240	1.532	0.055	158	339	1259	315	220
4/0	19	20	12	1.195	1.295	1.588	0.055	199	423	1423	360	250

UNDERGROUND DISTRIBUTION CABLE – 35 kV – TYPE UD – 1/3 NEUTRAL

COMPRESSED CONDUCTOR		COPPER NEUTRAL		DIAMETER (1) INCHES			NOMINAL JACKET THKN. INCHES (1)	APPROX. WEIGHT (1) LB/1000 FT			AMPACITY (3)	
AL AWG OR kcmil	NO. OF WIRES	NO. OF WIRES	WIRE SIZE AWG	INSULATION		ENCAP LLDPE JACKET		AL COND.	CU NEUT. WIRES	TOTAL	DIRECT BURIED	IN DUCT
				MIN.	MAX.							

345 mils NOMINAL EPR INSULATION – 100% INSULATION LEVEL (4)

1/0	1	9	16	1.010	1.105	1.341	0.055	97	77	800	220	170
1/0	19	9	16	1.045	1.145	1.378	0.055	99	77	835	220	170
2/0	19	11	16	1.090	1.190	1.422	0.055	125	95	911	250	200
3/0	19	14	16	1.140	1.240	1.472	0.055	158	120	1007	290	225
4/0	19	17	16	1.195	1.295	1.528	0.055	199	146	1116	330	255
250	37	20	16	1.250	1.350	1.584	0.055	234	172	1221	360	280
350	37	18	14	1.355	1.445	1.763	0.080	329	240	1543	435	340
500	37	25	14	1.480	1.580	1.891	0.080	468	341	1882	525	420
750	61	24	12	1.670	1.770	2.142	0.080	703	508	2526	640	510
1000	61	20	10	1.815	1.920	2.333	0.080	937	673	3104	730	595

(1) Extruded layer thicknesses and insulation and insulation shield diameters are in accordance with ANSI/ICEA S-94-649 for Concentric Neutral Cables Rated 5 through 46 kV and also meet the requirements of the latest revisions of AEIC CS8.

(2) Ampacity based on earth thermal resistivity of 90°C-cm/watt, 90°C conductor temp., 20°C earth ambient temperature, 75% load factor and 36" depth of burial. Values based on single phase operation, with full current return in the neutral wires. For specific ampacities, contact your General Cable sales representative.

(3) Ampacity based on earth thermal resistivity of 90°C-cm/watt, 90°C conductor temp., 20°C earth ambient temperature, 75% load factor and 36" depth of burial. Values based on a three phase circuit, one conductor per phase, in flat adjacent configuration, with neutral wires bonded at each end. For specific ampacities, contact your General Cable sales representative.

(4) RUS Bulletin 1728F (U1) dated 4/2/12 requires, at minimum, 220 mil insulation thickness for 15 kV cable, 260 mil insulation thickness for 25 kV cable, and 345 mil insulation thickness for 35 kV cable.

Dimensions and weights not designated minimum or maximum are nominal values and subject to manufacturing tolerances. In this context, weight means mass.

Notes

EmPowr® Fill Shielded Power Cable 5-35 kV

Al Conductor EPR Insulation Copper Wire PVC Jacket

Product Construction:

Complete Cable:

Cross-linked semi-conducting conductor shield, insulation and semi-conducting insulation shield are extruded over a solid or stranded aluminum conductor and cured in a single operation. Uncoated copper wires (helicly applied), separator tape and overlaying black PVC jacket are applied over the cable core. These products meet the latest requirements of ANSI/ICEA S-97-682 and AEIC CS8 as applicable for Ethylene Propylene Rubber (EPR) insulated shielded power cable.

Conductor:

Solid or Class B compressed concentric lay stranded 1350 aluminum.

Conductor Shield:

Extruded semi-conducting thermosetting polymeric stress control layer.

Insulation:

Extruded Ethylene Propylene Rubber (EPR) Class II and III.

Insulation Shield:

Extruded semi-conducting thermosetting layer, clean and free stripping from insulation.

Copper Wire Shield:

Helicly applied annealed solid bare copper wires with a lapped non-metallic tape serving as a binder/separator.

Jacket:

Black, non-conducting, sunlight-resistant Polyvinyl Chloride (PVC).

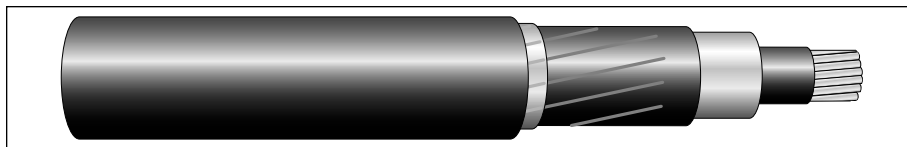
Features and Benefits:

- Triple-extruded for clean interfaces
- Class 10,000 environment utilized for cable core material handling
- Flexibility for easy handling
- Excellent moisture resistance
- Deformation-resistant
- High dielectric strength
- Low dielectric loss
- Excellent resistance to water treeing
- Clean-stripping insulation shield without the use of a release agent
- Sunlight-resistant

Temperature Rating:

- Normal 105°C
- Emergency* 140°C
- Short Circuit 250°C

* Operation at the emergency overload temperature shall not exceed 1500 hours cumulative during the lifetime of the cable.



COPPER WIRE SHIELDED POWER CABLE

COMPRESSED CONDUCTOR		COPPER NEUTRAL		DIAMETER (1) INCHES			NOMINAL JACKET THKN. INCHES (1)	APPROX. WEIGHT (1) LB/1000 FT			AMPACITY (2)	
AL AWG OR kcmil	NO. OF WIRES	NO. OF WIRES	WIRE SIZE AWG	INSULATION		PVC JACKET		AL COND.	CU SHIELD	TOTAL	DIRECT BURIED	IN DUCT
				MIN.	MAX.							

115 mils NOMINAL EPR INSULATION – 5 kV 133% OR 8 kV 100%

2	7	9	24	0.525	0.605	0.787	0.065	62	12	284	165	125
1	19	6	22	0.565	0.645	0.837	0.065	78	13	315	190	145
1/0	19	7	22	0.605	0.685	0.907	0.065	99	15	378	215	165
2/0	19	7	22	0.650	0.725	0.951	0.080	125	15	423	245	185
3/0	19	7	22	0.700	0.775	1.001	0.080	158	15	478	280	215
4/0	19	8	22	0.755	0.835	1.057	0.080	199	17	545	320	245
250	37	8	22	0.810	0.890	1.113	0.080	234	17	607	355	275
350	37	9	22	0.905	0.980	1.216	0.080	329	19	749	430	335
500	37	6	20	1.040	1.120	1.357	0.080	468	20	948	525	410
750	61	7	20	1.230	1.310	1.544	0.080	703	23	1273	660	510
1000	61	8	20	1.375	1.460	1.693	0.080	937	27	1577	765	615

175 mils NOMINAL EPR INSULATION – 15 kV 100% LEVEL

2	7	9	24	0.635	0.720	0.937	0.080	62	12	388	165	125
1	19	6	22	0.675	0.760	0.987	0.080	78	13	424	190	145
1/0	19	7	22	0.715	0.800	1.027	0.080	99	15	468	215	165
2/0	19	7	22	0.760	0.845	1.071	0.080	125	15	517	245	185
3/0	19	7	22	0.810	0.895	1.121	0.080	158	15	576	280	215
4/0	19	8	22	0.865	0.950	1.177	0.080	199	17	649	320	245
250	37	8	22	0.920	1.005	1.233	0.080	234	17	716	355	275
350	37	9	22	1.015	1.100	1.336	0.080	329	19	868	430	335
500	37	6	20	1.150	1.235	1.477	0.080	468	20	1080	525	410
750	61	7	20	1.340	1.425	1.664	0.080	703	23	1422	660	510
1000	61	8	20	1.485	1.575	1.873	0.110	937	27	1840	765	615

(1) Extruded layer thicknesses and insulation and insulation shield diameters are in accordance with ANSI/ICEA S-97-682 for Utility Shielded Power Cables Rated 5 through 46 kV and also meet the requirements of the latest revisions of AEIC CS8.

(2) Ampacity based on earth thermal resistivity of 90°C-cm/watt, 90°C conductor temp., 20°C earth ambient temperature, 75% load factor and 36" depth of burial. Values are based on one three-phase circuit, one conductor per phase, in flat adjacent configuration (direct buried) with metallic shield bonded at each end. For specific ampacities, contact your General Cable sales representative.

Dimensions and weights not designated minimum or maximum are nominal values and subject to manufacturing tolerances. In this context, weight means mass.

EmPowr® Fill Shielded Power Cable 5-35 kV

Al Conductor EPR Insulation Copper Wire PVC Jacket

COPPER WIRE SHIELDED POWER CABLE												
COMPRESSED CONDUCTOR		COPPER NEUTRAL		DIAMETER (1) INCHES			NOMINAL JACKET THKN. INCHES (1)	APPROX. WEIGHT (1) LB/1000 FT			AMPACITY (2)	
AL AWG OR kcmil	NO. OF WIRES	NO. OF WIRES	WIRE SIZE AWG	INSULATION		PVC JACKET		AL COND.	CU WIRES	TOTAL	DIRECT BURIED	IN DUCT
				MIN.	MAX.							
220 mils NOMINAL EPR INSULATION – 15 kV 133% LEVEL												
2	7	9	24	0.725	0.815	1.027	0.080	62	12	457	165	125
1	19	7	22	0.765	0.855	1.077	0.080	78	15	498	190	145
1/0	19	7	22	0.805	0.895	1.117	0.080	99	15	543	215	165
2/0	19	8	22	0.850	0.935	1.161	0.080	125	17	597	245	185
3/0	19	8	22	0.900	0.985	1.211	0.080	158	17	660	280	215
4/0	19	8	22	0.955	1.045	1.267	0.080	199	17	735	320	245
250	37	9	22	1.010	1.100	1.323	0.080	234	19	808	350	275
350	37	6	20	1.105	1.190	1.439	0.080	329	20	968	425	335
500	37	7	20	1.240	1.330	1.567	0.080	468	23	1189	520	410
750	61	8	20	1.430	1.520	1.814	0.110	703	27	1641	655	510
1000	61	9	20	1.575	1.670	1.963	0.110	937	30	1979	765	615
260 mils NOMINAL EPR INSULATION – 25 kV 100% LEVEL												
1	19	7	24	0.835	0.925	1.146	0.080	78	9	560	185	145
1/0	19	8	24	0.875	0.965	1.186	0.080	99	11	609	215	165
2/0	19	8	24	0.920	1.010	1.230	0.080	125	11	664	245	185
3/0	19	9	24	0.970	1.060	1.280	0.080	158	12	731	275	215
4/0	19	6	22	1.025	1.115	1.347	0.080	199	13	812	315	250
250	37	7	22	1.080	1.175	1.403	0.080	234	15	889	350	275
350	37	8	22	1.175	1.265	1.506	0.080	329	17	1055	420	335
500	37	9	22	1.310	1.405	1.634	0.080	468	19	1283	515	405
750	61	6	20	1.500	1.595	1.894	0.110	703	20	1751	650	520
1000	61	7	20	1.645	1.740	2.043	0.110	937	23	2098	755	605
345 mils NOMINAL EPR INSULATION – 35 kV 100% LEVEL												
1/0	19	7	22	1.045	1.145	1.367	0.080	99	15	784	210	170
2/0	19	7	22	1.090	1.119	1.411	0.080	125	15	845	240	190
3/0	19	7	22	1.140	1.240	1.461	0.080	158	15	918	275	220
4/0	19	8	22	1.195	1.295	1.517	0.080	199	17	1007	310	250
250	37	8	22	1.250	1.350	1.573	0.080	234	17	1088	345	275
350	37	9	22	1.345	1.445	1.676	0.080	329	19	1268	415	340
500	37	6	20	1.480	1.580	1.877	0.110	468	20	1615	510	410
750	61	7	20	1.670	1.770	2.064	0.110	703	23	2017	640	525
1000	61	8	20	1.815	1.920	2.213	0.110	937	27	2385	745	615

Applications:

EmPowr® Fill cables are intended for use in dry or wet locations for distribution of three-phase medium-voltage power. These cables may be installed in ducts or direct buried.

Options:

- Copper conductors
- EmPowr® Fill LF Lead-Free EAM
- STRANDFILL® blocked conductor. Tested in accordance with ICEA T-31-610
- Dry nitrogen cure
- True Triple Extrusion
- 3 X 1/C triplex or parallel
- Type MV-105 UL 1072
- UL Listed

For more information, or information on conductor sizes or voltage ratings not shown in the tables, contact your General Cable sales representative or e-mail info@generalcable.com.

(1) Extruded layer thicknesses and insulation and insulation shield diameters are in accordance with ANSI/ICEA S-97-682 for Utility Shielded Power Cables Rated 5 through 46 kV and also meet the requirements of the latest revisions of AEIC CS8.

(2) Ampacity based on earth thermal resistivity of 90°C-cm/watt, 90°C conductor temp., 20°C earth ambient temperature, 75% load factor and 36" depth of burial. Values are based on one three-phase circuit, one conductor per phase, in flat adjacent configuration (direct buried) with metallic shield bonded at each end. For specific ampacities, contact your General Cable sales representative.

Dimensions and weights not designated minimum or maximum are nominal values and subject to manufacturing tolerances. In this context, weight means mass.

EmPowr® Fill Shielded Power Cable 15-35 kV

Al Conductor EPR Insulation Longitudinally Applied Corrugated Tape LLDPE Jacket

Product Construction:

Complete Cable:

Cross-linked semi-conducting conductor shield, insulation and semi-conducting insulation shield are extruded over a solid or stranded aluminum conductor and cured in a single operation. Corrugated copper tape and an extruded black jacket are applied over the cable core. These products meet the latest requirements of ANSI/ICEA S-97-682 and AEIC CS8 as applicable for Ethylene Propylene Rubber (EPR) insulated shielded power cable.

Conductor:

Solid or Class B compressed concentric lay stranded 1350 aluminum.

Conductor Shield:

Extruded semi-conducting thermosetting polymeric stress control layer.

Insulation:

Extruded Ethylene Propylene Rubber (EPR) Class II and III.

Insulation Shield:

Extruded semi-conducting thermosetting layer, clean and free stripping from insulation.

Longitudinally Applied Corrugated Tape:

Copper, 8 or 10 mil thick Longitudinally Applied Corrugated Tape (LACT) with a minimum 375 mil overlap.

Jacket:

Black, non-conducting, sunlight-resistant, Linear Low-Density Polyethylene (LLDPE).

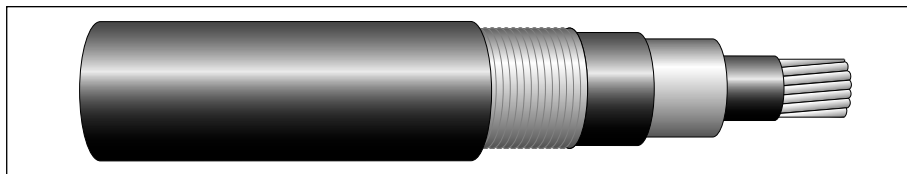
Features and Benefits:

- Even distribution of fault current and better heat dissipation
- Allows expansion/contraction of cable core
- Improved bending characteristics versus helical copper tape shield
- Triple-extruded for clean interfaces
- Class 10,000 environment utilized for cable core material handling
- Flexibility for easy handling
- Excellent moisture resistance
- Deformation-resistant
- High dielectric strength
- Low dielectric loss
- Excellent resistance to water treeing
- Clean-stripping insulation shield without the use of a release agent
- Sunlight-resistant

Temperature Rating:

- Normal105°C
- Emergency*140°C
- Short Circuit250°C

* Operation at the emergency overload temperature shall not exceed 1500 hours cumulative during the lifetime of the cable.



LONGITUDINALLY APPLIED CORRUGATED TAPE SHIELDED POWER CABLE

COMPRESSED CONDUCTOR		DIAMETER (1) INCHES					NOMINAL JACKET THKN. INCHES (1)	APPROX. WEIGHT (1) LB/1000 FT			AMPACITY (2)	
AL AWG OR kcmil	NO. OF WIRES	INSULATION		LACT SHIELD		LLDPE JACKET		AL COND.	CU SHIELD	TOTAL	DIRECT BURIED	IN DUCT
		MIN.	MAX.	THKN.	O.D.							

175 mils NOMINAL EPR INSULATION – 15 kV 100% INSULATION LEVEL

250	37	0.920	1.005	0.008	1.104	1.264	0.080	234	131	860	370	285
250	37	0.920	1.005	0.010	1.110	1.270	0.080	234	164	895	370	285
350	37	1.015	1.100	0.008	1.207	1.367	0.080	329	157	1037	445	345
350	37	1.015	1.100	0.010	1.213	1.373	0.080	329	191	1073	445	345
500	37	1.150	1.235	0.008	1.335	1.495	0.080	468	157	1250	545	425
500	37	1.150	1.235	0.010	1.355	1.515	0.080	468	220	1323	545	425
750	61	1.340	1.425	0.008	1.536	1.696	0.080	703	199	1645	665	530
750	61	1.340	1.425	0.010	1.542	1.702	0.080	703	243	1691	665	530
1000	61	1.485	1.575	0.008	1.685	1.905	0.110	937	208	2077	780	630
1000	61	1.485	1.575	0.010	1.691	1.911	0.110	937	260	2130	780	630

220 mils NOMINAL EPR INSULATION – 15 kV 133% INSULATION LEVEL

250	37	1.010	1.100	0.008	1.194	1.354	0.080	234	140	961	370	285
250	37	1.010	1.100	0.010	1.200	1.360	0.080	234	191	1012	370	285
350	37	1.105	1.190	0.008	1.297	1.457	0.080	329	157	1137	445	345
350	37	1.105	1.190	0.010	1.303	1.463	0.080	329	191	1173	445	345
500	37	1.240	1.330	0.008	1.439	1.599	0.080	468	185	1396	545	425
500	37	1.240	1.330	0.010	1.445	1.605	0.080	468	231	1444	545	425
750	61	1.430	1.520	0.008	1.626	1.846	0.110	703	203	1871	665	530
750	61	1.430	1.520	0.010	1.632	1.852	0.110	703	254	1923	665	530
1000	61	1.575	1.670	0.008	1.775	1.995	0.110	937	222	2228	780	630
1000	61	1.575	1.670	0.010	1.781	2.001	0.110	937	277	2285	780	630

(1) Extruded layer thicknesses and insulation and insulation shield diameters are in accordance with ANSI/ICEA S-97-682 for Utility Shielded Power Cables Rated 5 through 46 kV and also meet the requirements of the latest revisions of AEIC CS8.
 (2) Ampacity based on earth thermal resistivity of 90°C-cm/watt, 90°C conductor temp., 20°C earth ambient temperature, 75% load factor and 36" depth of burial. Values are based on one three-phase circuit, one conductor per phase, in flat adjacent configuration (direct buried) with metallic shield bonded at each end. For specific ampacities, contact your General Cable sales representative.

Dimensions and weights not designated minimum or maximum are nominal values and subject to manufacturing tolerances. In this context, weight means mass.

EmPowr® Fill Shielded Power Cable 15-35 kV

Al Conductor EPR Insulation Longitudinally Applied Corrugated Tape LLDPE Jacket

LONGITUDINALLY APPLIED CORRUGATED TAPE SHIELDED POWER CABLE

COMPRESSED CONDUCTOR		DIAMETER (1) INCHES					NOMINAL JACKET THKN. INCHES (1)	APPROX. WEIGHT (1) LB/1000 FT			AMPACITY (2)	
AL AWG OR kcmil	NO. OF WIRES	INSULATION		LACT SHIELD		LLDPE JACKET		AL COND.	CU SHIELD	TOTAL	DIRECT BURIED	IN DUCT
		MIN.	MAX.	THKN.	O.D.							

260 mils NOMINAL EPR INSULATION – 25 kV 100% INSULATION LEVEL

250	37	1.080	1.175	0.008	1.274	1.434	0.080	234	157	1064	370	285
250	37	1.080	1.175	0.010	1.280	1.440	0.080	234	191	1100	370	285
350	37	1.175	1.265	0.008	1.377	1.537	0.080	329	161	1235	445	345
350	37	1.175	1.265	0.010	1.397	1.557	0.080	329	220	1305	445	345
500	37	1.310	1.405	0.008	1.519	1.679	0.080	468	190	1503	545	425
500	37	1.310	1.405	0.010	1.525	1.685	0.080	468	237	1552	545	425
750	61	1.500	1.595	0.008	1.706	1.926	0.110	703	213	1998	665	530
750	61	1.500	1.595	0.010	1.712	1.932	0.110	703	266	2054	665	530
1000	61	1.645	1.740	0.008	1.855	2.075	0.110	937	227	2361	780	630
1000	61	1.645	1.740	0.010	1.861	2.081	0.110	937	289	2425	780	630

345 mils NOMINAL EPR INSULATION – 35 kV 100% INSULATION LEVEL

250	37	1.250	1.350	0.008	1.458	1.618	0.080	234	185	1305	360	295
250	37	1.250	1.350	0.010	1.464	1.624	0.080	234	231	1352	360	295
350	37	1.355	1.455	0.008	1.561	1.781	0.110	329	199	1594	430	355
350	37	1.355	1.455	0.010	1.567	1.787	0.110	329	243	1640	430	355
500	37	1.480	1.580	0.008	1.689	1.909	0.110	468	208	1858	530	430
500	37	1.480	1.580	0.010	1.695	1.915	0.110	468	260	1911	530	430
750	61	1.670	1.770	0.008	1.876	2.096	0.110	703	240	2294	650	550
750	61	1.670	1.770	0.010	1.882	2.102	0.110	703	289	2346	650	550
1000	61	1.815	1.920	0.008	2.025	2.245	0.110	937	245	2668	765	625
1000	61	1.815	1.920	0.010	2.031	2.251	0.110	937	306	2732	765	625

(1) Extruded layer thicknesses and insulation and insulation shield diameters are in accordance with ANSI/ICEA S-97-682 for Utility Shielded Power Cables Rated 5 through 46 kV and also meet the requirements of the latest revisions of AEIC CS8.

(2) Ampacity based on earth thermal resistivity of 90°C-cm/watt, 90°C conductor temp., 20°C earth ambient temperature, 75% load factor and 36" depth of burial. Values are based on one three-phase circuit, one conductor per phase, in flat adjacent configuration (direct buried) with metallic shield bonded at each end. For specific ampacities, contact your General Cable sales representative.

Dimensions and weights not designated minimum or maximum are nominal values and subject to manufacturing tolerances. In this context, weight means mass.

Applications:

EmPowr® Fill cables are intended for use in dry or wet locations for distribution of three-phase medium-voltage power. These cables may be installed in ducts or direct buried.

Options:

- Copper conductors
- EmPowr® Fill LF Lead-Free EAM
- STRANDFILL® blocked conductor. Tested in accordance with ICEA T-31-610
- BIFILL® tested to ICEA T-34-664
 1. blocked conductor
 2. blocked cable core/LACT
- TRIFILL® tested to ICEA T-34-664
 1. blocked conductor
 2. blocked cable core/LACT
 3. sealed overlap and blocked LACT/jacket
- Sealed LACT overlap
- Dry nitrogen cure
- True Triple Extrusion
- Red stripes on jacket
- Semi-conducting thermoplastic jacket
- 3 X 1/C triplex or parallel
- Type MV-90 UL 1072
- UL Listed

For more information, or information on conductor sizes or voltage ratings not shown in the tables, contact your General Cable sales representative or e-mail info@generalcable.com.

PowrPak[®]

The Next Generation of MV-UD Cable

Since the early 1920s, Paper Insulated Lead Covered (PILC) cable has been the standard for cable reliability. But as load demands increased, environmental concerns grew and urban distribution systems aged, it became necessary to develop a new cable design. PowrPak[®] is that cable.

- > **Increased Load Capacity**
- > **More Environmentally Friendly**
- > **Easier to Retrofit**
- > ***Now Available with Lead-Free Filled EAM Insulation***



Over 80 Million Feet Installed Since 1989

Easier Splicing, Terminating and Installation

Paper Insulated Lead Covered (PILC) cable with three conductors within a common lead sheath is stiff, heavy and difficult to handle. Plus, the special skills required for terminating and splicing are limited and labor-intensive. PowrPak® is easy to work with because it is three single conductors, more flexible and lighter than lead-encased oil-impregnated PILC, and uses commercially available splicing and terminating components. Retrofitting into existing duct work is easier and less labor-intensive, which results in reduced handling, installation and overall costs.

Pack More Power Into a Smaller Cable

PowrPak's unique design and special manufacturing techniques allow for a cable which has a diameter reduction of more than 15 percent relative to standard AEIC solid dielectric cables yet handles greater loads than the same size PILC. This is a major advantage for retrofitting into aging urban underground distribution systems. The smaller PowrPak cable can be installed into existing ductwork...a feat not always possible with other types of PILC replacement cable.

Long-Term Reliability

PowrPak is manufactured using state-of-the-art super-clean components, mixed with techniques that produce a homogeneous material that is the cleanest EPR compound in the power cable industry. General Cable's manufacturing process technology allows for tight control of all dimensions. Our triple extrusion techniques control dimensional tolerances. Material handling systems for all PowrPak material are second to none, including the use of Class 1000 and 10000 clean rooms at compounding and manufacturing plants. This assures a high degree of purity, consistency and long-term cable reliability.

PowrPak Features

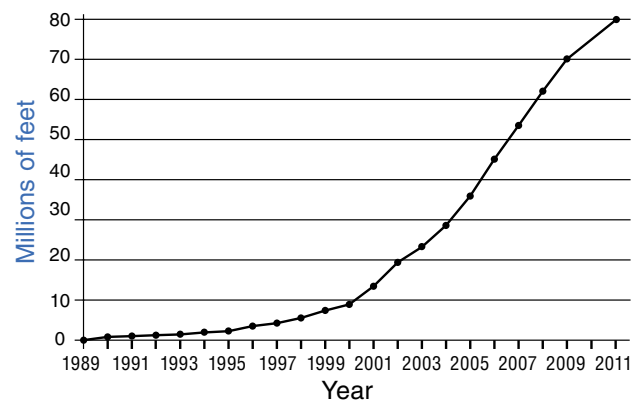
- > High ampacity
- > Reduced diameter
- > High dielectric strength
- > Low dielectric loss
- > Easy installation, splice and termination
- > Lower cost than PILC
- > More environmentally friendly than PILC
- > Available with TRXLPE insulation
- > **Now Available with Lead-Free Filled EAM Insulation**



It's Time for PowrPak®

General Cable has proven itself as a pioneer and innovator in the cable industry. PowrPak is one example of how we think ahead and anticipate the changing needs of the electric utility industry. Since 1989, utility companies have installed millions of feet of PowrPak cable provided by General Cable.

Cumulative PowrPak Usage



Designed to Your Requirements

No two applications are identical, and neither are any two installations. General Cable engineers will provide a PowrPak cable design to fit your conductor size, voltage, shield, duct size and duct clearance. Formula for calculating duct clearance:

$$\text{Clearance} = \frac{D}{2} - 1.366(d) + \frac{D-d}{2} \sqrt{1 - \left(\frac{d}{D-d}\right)^2}$$

Where: D = Inside diameter of duct (inches)
d = Max. diameter of one conductor (inches)



PowrPak® Underground PILC Replacement Cable

Cu Conductor EPR Insulation Flat Strap Concentric Neutral LLDPE Jacket



Product Construction:

Complete Cable:

Cross-linked semi-conducting conductor shield, insulation and semi-conducting insulation shield are extruded over stranded copper conductor and cured in a single operation. Uncoated copper flat strap neutrals (helically applied) and extruded-to-fill black jacket are applied over the cable core. PowrPak® cables meet the latest ANSI/ICEA S-94-649 and AEIC CS8 specifications for Ethylene Propylene Rubber (EPR) insulated concentric neutral cable except for dimensional requirements.

Conductor:

STRANDFILL®, bare, compact, concentric lay stranded copper tested in accordance with ICEA T-31-610.

Conductor Shield:

Extruded semi-conducting thermosetting polymeric stress control layer.

Insulation:

Extruded Ethylene Propylene Rubber (EPR) Class II and III.

Insulation Shield:

Extruded semi-conducting thermosetting layer, clean and free stripping from insulation.

Copper Flat Straps:

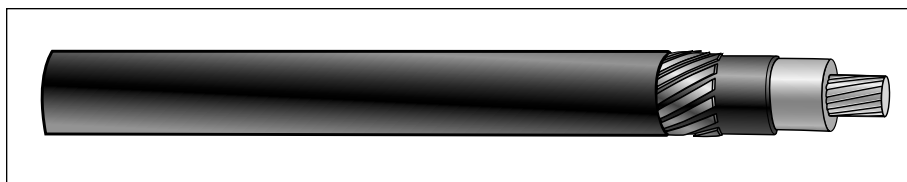
Bare annealed copper flat strap neutrals designed to meet customer fault current requirements.

Jacket:

Black, non-conducting Linear Low-Density Polyethylene (LLDPE) extruded to fill spaces between flat straps.

Features and Benefits:

- Reduced overall diameter for tight duct applications without reducing insulation wall
- No environmental concerns
- Higher emergency ampacity capabilities
- Less costly than PILC
- Millions of feet successfully installed and operated since its introduction in 1989
- Triple-extruded for clean interfaces
- Class 10,000 environment utilized for cable core material handling
- Flexibility for easy handling
- Excellent moisture resistance
- Improved temperature rating over PILC
- Low dielectric loss
- Deformation-resistant
- High dielectric strength
- Excellent resistance to water treeing
- Clean-stripping insulation shield without the use of a release agent



PILC REPLACEMENT CABLE – 15 kV-PowrPak

COMPACT CONDUCTOR		FLAT STRAP SHIELD (1)			NOMINAL O.D. INCHES					NOM. JACKET THKN. INCHES	APPROX. WEIGHT LB/1000 FT			AMP. IN DUCT (2)	DUCT CLEARANCE (3)	
CU AWG OR kcmil	MIN. NO. OF WIRES	NO. OF STRAPS	THKN. mils	WIDTH mils	INS. ± 25 mils	INS. SHIELD ± 30 mils	FLAT STRAP	ENCAP JACKET ± 50 mils	CU COND.		CU SHIELD	TOTAL	DUCT I.D. INCHES		MIN. CLEAR INCHES	

175 mils NOMINAL EPR INSULATION-100% INSULATION LEVEL

4/0	18	12	20	175	0.865	0.925	0.965	1.065	0.050	653	178	1167	305	3.0	0.72
350	35	14	20	175	1.006	1.066	1.106	1.206	0.050	1081	208	1694	400	3.0	0.36
500	35	14	20	175	1.126	1.186	1.226	1.326	0.050	1544	208	2222	495	3.5	0.63
750	58	16	20	175	1.298	1.358	1.398	1.498	0.050	2316	237	3120	615	4.0	0.75
1000	58	16	20	175	1.450	1.510	1.550	1.650	0.050	3088	237	3980	705	4.0	0.36

PILC REPLACEMENT CABLE – 25 kV-PowrPak

COMPACT CONDUCTOR		FLAT STRAP SHIELD (1)			NOMINAL O.D. INCHES					NOM. JACKET THKN. INCHES	APPROX. WEIGHT LB/1000 FT			AMP. IN DUCT (2)	DUCT CLEARANCE (3)	
CU AWG OR kcmil	MIN. NO. OF WIRES	NO. OF STRAPS	THKN. mils	WIDTH mils	INS. ± 25 mils	INS. SHIELD ± 30 mils	FLAT STRAP	ENCAP JACKET ± 50 mils	CU COND.		CU SHIELD	TOTAL	DUCT I.D. INCHES		MIN. CLEAR INCHES	

260 mils NOMINAL EPR INSULATION-100% INSULATION LEVEL

4/0	18	12	20	175	1.035	1.095	1.135	1.235	0.050	653	179	1319	315	3.5	0.86
350	35	14	20	175	1.176	1.236	1.276	1.376	0.050	1081	208	1866	410	3.5	0.50
500	35	14	20	175	1.296	1.356	1.396	1.496	0.050	1544	208	2409	505	4.0	0.76
750	58	16	20	175	1.468	1.528	1.568	1.668	0.050	2316	238	3331	620	4.0	0.31
1000	58	16	20	175	1.620	1.680	1.720	1.820	0.050	3088	238	4211	730	5.0	1.15

(1) Concentric neutral designs shown are for typical metallic shield requirements. The concentric neutral can be designed to fit the customer's fault current and time duration requirements. See fault current capability of typical designs on following page.

(2) Ampacity based on three phases in a duct and one duct load in the duct bank. Concrete thermal resistivity of 85°C-cm watt, earth thermal resistivity of 90°C-cm/watt, burial depth to top of duct bank is 30", 90°C conductor temperature, 20°C earth ambient temperature and 75% load factor. For specific ampacities, contact your General Cable sales representative.

(3) Duct clearance based on maximum cable diameter and inside diameter of schedule 40 duct.

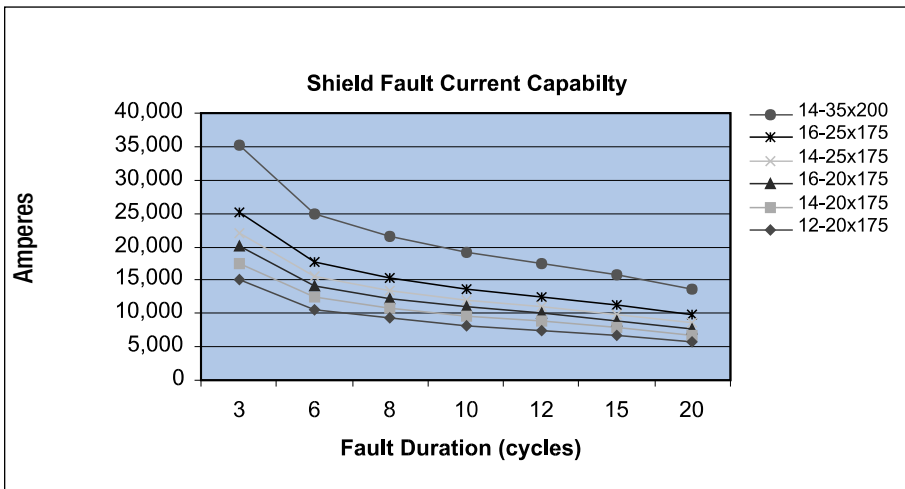
Dimensions and weights not designated minimum or maximum are nominal values and subject to manufacturing tolerances. In this context, weight means mass.

PowrPak® Underground PILC Replacement Cable

Cu Conductor EPR Insulation Flat Strap Concentric Neutral LLDPE Jacket



FAULT CURRENT CAPABILITY OF FLAT STRAP NEUTRAL										
NO. STRAPS	THKN. mils	WIDTH mils	CROSS-SECTIONAL AREA (kcmil)	AMPERES FOR FAULT DURATION (CYCLES)						
				3	6	8	10	12	15	20
12	20	175	53.466	15,064	10,652	9,225	8,251	7,532	6,737	5,834
14	20	175	62.377	17,574	12,427	10,762	9,626	8,787	7,850	6,807
16	20	175	71.288	20,085	14,202	12,300	11,001	10,043	8,982	7,779
14	25	175	77.971	21,968	15,534	13,453	12,032	10,984	9,824	8,508
16	25	175	89.110	25,106	17,753	15,374	13,751	12,553	11,228	9,724
14	35	200	124.754	35,149	24,854	21,524	19,252	17,574	15,719	13,613



Temperature Rating:

- Normal 105°C
- Emergency* 140°C
- Short Circuit 250°C

* Operation at the emergency overload temperature shall not exceed 1500 hours cumulative during the lifetime of the cable.

Applications:

PowrPak® cables are intended for use in dry or wet locations for today's aging and expanding urban underground distribution systems of utilities where PILC has been used previously. It is specifically designed to be used in urban underground network systems where existing duct space is limited.

Options:

- Class C copper conductors
- Reduced insulation wall thickness
- BIFILL® blocked conductor and cable core/jacket. Tested in accordance with ICEA T-34-664
- Dry nitrogen cure
- True Triple Extrusion
- Red stripes on jacket
- Deformation-resistant polypropylene jacket
- 3 X 1/C triplex or parallel
- Lead-free filled EAM insulation
- TRXLPE insulation

For more information, or information on conductor sizes or voltage ratings not shown in the tables, contact your General Cable sales representative or e-mail info@generalcable.com.