KNOW YOUR OPTIONS: 161 KV POWER CABLE

CONDUCTOR MATERIAL AND SIZE

Conductor material is a matter of both customer preference and required current carrying capacity

- Copper conductor common for larger loads
- When both copper and aluminum conductors can meet your requirements, the more economical solution will be a function of the metal and the cable component costs

INSULATION THICKNESS

- For cables with a radial moisture barrier, “Southwire Standard Wall” reduced insulation thicknesses within the stress limits in AEIC specification CS9 are recommended
- For applications requiring smaller cable diameters, specific designs are available upon request within the stress limits in AEIC specification CS9

SHEATH MATERIAL

- Copper and aluminum corrugated sheaths offer the best mechanical and moisture protection for your HV cable, and copper will provide better short circuit performance and improved connectability
- Composite laminate sheaths in both copper and aluminum that offer excellent protection against moisture ingress

JACKET

- Standard outer jacket: extruded LLDPE with a co-extruded outer semi-conductive polyethylene layer for jacket integrity testing
- Halogen Free Fire Retardant (HFFR) compounds are available upon request for installations in cable trays and ventilated troughs

161 kV XLPE - Copper Conductor

SW STANDARD WALL XLPE COPPER CORRUGATED SHEATH

CABLE CONSTRUCTION

- Reverse Concentric Stranded Copper, Compressed Conductor or MIlliken
- Super Smooth Conductor Shield
- Super Clean XLPE Insulation
- 690 mil XLPE minimum
- True Triple Extrusion and Dry Cured
- Firmly Bonded Insulation Shield
- Welded Copper Corrugated Sheath
- Polyethylene Jacket with Extruded Semi-Conductive Outer Layer

CABLE DATA	
Voltage Characteristics (kV)	
Max Voltage Rating	169
BIL Rating	750
Temperatures (°C)	
Nominal Conductor	90
Max. Emergency Conductor	105
Short Circuit Conductor	250
Minimum Installation	-10
Design Characteristics	
Design Standards	AEIC, IEC
Typical Test Voltages	280 kV / 15 min.
XLPE Loss Factor	0.0005
Relative Permittivity	2.3

Conductor Size in kcmil[1]		750	1000	1250	1500	1750	2000	2500	3000	3500	4000
Dimensional	Nominal										
Conductor Diameter	in	0.97	1.12	1.25	1.37	1.48	1.61	1.76	1.92	2.08	2.21
	mm	24.7	28.5	31.8	34.8	37.6	40.9	44.7	48.8	52.8	56.1
Insulation Thickness	mils	840	790	760	730	710	690	700	710	720	730
	mm	21.3	20.1	19.3	18.5	18.0	17.5	17.8	18.0	18.3	18.5
Diameter over Insulation	in	2.77	2.82	2.89	2.95	3.02	3.08	3.36	3.52	3.72	3.87
	mm	70.3	71.6	73.4	74.9	76.7	78.3	85.3	89.4	94.4	98.3
Diameter over Sheath	in	3.32	3.36	3.44	3.51	3.58	3.65	3.96	4.14	4.36	4.52
	mm	84.3	85.4	87.5	89.2	91.0	92.7	100.7	105.2	110.6	114.9
Overall Jacket Diameter	in	3.60	3.64	3.72	3.79	3.86	3.93	4.24	4.42	4.64	4.80
	mm	91.4	92.5	94.6	96.3	98.1	99.8	107.8	112.3	117.8	122.0
Total Weight	lbs/ft	6.8	7.6	8.4	9.3	10.1	11.0	13.2	15.1	17.1	19.0
Min. Bending Radius (install/ perm.)	in	72/54	73/55	74/56	76/57	77/58	79/59	85/64	88/66	93/70	96/72
Maximum Pulling Tension	lbs	6,000	8,000	10,000	12,000	14,000	16,000	20,000	24,000	28,000	32,000
Typical Shipping Reel Size											
Flange x Traverse	in	138x95	126x95	126x95	126x95	150x95	150x95	158x95	150x95	150x95	158x95
Shipping Reel Capacity[2]	ft	3,000	2,950	2,950	2,950	3,000	3,000	2,725	2,450	2,150	1,900
Electrical											
Electrical Stress @ U_o											
Conductor Shield	kV/mm	7.2	7.2	7.2	7.2	7.2	7.2	6.9	6.8	6.6	6.4
Insulation Shield	kV/mm	2.8	3.2	3.4	3.6	3.8	4.0	4.0	4.1	4.0	4.0
Short Circuit for 0.5s[3]											
Conductor	kA	76.9	102.5	128.1	153.8	179.4	205.0	256.3	307.5	358.8	410.0
Sheath	kA	41.6	42.1	43.1	44.0	44.9	45.7	49.7	51.9	54.6	56.7
Conductor Resistance											
DC @ 20° C	Ω/kft	0.014	0.011	0.008	0.007	0.007	0.005	0.004	0.004	0.003	0.003
DC @ 90° C	Ω/kft	0.018	0.014	0.011	0.009	0.008	0.007	0.005	0.005	0.004	0.003
Capacitance	pF/ft	41.7	47.3	52.2	57.0	61.3	65.6	72.3	76.8	79.4	82.2
Charging Current	Amps/ kft	1.46	1.66	1.83	2.00	2.15	2.30	2.53	2.69	2.78	2.88
Ampacity @ 90o C	per circuit										
Typical Single Ductbank[4]	Amps	714	842	952	1037	1111	1179	1413	1532	1633	1718
Power Rating	MVA	200	235	266	290	310	329	395	428	456	480
Typical Double Ductbank[4]	Amps	607	711	799	866	924	977	1163	1255	1330	1393
Power Rating	MVA	170	199	223	242	258	273	325	350	371	389

[1] 2500-4000 kcmil conductors are 5 segment Milliken conductors.
[2] Increased shipping reel capacity can be accommodated on request.
[3] Declared values for 30 mils copper sheath. Thicker sheath can accommodate more current.
[4] 4ft top of duct, 1°C-m/W native, 0.8°C-m/W ductbank backfill, 25°C Ambient, 75% lf, 9" spacing, single-point or cross bonded

161 kV XLPE - Aluminum Conductor

SW STANDARD WALL XLPE ALUMINUM CORRUGATED SHEATH

CABLE CONSTRUCTION

- Reverse Concentric Stranded Aluminum, Compressed Conductor
- Super Smooth Conductor Shield
- Super Clean XLPE Insulation
- 690 mil XLPE minimum
- True Triple Extrusion and Dry Cured
- Firmly Bonded Insulation Shield
- Welded Aluminum Corrugated Sheath
- Polyethylene Jacket with Extruded Semi-Conductive Outer Layer

CABLE DATA	
Voltage Characteristics (kV)	
Max Voltage Rating	169
BIL Rating	750
Temperatures (°C)	
Nominal Conductor	90
Max. Emergency Conductor	105
Short Circuit Conductor	250
Minimum Installation	-10
Design Characteristics	
Design Standards	AEIC, IEC
Typical Test Voltages	280 kV / 15 min.
XLPE Loss Factor	0.0005
Relative Permittivity	2.3

Conductor Size in kcmil		750	1000	1250	1500	1750	2000
Dimensional	Nominal						
Conductor Diameter	in	0.97	1.12	1.26	1.38	1.49	1.61
	mm	24.7	28.5	31.9	35.0	37.8	40.9
Insulation Thickness	mils	840	790	760	730	710	690
	mm	21.3	20.1	19.3	18.5	18.0	17.5
Diameter over Insulation	in	2.77	2.82	2.89	2.95	3.02	3.08
	mm	70.3	71.6	73.4	74.9	76.7	78.3
Diameter over Sheath	in	3.42	3.47	3.55	3.62	3.70	3.76
	mm	86.9	88.1	90.2	91.9	93.9	95.6
Overall Jacket Diameter	in	3.70	3.76	3.83	3.90	3.98	4.04
	mm	94.1	95.5	97.3	99.0	101.0	102.7
Total Weight	lbs/ft	4.5	4.7	5.0	5.3	5.6	5.9
Min. Bending Radius (install/perm.) in	in	74/56	75/56	77/57	78/58	80/60	81/61
Maximum Pulling Tension	lbs	4,500	6,000	7,500	9,000	10,500	12,000
Typical Shipping Reel Size							
Flange x Traverse	in	150x95	150x95	150x95	150x95	150x95	150x95
Shipping Reel Capacity[1]	ft	3,000	3,000	3,000	3,000	3,000	2,725
Electrical							
Electrical Stress @ U_o							
Conductor Shield	kV/mm	7.2	7.2	7.2	7.2	7.2	7.2
Insulation Shield	kV/mm	2.8	3.2	3.4	3.6	3.8	4.0
Short Circuit for 0.5s[2]							
Conductor	kA	50.8	67.7	84.6	101.5	118.5	135.4
Sheath	kA	46.8	47.4	48.5	49.5	50.5	51.4
Conductor Resistance							
DC @ 20° C	Ω/kft	0.023	0.017	0.014	0.012	0.010	0.009
DC @ 90° C	Ω/kft	0.030	0.022	0.018	0.015	0.013	0.011
Capacitance	pF/ft	41.7	47.3	52.2	57.0	61.3	65.6
Charging Current	Amps/kft	1.46	1.66	1.83	2.00	2.15	2.30
Ampacity @ 90° C	per circuit						
Typical Single Ductbank[3]	Amps	559	665	758	833	902	969
Power Rating	MVA	156	186	212	233	252	271
Typical Double Ductbank[3]	Amps	475	562	637	697	751	804
Power Rating	MVA	133	157	178	195	210	225

[1] Increased shipping reel capacity can be accommodated on request.
[2] Declared values for 50 mils alluminum sheath. Thicker sheath can accommodate more current.
[3] 4ft top of duct, 1°C-m/W native, 0.8°C-m/W ductbank backfill, 25°C Ambient, 75% lf, 9" spacing, single-point or cross bonded

161 kV XLPE - Copper Conductor

SW STANDARD WALL XLPE COPPER NEUTRALS WITH COPPER COMPOSITE LAM INATE SHEATH

CABLE CONSTRUCTION

- Reverse Concentric Stranded Copper, Compressed Conductor or Milliken
- Super Smooth Conductor Shield
- Super Clean XLPE Insulation
- 690 mil XLPE minimum
- True Triple Extrusion and Dry Cured
- Firmly Bonded Insulation Shield
- Copper Neutrals with Copper Composite Laminate Sheath
- Polyethylene Jacket with Extruded Semi-Conductive Outer Layer

CABLE DATA	
Voltage Characteristics (kV)	
Max Voltage Rating	169
BIL Rating	750
Temperatures (°C)	
Nominal Conductor	90
Max. Emergency Conductor	105
Short Circuit Conductor	250
Minimum Installation	-10
Design Characteristics	
Design Standards	AEIC, IEC
Typical Test Voltages	280 kV / 15 min.
XLPE Loss Factor	0.0005
Relative Permittivity	2.3

Conductor Size in kcmil[1]		750	1000	1250	1500	1750	2000	2500	3000	3500	4000
Dimensional	Nominal										
Conductor Diameter	in	0.97	1.12	1.25	1.37	1.48	1.61	1.76	1.92	2.08	2.21
	mm	24.7	28.5	31.8	34.8	37.6	40.9	44.7	48.8	52.8	56.1
Insulation Thickness	mils	840	790	760	730	710	690	700	710	720	730
	mm	21.3	20.1	19.3	18.5	18.0	17.5	17.8	18.0	18.3	18.5
Diameter over Insulation	in	2.77	2.82	2.89	2.95	3.02	3.08	3.36	3.52	3.72	3.87
	mm	70.3	71.6	73.4	74.9	76.7	78.3	85.3	89.4	94.4	98.3
Diameter over Sheath	in	3.15	3.20	3.28	3.34	3.41	3.47	3.69	3.87	4.05	4.20
	mm	80.1	81.3	83.2	84.7	86.5	88.1	93.8	98.3	102.8	106.7
Overall Jacket Diameter	in	3.47	3.52	3.60	3.66	3.73	3.79	4.01	4.19	4.37	4.52
	mm	88.2	89.5	91.3	92.8	94.6	96.2	101.9	106.5	110.9	114.8
Total Weight	lbs/ft	6.7	7.5	8.4	9.2	10.0	10.8	12.8	14.6	16.5	18.4
Min. Bending Radius (install/ perm.)	in	69/52	70/53	72/54	73/55	75/56	76/57	80/60	84/63	87/65	90/68
Maximum Pulling Tension	lbs	6,000	8,000	10,000	12,000	14,000	16,000	20,000	24,000	28,000	32,000
Typical Shipping Reel Size											
Flange x Traverse	in	138x95	138x95	138x95	138x95	150x95	150x95	150x95	150x95	158x95	158x95
Shipping Reel Capacity[2]	ft	3,000	3,000	3,000	3,000	3,000	3,000	2,725	2,600	2,250	2,025
Electrical											
Electrical Stress @ U_o											
Conductor Shield	kV/mm	7.2	7.2	7.2	7.2	7.2	7.2	6.9	6.8	6.6	6.4
Insulation Shield	kV/mm	2.8	3.2	3.4	3.6	3.8	4.0	4.0	4.1	4.0	4.0
Short Circuit for 0.5s[3]											
Conductor	kA	76.9	102.5	128.1	153.8	179.4	205.0	256.3	307.5	358.8	410.0
Sheath	kA	43.8	43.9	44.1	44.3	44.5	44.6	45.2	45.7	46.1	46.5
Conductor Resistance											
DC @ 20° C	Ω/kft	0.014	0.011	0.008	0.007	0.007	0.005	0.004	0.004	0.003	0.003
DC @ 90° C	Ω/kft	0.018	0.014	0.011	0.009	0.008	0.007	0.005	0.005	0.004	0.003
Capacitance	pF/ft	41.7	47.3	52.2	57.0	61.3	65.6	72.3	76.8	79.4	82.2
Charging Current	Amps/ kft	1.46	1.66	1.83	2.00	2.15	2.30	2.53	2.69	2.78	2.88
Ampacity @ 90° C	per circuit										
Typical Single Ductbank[4]	Amps	724	856	969	1058	1136	1209	1464	1602	1723	1830
Power Rating	MVA	202	239	271	296	317	338	409	447	481	511
Typical Double Ductbank[4]	Amps	614	721	813	883	944	1001	1209	1317	1412	1495
Power Rating	MVA	172	202	227	247	264	280	338	368	394	417

[1] 2500-4000 kcmil conductors are 5 segment Milliken conductors.
[2] Increased shipping reel capacity can be accommodated on request.
[3] Declared values for 80 x 14 AWG copper wire screen with 6 mil copper tape shield. Larger wires can accommodate more current.
[4] 4ft top of duct, 1°C-m/W native, 0.8°C-m/W ductbank backfill, 25°C Ambient, 75% lf, 9" spacing, single-point or cross bonded

161 kV XLPE - Aluminum Conductor

SW STANDARD WALL XLPE COPPER NEUTRALS WITH ALUMINUM COMPOSITE LAMINATE SHEATH

CABLE CONSTRUCTION

- Reverse Concentric Stranded Aluminum, Compressed Conductor
- Super Smooth Conductor Shield
- Super Clean XLPE Insulation
- 690 mil XLPE minimum
- True Triple Extrusion and Dry Cured
- Firmly Bonded Insulation Shield
- Copper Neutrals with Aluminum Composite Laminate Sheath
- Polyethylene Jacket with Extruded Semi-Conductive Outer Layer

CABLE DATA	
Voltage Characteristics (kV)	
Max Voltage Rating	169
BIL Rating	750
Temperatures (°C)	
Nominal Conductor	90
Max. Emergency Conductor	105
Short Circuit Conductor	250
Minimum Installation	-10
Design Characteristics	
Design Standards	AEIC, IEC
Typical Test Voltages	280 kV / 15 min.
XLPE Loss Factor	0.0005
Relative Permittivity	2.3

Conductor Size in kcmil		750	1000	1250	1500	1750	2000
Dimensional	Nominal						
Conductor Diameter	in	0.97	1.12	1.26	1.38	1.49	1.61
	mm	24.7	28.5	31.9	35.0	37.8	40.9
Insulation Thickness	mils	840	790	760	730	710	690
	mm	21.3	20.1	19.3	18.5	18.0	17.5
Diameter over Insulation	in	2.77	2.82	2.89	2.95	3.02	3.08
	mm	70.3	71.6	73.4	74.9	76.7	78.3
Diameter over Sheath	in	3.16	3.21	3.28	3.34	3.41	3.47
	mm	80.2	81.4	83.3	84.8	86.6	88.2
Overall Jacket Diameter	in	3.48	3.53	3.60	3.66	3.73	3.79
	mm	88.3	89.6	91.4	92.9	94.7	96.3
Total Weight	lbs/ft	5.0	5.2	5.5	5.8	6.1	6.4
Min. Bending Radius (install/perm.)	in	70/52	71/53	72/54	73/55	75/56	76/57
Maximum Pulling Tension	lbs	4,500	6,000	7,500	9,000	10,500	12,000
Typical Shipping Reel Size							
Flange x Traverse	in	138x95	138x95	138x95	138x95	150x95	150x95
Shipping Reel Capacity[1]	ft	3,000	3,000	3,000	3,000	3,000	3,000
Electrical							
Electrical Stress @ U_o							
Conductor Shield	kV/mm	7.2	7.2	7.2	7.2	7.2	7.2
Insulation Shield	kV/mm	2.8	3.2	3.4	3.6	3.8	4.0
Short Circuit for 0.5s[2]							
Conductor	kA	50.8	67.7	84.6	101.5	118.5	135.4
Sheath	kA	42.8	42.9	43.1	43.3	43.4	43.6
Conductor Resistance							
DC @ 20° C	Ω/kft	0.023	0.017	0.014	0.012	0.010	0.009
DC @ 90° C	Ω/kft	0.030	0.022	0.018	0.015	0.013	0.011
Capacitance	pF/ft	41.7	47.3	52.2	57.0	61.3	65.6
Charging Current	Amps/kft	1.46	1.66	1.83	2.00	2.15	2.30
Ampacity @ 90° C	per circuit						
Typical Single Ductbank[3]	Amps	566	675	771	848	920	990
Power Rating	MVA	158	189	216	237	257	277
Typical Double Ductbank[3]	Amps	480	569	646	708	765	821
Power Rating	MVA	134	159	181	198	214	229

[1] Increased shipping reel capacity can be accommodated on request.
[2] Declared values for 80 x 14 AWG copper wire screen with 8 mil aluminum tape shield. Larger wires can accommodate more current.
[3] 4ft top of duct, 1°C-m/W native, 0.8°C-m/W ductbank backfill, 25°C Ambient, 75% lf, 9" spacing, single-point or cross bonded