

High Voltage Aluminum, Smooth Aluminum Shield/Sheath

XLPE Insulation, HDPE Jacket, 69 kV - 138 kV

CME[®]
wire and cable

A Viakable Company

Features

True triple vertical extrusion system for optimum insulation concentricity, and excellent electric field control.

Dry cure process.

Closed handling of raw materials system to eliminate any contact with ambient, until extrusion process ends.

Low dielectric losses.

Metallic shield for ground connection.

Sunlight resistant jacket.

Application

Transmission and distribution circuits, in cities with high load densities. Also, for Industrial and Commercial installations.

May be installed in wet or dry locations indoors or outdoors in conduit and underground ducts.

Standards

IEC 60840: Power cables with extruded insulation for rated voltages above 30 kV up to 150 kV.

AEIC CS9: Specifications for extruded insulation power cables and their accessories rated above 46 kV through 345 kV.

ICEA S-108-720: Standard for extruded insulation power cables rated above 46 kV to 345 kV.

Specifications

Operating (maximum) voltage:

- 69 kV (72.5 kV), 115 kV (123 kV) or 138 kV (145 kV)

Maximum conductor operation temperatures:

Wet and dry locations

- Normal: 90 °C
- Emergency: 105 °C
- Short Circuit: 250 °C

Engineering Information

1. Conductor: 1350-H19 Aluminum, Class B or Class 2 filled stranding compacted round or segmental as per ASTM B400 or IEC 60228.

Sizes: 500 kcmil up to 4000 kcmil.

On request, unfilled conductor.

2. Semiconducting Tape: A semiconducting tape may be applied helically with an overlap, as required.

3. Conductor Shield:

Semiconducting cross-linked polyethylene.

4. Insulation: High quality, heat, moisture, ozone and corona resistant, cross-linked polyethylene (XLPE).

5. Insulation Shield:

Semiconducting cross-linked polyethylene.

6. Water Barrier: Semiconducting water blocking tape, helically applied.

7. Metallic Shield/Sheath:

Welded smooth aluminum tape longitudinally applied over semiconducting water blocking tapes.

8. Jacket: Black high density polyethylene (HDPE) sunlight resistant thermoplastic compound.

On request, semiconducting PE layer.



Technical Data

69 kV Aluminum, XLPE Insulated

Size	kcmil	500	750	1000	1250	1500	1750	2000	2500	3000	3500	4000
Conductor												
Shape		Round						Segmental				
Number of Strands		37	61	61	61	61	85	85	305	305	305	305
Conductor Diameter	in	0.74	0.91	1.06	1.21	1.31	1.48	1.57	1.78	1.95	2.12	2.28
Insulation												
Insulation Thickness	mil	380	360	340	330	320	320	310	310	300	300	300
Insulation OD	in	1.57	1.71	1.82	2.02	2.09	2.27	2.34	2.55	2.70	2.87	3.03
Metallic Sheath												
Thickness	mil	60										
Diameter over sheath	in	1.96	2.09	2.2	2.4	2.48	2.65	2.72	2.94	3.09	3.26	3.42
Complete Cable												
Approximate Outside Diameter	in	2.36	2.50	2.61	2.81	2.88	3.06	3.13	3.35	3.50	3.67	3.83
Approximate Net Weight	lb/ft	2.3	2.7	3.0	3.6	3.9	4.3	4.6	5.4	6.1	6.8	7.4
Minimum Bending Radius	in	49	51	54	58	59	63	64	68	71	75	78
Maximum Pulling Tension	lb	3,000	4,000	6,000	7,500	9,000	10,500	12,000	15,000	18,000	21,000	24,000
Electrical Stress @ U₀												
Conductor Shield	kV/mm	5.8	5.8	5.8	5.8	5.9	5.8	5.9	5.8	5.9	5.8	5.8
Insulation Shield	kV/mm	3.0	3.3	3.6	3.9	4.1	4.1	4.3	4.4	4.6	4.6	4.6
Short Circuit for 0.5 s												
Conductor	kA	33.3	49.9	66.5	83.2	99.8	116.4	133.0	166.3	199.6	232.8	262.6
Sheath	kA	28.3	30.3	32.0	34.9	36.0	38.6	39.7	43.0	45.2	47.7	50.2
Conductor Resistance												
dc @ 20 °C	Ω/kft	0.035	0.023	0.017	0.014	0.012	0.010	0.009	0.007	0.006	0.005	0.005
dc @ 90 °C	Ω/kft	0.045	0.030	0.022	0.018	0.015	0.013	0.011	0.009	0.008	0.006	0.006
Capacitance	pF/ft	53.1	63.8	74.7	88.3	95.7	105.4	113.4	125.5	139.1	149	158.5
Charging Current	A/kft	0.80	0.96	1.12	1.33	1.44	1.58	1.70	1.88	2.09	2.24	2.38
Ampacity @ 90 °C (3 ft top of duct, 1 °C·m/W native, 20 °C Ambient, 75% if single-point or cross bonded)												
Single Circuit Bank	A	524	656	769	867	954	1033	1104	1307	1432	1543	1641
Double Circuit Bank	A	440	547	637	713	781	842	895	1095	1206	1296	1376

The above data are approximate and subject to normal manufacturing tolerances.

Technical Data

115 kV Aluminum, XLPE Insulated

Size	kcmil	750	1000	1250	1500	1750	2000	2500	3000	3500	4000
Conductor											
Shape		Round						Segmental			
Number of Strands		61	61	61	61	85	85	305	305	305	305
Conductor Diameter	in	0.91	1.06	1.21	1.31	1.48	1.57	1.78	1.95	2.12	2.28
Insulation											
Insulation Thickness	mil	730	680	630	610	590	580	570	550	540	540
Insulation OD	in	2.46	2.51	2.63	2.68	2.82	2.89	3.08	3.21	3.36	3.52
Metallic Sheath											
Thickness	mil	60									
Diameter over sheath	in	2.84	2.90	3.02	3.07	3.20	3.27	3.48	3.61	3.76	3.92
Complete Cable											
Approximate Outside Diameter	in	3.25	3.30	3.42	3.47	3.61	3.68	3.88	4.01	4.16	4.32
Approximate Net Weight	lb/ft	4.1	4.4	4.8	5.1	5.5	5.8	6.7	7.3	8.1	8.7
Minimum Bending Radius	in	67	68	70	71	74	75	79	82	85	88
Maximum Pulling Tension	lb	4,000	6,000	7,500	9,000	10,500	12,000	15,000	18,000	21,000	24,000
Electrical Stress @ U₀											
Conductor Shield	kV/mm	5.8	5.8	5.9	5.9	5.9	5.9	5.8	5.9	5.9	5.8
Insulation Shield	kV/mm	2.3	2.6	3.0	3.2	3.4	3.5	3.6	3.8	4.0	4.0
Short Circuit for 0.5 s											
Conductor	kA	49.9	66.5	83.2	99.8	116.4	133.0	166.3	199.6	232.8	262.6
Sheath	kA	41.5	42.3	44.0	44.8	46.9	47.9	50.9	52.9	55.1	57.5
Conductor Resistance											
dc @ 20 °C	Ω/kft	0.023	0.017	0.014	0.012	0.010	0.009	0.007	0.006	0.005	0.005
dc @ 90 °C	Ω/kft	0.030	0.022	0.018	0.015	0.013	0.011	0.009	0.008	0.006	0.006
Capacitance	pF/ft	38.5	44.5	53.2	57.2	64.0	67.6	75.1	82.8	89.5	94.8
Charging Current	A/kft	0.96	1.11	1.33	1.43	1.60	1.69	1.88	2.07	2.24	2.37
Ampacity @ 90 °C (3 ft top of duct, 1 °C·m/W native, 20 °C Ambient, 75% if single-point or cross bonded)											
Single Circuit Bank	A	651	762	859	946	1023	1093	1324	1453	1568	1658
Double Circuit Bank	A	549	639	718	787	848	903	1091	1192	1282	1360

The above data are approximate and subject to normal manufacturing tolerances.

Technical Data

138 kV Aluminum, XLPE Insulated

Size	kcmil	750	1000	1250	1500	1750	2000	2500	3000	3500	4000
Conductor											
Shape		Round						Segmental			
Number of Strands		61	61	61	61	85	85	305	305	305	305
Conductor Diameter	in	0.91	1.06	1.21	1.31	1.48	1.57	1.78	1.95	2.12	2.28
Insulation											
Insulation Thickness	mil	970	890	810	790	760	740	710	700	680	670
Insulation OD	in	2.94	2.93	2.99	3.04	3.16	3.21	3.36	3.51	3.64	3.78
Metallic Sheath											
Thickness	mil	60									
Diameter over sheath	in	3.32	3.32	3.38	3.43	3.54	3.59	3.76	3.91	4.04	4.18
Complete Cable											
Approximate Outside Diameter	in	3.73	3.72	3.78	3.83	3.95	4.00	4.16	4.31	4.44	4.58
Approximate Net Weight	lb/ft	5.2	5.4	5.7	6.0	6.4	6.6	7.4	8.1	8.9	9.5
Minimum Bending Radius	in	76	76	77	78	81	82	85	88	90	93
Maximum Pulling Tension	lb	4,000	6,000	7,500	9,000	10,500	12,000	15,000	18,000	21,000	24,000
Electrical Stress @ U_0											
Conductor Shield	kV/mm	5.9	5.9	5.9	5.9	5.8	5.9	5.9	5.8	5.9	5.9
Insulation Shield	kV/mm	1.9	2.3	2.7	2.8	3.0	3.1	3.4	3.5	3.7	3.8
Short Circuit for 0.5 s											
Conductor	kA	49.9	66.5	83.2	99.8	116.4	133.0	166.3	199.6	232.8	262.6
Sheath	kA	48.7	48.5	49.4	50.2	51.9	52.7	55.1	57.3	59.3	61.4
Conductor Resistance											
dc @ 20 °C	Ω /kft	0.023	0.017	0.014	0.012	0.010	0.009	0.007	0.006	0.005	0.005
dc @ 90 °C	Ω /kft	0.030	0.022	0.018	0.015	0.013	0.011	0.009	0.008	0.006	0.006
Capacitance	pF/ft	32.3	37.3	44.7	47.6	53.1	56.3	63.5	68.5	74.5	79.7
Charging Current	A/kft	0.97	1.12	1.34	1.43	1.59	1.69	1.91	2.06	2.24	2.39
Ampacity @ 90 °C (3 ft top of duct, 1 °C·m/W native, 20 °C Ambient, 75% if single-point or cross bonded)											
Single Circuit Bank	A	658	756	853	939	1015	1079	1305	1430	1543	1641
Double Circuit Bank	A	540	637	712	777	842	896	1079	1178	1225	1300

The above data are approximate and subject to normal manufacturing tolerances.

Technical Data

Notes

In this publication, conductor sizes are given in kcmil.

According to the best practice in industry, when using pulling eyes attached to phase conductors, the maximum mechanical pulling tension that can be applied to each conductor or group of conductors being installed in ducts, should not be higher than 6,000 lbf.

Doing calculations of cable pulling tensions prior to each installation, increases the possibilities of a safe and secure operation.

Installation conditions taken as reference for ampacity calculations are:

1. One and two three phase circuits, cables in underground buried ducts, one cable per duct, flat parallel configuration with a distance between duct centers of twice the OD of each cable.
2. 75% Load Factor.
3. Single point or cross bonded shield grounding connection.
4. Ambient Ground Temperature, $T_a = 20\text{ }^\circ\text{C}$.
5. Deep to top of ducts, 3 ft.
6. Ground Thermal Resistivity: $1\text{ }^\circ\text{C}\cdot\text{m}/\text{W}$.

For this publication, ampacity values were calculated according to the available best engineering practice (per IEC 60287). However, they should be considered as reference values only, applicable to the conditions described below.

For other cases, correction factors can be applied as follows:

Deep, m	1.0	1.2	1.3	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
Factor	1.03	1.01	1.00	0.98	0.95	0.93	0.91	0.89	0.88	0.87	0.86
Soil Thermal Resistivity (°C)	0.8	1.0	1.2	1.5	2.0	2.5					
Factor	1.09	1.00	0.93	0.85	0.75	0.67					
Soil Temperature (°C)	10	15	20	25	30	35	40				
Factor	1.07	1.04	1.00	0.96	0.92	0.88	0.84				
Temperature Correction Factor											
Distance Between Centers mm	400	600	800	1000							
1 circuit	1.00	1.00	1.00	1.00							
2 circuit	0.79	0.83	0.87	0.89							
3 circuit	0.70	0.75	0.78	0.81							
4 circuit	0.64	0.70	0.74	0.78							

Only nominal dimensions are included in this publication. For accessory selection, please contact our Sales Department.

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