Extra High Voltage Copper, Smooth Aluminum Shield/Sheath

XLPE Insulation, HDPE Jacket, 230 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 systems in urban and industrial installations with high load density.

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

Standards

IEC 62067: Power cables with extruded insulation and their accessories for rated voltages above 150 kV up to 500 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:

- 230 kV / 245 kV

Maximum conductor operation temperatures:

Wet and dry locations

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

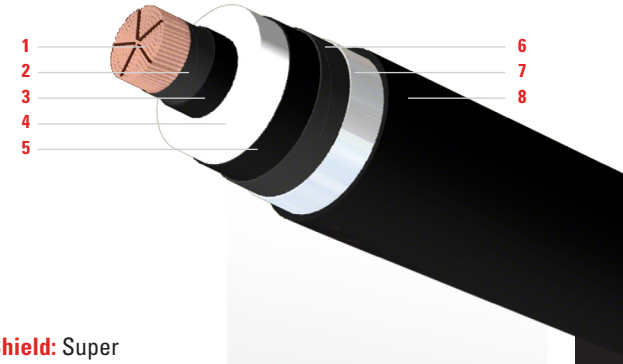
Engineering Information

1. Conductor: Uncoated soft annealed copper, Class B or Class 2 filled stranding compacted round or segmental as per ASTM B496 or IEC 60228.

Sizes: 1000 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: Super smooth 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.

230 kV Copper, XLPE Insulated

Size	kcmil	1000	1250	1500	1750	2000	2500	3000	3500	4000
Conductor										
Shape		Round					Segmental			
Number of Strands		61	61	61	85	85	305	305	305	305
Conductor Diameter	in	1.06	1.21	1.31	1.48	1.57	1.78	1.95	2.12	2.28
Insulation										
Insulation Thickness	mil	1350	1190	1150	1080	1060	1000	970	950	930
Insulation OD	in	3.85	3.75	3.76	3.80	3.85	3.94	4.05	4.18	4.30
Metallic Sheath										
Thickness	mil	60								
Diameter over sheath	in	4.24	4.14	4.15	4.18	4.23	4.34	4.45	4.58	4.70
Complete Cable										
Approximate Outside Diameter	in	4.64	4.54	4.55	4.59	4.64	4.74	4.85	4.98	5.10
Approximate Net Weight	lb/ft	10.1	10.4	11.2	11.9	12.8	14.6	16.3	18.2	19.8
Minimum Bending Radius	in	94	92	93	93	94	96	99	101	104
Maximum Pulling Tension	lb	8,000	10,000	12,000	14,000	16,000	20,000	24,000	28,000	31,576
Electrical Stress @ U_0										
Conductor Shield	kV/mm	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6
Insulation Shield	kV/mm	2.2	2.7	2.9	3.2	3.4	3.7	3.9	4.1	4.3
Short Circuit for 0.5 s										
Conductor	kA	66.5	83.2	99.8	116.4	133.0	166.3	199.6	232.8	262.6
Sheath	kA	62.2	60.7	60.9	61.5	62.2	63.7	65.4	67.3	69.1
Conductor Resistance										
dc @ 20 °C	Ω/kft	0.011	0.009	0.007	0.006	0.005	0.004	0.004	0.003	0.003
dc @ 90 °C	Ω/kft	0.013	0.011	0.009	0.008	0.007	0.005	0.005	0.004	0.003
Capacitance	pF/ft	29.0	34.8	37.0	41.6	43.7	49.4	53.7	57.7	61.8
Charging Current	A/kft	1.45	1.74	1.85	2.08	2.19	2.47	2.69	2.89	3.09
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	928	1047	1133	1220	1295	1549	1627	1823	1936
Double Circuit Bank	A	788	874	950	1015	1079	1283	1399	1499	1588

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

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, Ta = 20 °C.
5. Deep to top of ducts, 3 ft.
6. Ground Thermal Resistivity: 1° C·m/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

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