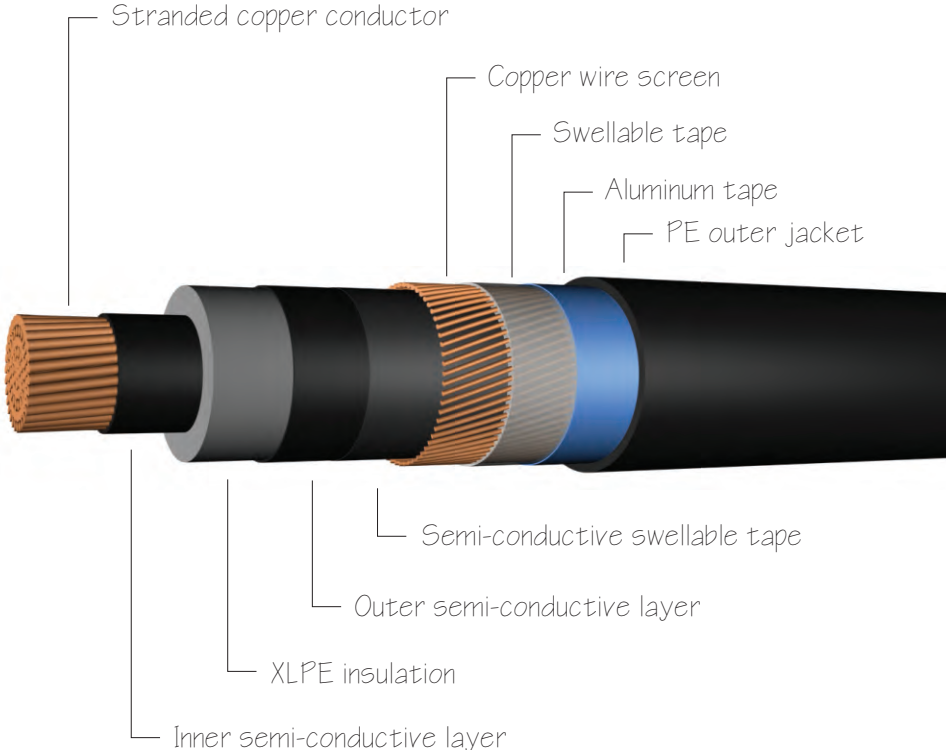


**high voltage Electrical Cables**

Insulated | Radial & Longitudinally Sealed | Single Core | Copper Conductor

**40/69 kV to  
127/220 kV  
XLPE**



# catalog | **h-VOLT**<sup>®</sup> | high voltage **Electrical Cables**

4SProducts Cable producing XLPE insulated Medium Voltage Power Cables since 2003, expanded its production range and started the producing of High Voltage Power Cables by CV method at its new production premises which have been completed in 2006. 4SProducts Cable will be able to produce HV Power Cables up to 220 kV in first line and up to 400 kV in second line. Both CV lines have been equipped by the latest most advanced technological machines and equipments. All processes from the wire input to final product are performed in the same premise because of full integrated plant characteristics. Thus, a continuous quality control is provided both in the raw material check and production stages very carefully.

Making production in compliance with such standards as VDE, IEC, BS and other international standards, 4SProducts has completed its product range after adding this new product of medium and high-voltage energy cables. XLPE insulated medium and high voltage power cables can be easily and safely used for underground networks and prevent the energy leakage and thus provide to transform the energy losses in to savings. XLPE that is one of the most preferred materials of cable industry is used as the insulation. The superior features provided to the product by XLPE is enumerated as follows:

The superior features provided to the product by XLPE is enumerated as follows:

- Power losses are minimum, almost zero
- High thermal strength and a long life
- High strength against serious temperature changes
- High strength against chemicals
- High mechanical resistance (strength against repeated bendings)
- Continuous current carrying capacity and high short circuit strength
- Smaller cable diameter and less cable weight
- No water absorption

The production is performed with CV (Continuous Vulcanization) method: In the CV method, the insulation of the medium and high voltage energy cables with aluminum and copper conductors is applied at the same time as that of the inner and outer semi conductor layers. The insulation materials are provided with vacuumed packages and treated with extrusion process by using such carriage, loading and drying systems with total automation. In this method, insulated cable is passed through a pressured hot tube with nitrogen gas. The temperature of the tube is between 200-450°C and the tube pressure is 10 bars. By this method, a new chemical structure is formed by adding peroxide into the polyethylene. The polyethylene molecules are disseminated and their molecular ties are strengthened. The forming of the insulation in this process gives a graphics depending on heat and time. As a result of this reaction, the thermoplastic materials are transformed into thermoset materials. After this stage, the cable is cooled by water and nitrogen gas. Then it is disclosed to the atmospheric pressure and coiled to the reels.

High Voltage cables produced by 4SProducts are certified by Kema who is well known, reliable, independent inspection authority.



**// Application**

These are cables with low dielectric losses used in energy networks with sudden load changes. Laid in residential or industrial areas, underground or in ducts. If the cable gets water inside due to mechanical damage, swellable tapes prevent the movement of the water inside the cable.

**// Construction**

1. Stranded copper conductor.
2. Inner semi-conductive layer.
3. XLPE insulation.
4. Outer semi-conductive layer.
5. Semi-conductive swellable tape.
6. Copper wire screen.
7. Swellable tape.
8. Aluminum tape.
9. PE outer jacket

**// Cable Summary**

Max. operating temperature	: 90°C
Max. short circuit temperature	: 250 °C
Rated voltage	: 40/69 kV
Min. bending radius	: 20 x D

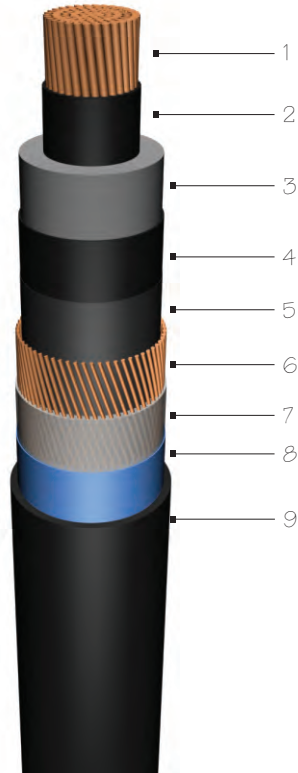
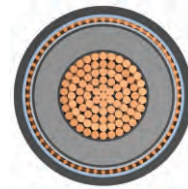
D = Cable outer diameter

**// Standards**

IEC 60840 | VDE 0276-632

**// Code**

2XS(FL)2Y, CU/XLPE/LW/CWS/LW/PE

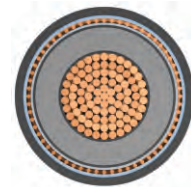


### Electrical Properties

DC Conductor Resistance @ 20 °C	Operation Capacitance (approx.)	Current Carrying Capacity			
		in Ground @ 20 °C	in Duct @ 20 °C	in Air @ 30 °C	in Air @ 30 °C
m	ohm/km	○○○	○○	○○○	○○
0.0754	0.18	530	483	692	606
0.0601	0.19	599	544	795	693
0.0470	0.21	683	616	925	802
0.0366	0.23	780	729	1075	929
0.0283	0.26	886	828	1247	1066
0.0221	0.28	997	929	1432	1210
0.0176	0.31	1173	1087	1728	1473
0.0151	0.33	1270	1173	1894	1611
0.0113	0.37	1465	1375	2245	1883
0.0090	0.41	1627	1530	2556	2111

### Dimensions & Weights

Nominal Cross Section	Overall Dia. (approx.)	Net Weight (approx.)
mm <sup>2</sup>	mm	kg/km
1 x 240	61.0	4700
1 x 300	63.0	5400
1 x 400	66.0	6300
1 x 500	70.0	7600
1 x 630	75.0	9000
1 x 800	79.0	10700
1 x 1000	84.0	12900
1 x 1200	90.0	15000
1 x 1600	95.0	18800
1 x 2000	102.0	22800



**// Application**

These are cables with low dielectric losses used in energy networks with sudden load changes. Laid in residential or industrial areas, underground or in ducts. If the cable gets water inside due to mechanical damage, swellable tapes prevent the movement of the water inside the cable.

**// Construction**

1. Stranded copper conductor.
2. Inner semi-conductive layer.
3. XLPE insulation.
4. Outer semi-conductive layer.
5. Semi-conductive swellable tape.
6. Copper wire screen.
7. Swellable tape.
8. Aluminum tape.
9. PE outer jacket

**// Cable Summary**

Max. operating temperature	: 90°C
Max. short circuit temperature	: 250 °C
Rated voltage	: 64/110 kV
Min. bending radius	: 20 x D

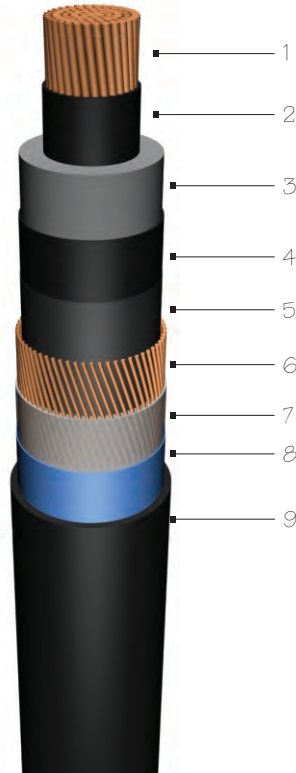
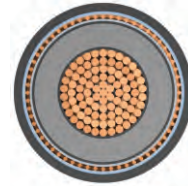
D = Cable outer diameter

**// Standards**

IEC 60840 | VDE 0276-632

**// Code**

2XS(FL)2Y, CU/XLPE/LW/CWS/LW/PE



### Electrical Properties

DC Conductor Resistance @ 20 °C	Operation Capacitance (approx.)	Current Carrying Capacity			
		in Ground @ 20 °C <sup>○○○</sup>	in Duct <sup>○○</sup> @ 20 °C	in Air <sup>○○○</sup> @ 30 °C	in Air <sup>○○</sup> @ 30 °C
m	ohm/km				
0.0754	0.18	528	495	682	605
0.0601	0.19	597	599	783	692
0.0470	0.21	681	650	909	800
0.0366	0.22	775	739	1503	922
0.0283	0.24	884	841	1226	1065
0.0221	0.26	994	945	1406	1208
0.0176	0.29	1169	1106	1695	1465
0.0151	0.31	1264	1231	1849	1595
0.0113	0.34	1456	1415	2185	1860
0.0090	0.41	1618	1570	2487	2089

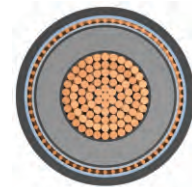
### Dimensions & Weights

Nominal Cross Section	Overall Dia. (approx.)	Net Weight (approx.)
mm <sup>2</sup>	mm	kg/km
1 x 240	68.0	5400
1 x 300	71.0	6100
1 x 400	74.0	7100
1 x 500	78.0	8400
1 x 630	82.0	9900
1 x 800	86.0	11600
1 x 1000	92.0	14000
1 x 1200	97.0	16000
1 x 1600	104.0	20000
1 x 2000	115.0	24000



Laying / Installation method:

Linear | ○○○  
Triangular | ○○



**// Application**

These are cables with low dielectric losses used in energy networks with sudden load changes. Laid in residential or industrial areas, underground or in ducts. If the cable gets water inside due to mechanical damage, swellable tapes prevent the movement of the water inside the cable.

**// Construction**

1. Stranded copper conductor.
2. Inner semi-conductive layer.
3. XLPE insulation.
4. Outer semi-conductive layer.
5. Semi-conductive swellable tape.
6. Copper wire screen.
7. Swellable tape.
8. Aluminum tape.
9. PE outer jacket

**// Cable Summary**

Max. operating temperature	: 90°C
Max. short circuit temperature	: 250 °C
Rated voltage	: 76/132 kV
Min. bending radius	: 20 x D

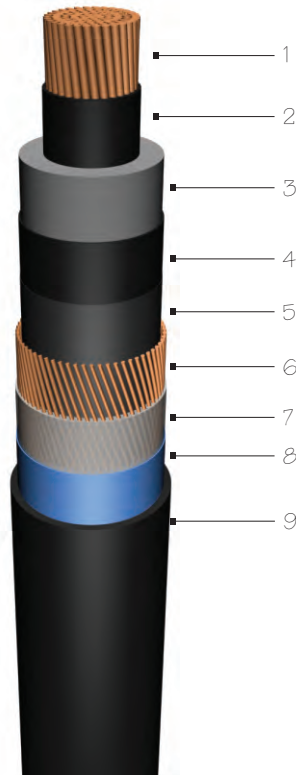
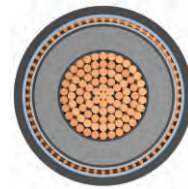
D = Cable outer diameter

**// Standards**

IEC 60840 | VDE 0276-632

**// Code**

2XS(FL)2Y, CU/XLPE/LW/CWS/LW/PE



### Electrical Properties

DC Conductor Resistance @ 20 °C	Operation Capacitance (approx.)	Current Carrying Capacity			
		in Ground @ 20 °C	in Duct @ 20 °C	in Air @ 30 °C	in Air @ 30 °C
m	ohm/km	○○○	○○	○○○	○○
0.0754	0.17	525	492	673	601
0.0601	0.18	593	555	774	688
0.0470	0.19	675	632	896	792
0.0366	0.21	767	716	1033	908
0.0283	0.22	872	811	1200	1045
0.0221	0.24	979	932	1374	1182
0.0176	0.26	1145	1087	1649	1420
0.0151	0.28	1233	1212	1801	1539
0.0113	0.31	1414	1388	2125	1784
0.0090	0.33	1569	1532	2418	2003

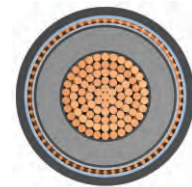
### Dimensions & Weights

Nominal Cross Section	Overall Dia. (approx.)	Net Weight (approx.)
mm <sup>2</sup>	mm	kg/km
1 x 240	76.0	7100
1 x 300	79.0	7800
1 x 400	82.0	8900
1 x 500	85.0	10000
1 x 630	89.0	11500
1 x 800	93.0	13500
1 x 1000	100.0	15500
1 x 1200	105.0	17500
1 x 1600	112.0	21500
1 x 2000	120.0	25800



Laying / Installation method:

Linear | ○○○  
Triangular | ○○





**// Application**

These are cables with low dielectric losses used in energy networks with sudden load changes. Laid in residential or industrial areas, underground or in ducts. If the cable gets water inside due to mechanical damage, swellable tapes prevent the movement of the water inside the cable.

**// Construction**

1. Stranded copper conductor.
2. Inner semi-conductive layer.
3. XLPE insulation.
4. Outer semi-conductive layer.
5. Semi-conductive swellable tape.
6. Copper wire screen.
7. Swellable tape.
8. Aluminum tape.
9. PE outer jacket

**// Cable Summary**

Max. operating temperature	: 90°C
Max. short circuit temperature	: 250 °C
Rated voltage	: 89/154 kV
Min. bending radius	: 20 x D

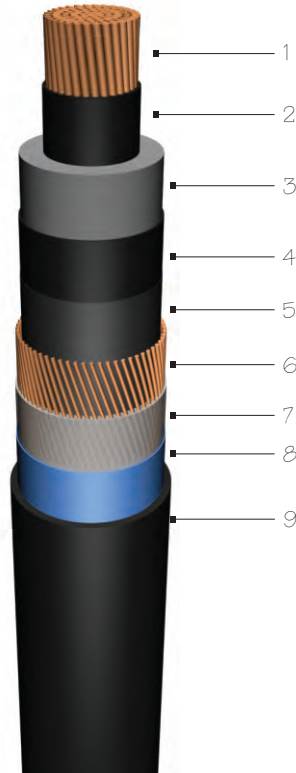
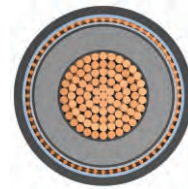
D = Cable outer diameter

**// Standards**

IEC 60840 | VDE 0276-632

**// Code**

2XS(FL)2Y, CU/XLPE/LW/CWS/LW/PE



### Electrical Properties

DC Conductor Resistance @ 20 °C	Operation Capacitance (approx.)	Current Carrying Capacity			
		in Ground @ 20 °C	in Duct @ 20 °C	in Air @ 30 °C	in Air @ 30 °C
m	ohm/km	○○○	○○	○○○	○○
-	-	-	-	-	-
0.0601	0.22	591	553	765	684
0.0470	0.24	673	629	887	789
0.0366	0.26	766	713	1027	907
0.0283	0.29	871	829	1193	1043
0.0221	0.31	977	928	1367	1181
0.0176	0.34	1143	1081	1639	1415
0.0151	0.37	1232	1208	1790	1535
0.0113	0.41	1404	1382	2100	1765
0.0090	0.45	1554	1523	2384	1973

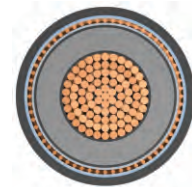
### Dimensions & Weights

Nominal Cross Section	Overall Dia. (approx.)	Net Weight (approx.)
mm <sup>2</sup>	mm	kg/km
-	-	-
1 x 300	85.0	8500
1 x 400	89.0	9600
1 x 500	93.0	10800
1 x 630	96.0	12400
1 x 800	102.0	14200
1 x 1000	106.0	16500
1 x 1200	110.0	18500
1 x 1600	118.0	22500
1 x 2000	126.0	26500



Laying / Installation method:

Linear | ○○○  
Triangular | ○○



**// Application**

These are cables with low dielectric losses used in energy networks with sudden load changes. Laid in residential or industrial areas, underground or in ducts. If the cable gets water inside due to mechanical damage, swellable tapes prevent the movement of the water inside the cable.

**// Construction**

1. Stranded copper conductor.
2. Inner semi-conductive layer.
3. XLPE insulation.
4. Outer semi-conductive layer.
5. Semi-conductive swellable tape.
6. Copper wire screen.
7. Swellable tape.
8. Aluminum tape.
9. PE outer jacket

**// Cable Summary**

Max. operating temperature	: 90°C
Max. short circuit temperature	: 250 °C
Rated voltage	: 127/220 kV
Min. bending radius	: 20 x D

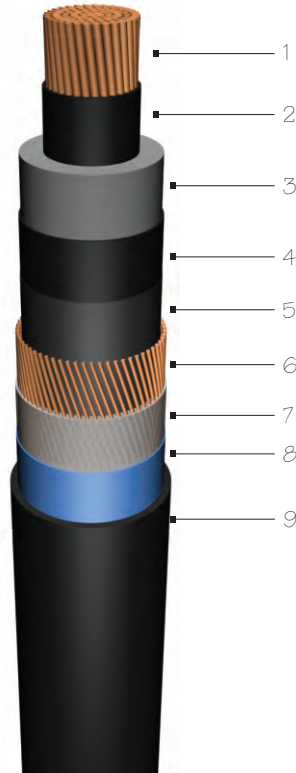
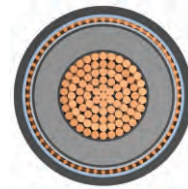
D = Cable outer diameter

**// Standards**

IEC 60840 | VDE 0276-632

**// Code**

2XS(FL)2Y, CU/XLPE/LW/CWS/LW/PE



### Electrical Properties

DC Conductor Resistance @ 20 °C	Operation Capacitance (approx.)	Current Carrying Capacity			
		in Ground @ 20 °C <sup>○○○</sup>	in Duct <sup>○○</sup> @ 20 °C	in Air <sup>○○○</sup> @ 30 °C	in Air <sup>○○</sup> @ 30 °C
m	ohm/km				
-	-	-	-	-	-
-	-	-	-	-	-
0.0470	0.15	668	634	863	779
0.0366	0.16	759	719	998	895
0.0283	0.18	864	842	1159	1031
0.0221	0.19	970	944	1326	1167
0.0176	0.21	1131	1100	1583	1390
0.0151	0.22	1221	1185	1733	1512
0.0113	0.24	1397	1354	2040	1750
0.0090	0.25	1543	1489	2309	1950

### Dimensions & Weights

Nominal Cross Section	Overall Dia. (approx.)	Net Weight (approx.)
mm <sup>2</sup>	mm	kg/km
-	-	-
-	-	-
1 x 400	94.0	10300
1 x 500	98.0	11500
1 x 630	102.0	13000
1 x 800	106.0	15000
1 x 1000	112.0	17500
1 x 1200	116.0	19500
1 x 1600	124.0	23700
1 x 2000	130.0	27800



Laying / Installation method:

Linear | ○○○  
Triangular | ○○

