



# LV/MV CABLE

LS Cable & System lights up the world



# THE WORLD BEST CABLE SOLUTION LEADER

LS Cable & System supplies various cables and materials used for power grids and communication networks around the world across all industries providing its top class technology and excellent quality. The company has also developed state of the art products, such as superconductors, HVDC and submarine cables that will lead the future energy industry.

**LS spun off from LG in 2003 as a group specializing in electronics, electrical systems, energy and materials.**



**LS** Cable & System

Transmission Cable  
Distribution Cable  
Submarine Cable  
Telecommunication Cable  
Industrial Cable  
Industrial Material

**LS**ELECTRIC

Electric &  
Automatic Equipments

**LS**-Nikko Copper

Copper Refinement

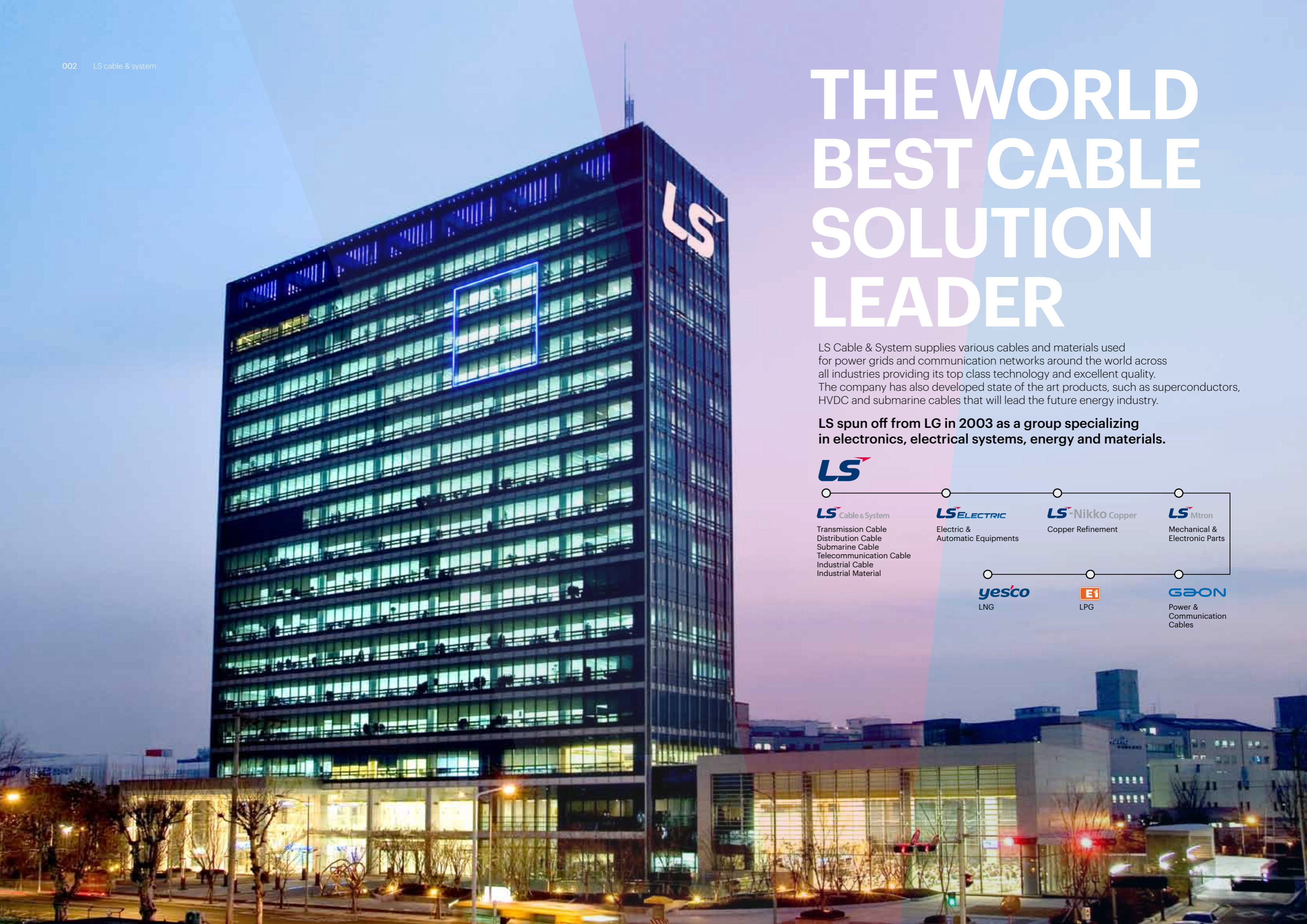
**LS** Mitron

Mechanical &  
Electronic Parts

**yesco**  
LNG

**E1**  
LPG

**GBON**  
Power &  
Communication  
Cables





# Contents

## LS LV/MV Cable

During last 15-20 years the demand for cross-linked polyethylene insulated cable has expanded rapidly and this type of cable has become the main type for power cables. LS Cable & System has actively developed and applied recent manufacturing techniques for XLPE insulated cable, and has been engaged in a constant effort to obtain more stable quality, and produce XLPE cables for higher voltages, exceeding 500kV. The products in this catalogue are based on the IEC Pub 502-1983 specification.

0.6/1 kV Power Cable	8	Maximum Conductor Resistance (in accordance with IEC 60228)	22
3.6/6 kV Power Cable	12	Current Carrying Capacity (in accordance with IEC 60287)	
6/10 kV Power Cable	14	Rating Factors	27
8.7/15 kV Power Cable	16	Type Test/Pre-Qualification Test Certificates & ISO Certificates	30
12/20 kV Power Cable	18		
18/30 kV Power Cable	20		

## Code Designation

The code designations for LS XLPE cable consist of the initial letter "C", to which the following letters indicating individual important component parts are added, starting from the insulation.

- C** : Cross-linked polyethylene insulation (XLPE)
- V** : PVC Inner covering or separation sheath or outer sheath
- AWA** : Aluminum Wire Armor(Single Core)
- WA** : Galvanized Steel Wire Armor
- TA** : Double Steel Tape Armor
- ATA** : Double Aluminum tape Armor(Single Core)

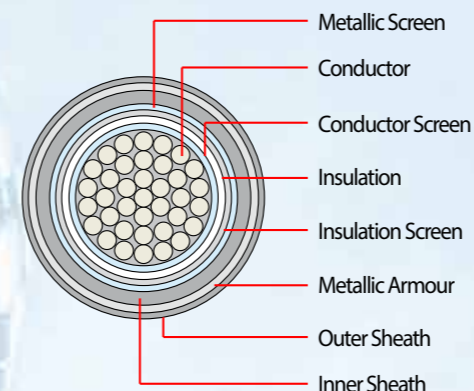
### Examples of cables with copper conductors.

- **1x95mm<sup>2</sup> 6/10kV CV**  
Single core screened cable with XLPE insulation, PVC outer sheath
- **3x95mm<sup>2</sup> 6/10kV CVWAV**  
Three core screened cable with XLPE insulation, PVC separation sheath, Galvanized steel wire armor and PVC sheath.
- **3x95mm<sup>2</sup> 6/10kV CVTAV**  
Three core screened cable with XLPE insulation, PVC separation sheath, double steel tape armor and PVC outer sheath.

## Design & Construction of XLPE Cable

### Structure of XLPE Cable

The XLPE Cable has the construction of a conductor (copper or aluminum) insulated with the cross-linked polyethylene and then shielded with metallic screen (corrugated and seamless aluminum or wire shield), to be covered by PVC (ST<sub>2</sub>), PE (ST<sub>7</sub>) or halogenfree (ST<sub>8</sub>) for anti-corrosion.



### Assembly

The assembly of multiple conductors shall be done by cabling together the required number of conductors with suitable fillers. The metallic shielding in multiple conductor cables are in contact with each other. A suitable binder tape shall be applied over the entire assembly.

### Metallic Armour

The armor is a single layer of round wires or double tapes. Material for the armor shall consist of galvanized steel or aluminum. The armor for single core cables for use on AC circuits shall consist of non-magnetic material (eg aluminum) due to the excessive losses induced by steel armor. When round wire or tape armor is required, in the case of single and multiple conductor cables, it shall be applied on extruded PVC an inner covering[not clear], if there is no screening.

Where the metal screening and the armor applied over the screening are of different metals, the two shall be separated by an extruded separation sheath.

When a tape armor is applied, the thickness of the inner covering shall be reinforced by a bedding tape. If a separating sheath is provided, the additional bedding tape is not necessary.

The tape armor shall be applied helically in two layers so that the outer tape is approximately centered over the gap of the inner tape. The gap between the adjacent turns of each layer of tape shall not exceed 50% of the width of the tape. The standard color of the inner covering and separation sheath shall be black.

### Outer Sheath

To protect the metallic sheath from electrical or chemical corrosion, it is covered by PVC (ST<sub>2</sub>), PE (ST<sub>7</sub>) or halogenfree (ST<sub>8</sub>)

### Core Identification

Multiple conductors shall be identified by color or numbering with a suitable method. The color code may be changed in any contract.

- For 0.6/1kV
  - Two core : Black, Red
  - Three core : Red, Yellow, Blue
  - Four core : Black, Red, Yellow, Blue
- For 3.6/6kV ~ 18/30kV
  - Three core : Red, Yellow, Blue or 1ONE. 2TWO. 3THREE.

### Cable Marking

The standard marking for all cables shall be shown on the external surface of the outer sheath with voltage designation, manufacturer's name, year of manufacture and others as required, with a suitable method.

### Test

The finished cable shall meet all the test requirements specified by IEC 60502, as applicable.

### Conductor

The conductor consists of annealed copper or hard aluminum stranded wires and classified into three (3) major types of concentric, compacted circular and segmental compacted circular.

The concentric is the wires wound up concentrically, the compacted circular conductor consists of segments wound up and then compacted. Normally the segmental compacted circular conductor has four (4) segments and is applied for the cross-section over than 800mm<sup>2</sup>, to prevent the increase of A.C. resistance caused by skin effect. When the conductor's cross-section is less than 800mm<sup>2</sup>, the compacted circular is applied generally.

### Conductor Screen

The conductor screen consists of an extruded semi-conducting polyethylene to minimize electrical stresses due to the stranded configuration of the conductor. The semi-conducting material used for conductor screen has no deleterious effect on the conductor. Semi-conducting tape is sometimes applied as a separator.

### Insulation

The insulation material is extruded cross-linked polyethylene. The conductor screen, the insulation and the insulation screen mentioned to the following clause are extruded simultaneously in one process to ensure that the screen and insulation are intimately bonded together and free from all possibilities of voids between layers.

The extrusion process is carried out under strictly controlled atmospheric conditions.

The thickness of the insulation layer is the maximum value figured out from the design of the impulse voltage and A.C. voltage.

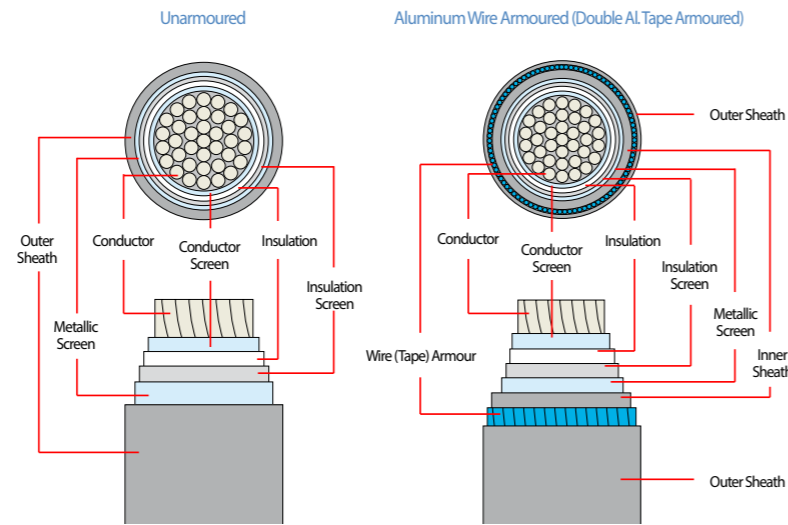
The conventional cross-linking process by saturated steam has frequently caused deterioration of the electrical characteristics of the insulation as treeing phenomena arose when put to use for long time. But the new process by N<sub>2</sub> gas has enabled to protect the electrical characteristics from being deteriorated and to lessen the thickness of the insulation and accordingly the cable's outer diameter itself.

### Insulation Screen

The insulation screen is provided over the insulation by extruding the semi-conducting compound concentrically and circularly to minimize the possibility of ionization on the outer surface of the dielectric.

# 0.6/1kV 1 Core XLPE Cable

# 0.6/1kV 2 Cores XLPE Cable



Construction Table (in accordance with IEC 60502-1, 61034 and 60754)

Nominal Cross-sectional Area	Approx. Outside Diameter of Conductor	Thickness of Insulation (nom.)	Thickness of Extruded Inner Covering		Diameter of Armour Wire (nom.)			Thickness of PVC Outer Sheath (nom.)			Approx. Overall Diameter			Approx. Weight of Cable						Nominal Drum Length							
			AWA*	DATA**	AWA*	DATA**	UnAr***	AWA*	DATA**	UnAr***	AWA*	DATA**	UnAr***	AWA*	DATA**	UnAr***	AWA*	DATA**	UnAr***	AWA*	DATA**	UnAr***	AWA*	DATA**	UnAr***	AWA*	DATA**
15	1.59	0.7	1.0	0.9	1.4	1.8	7	11	50	160				500	500												
25	2.01	0.7	1.0	0.9	1.4	1.8	7	11	65	170				500	500												
4	2.55	0.7	1.0	0.9	1.4	1.8	8	12	80	190				500	500												
6	3.12	0.7	1.0	0.9	1.4	1.8	8	12	110	240				500	500												
10	4.05	0.7	1.0	0.9	1.4	1.8	9	13	150	280				500	500												
16	4.7	0.7	1.0	1.0	0.9	0.5	1.4	1.8	1.8	10	14	14	210	340	320	120	250	220	500	500	500						
25	5.9	0.9	1.0	1.0	0.9	0.5	1.4	1.8	1.8	11	16	16	310	470	440	160	310	280	500	500	500						
35	6.9	0.9	1.0	1.0	0.9	0.5	1.4	1.8	1.8	12	17	17	410	580	540	200	360	330	500	500	500						
50	8.1	1.0	1.0	1.0	0.9	0.5	1.4	1.8	1.8	14	18	18	540	720	680	250	430	390	500	500	500						
70	9.8	1.1	1.0	1.0	0.9	0.5	1.4	1.8	1.8	16	20	20	750	960	910	330	530	490	500	500	500						
95	11.4	1.1	1.0	1.0	0.9	0.5	1.5	1.8	1.8	18	22	22	1,010	1,230	1,180	430	640	590	500	500	500						
120	12.8	1.2	1.0	1.0	1.6	0.5	1.5	1.8	1.8	19	25	23	1,270	1,610	1,450	520	860	700	500	500	500						
150	14.2	1.4	1.0	1.0	1.6	0.5	1.6	1.8	1.8	21	27	25	1,560	1,920	1,750	640	1,000	820	500	500	500						
185	15.8	1.6	1.0	1.0	1.6	0.5	1.6	1.8	1.8	23	29	27	1,940	2,330	2,140	780	1,170	980	500	500	500						
240	18.1	1.7	1.0	1.0	1.6	0.5	1.7	1.9	1.8	26	32	30	2,540	2,980	2,750	1,000	1,440	1,210	500	500	500						
300	20.4	1.8	1.0	1.0	1.6	0.5	1.8	2.0	1.9	29	34	33	3,160	3,630	3,390	1,230	1,700	1,450	500	500	500						
400	23.2	2.0	1.2	1.2	2.0	0.5	1.9	2.1	2.0	32	39	36	4,010	4,670	4,290	1,550	2,200	1,820	500	500	500						
500	26.3	2.2	1.2	1.2	2.0	0.5	2.0	2.2	2.2	36	43	42	5,110	5,840	5,630	1,950	2,670	2,460	500	500	500						
630	30.2	2.4	1.4		2.5		2.2	2.5		42	49		6,680	7,360		2,580	3,570		500								
800	34.0	2.6	1.4		2.5		2.3	2.7		46	54		8,450	9,240		3,200	4,320		500								
1,000	38.7	2.8	1.4		2.5		2.4	2.8		51	59		10,530	11,567		3,940	5,070		250								

16mm<sup>2</sup> to 800mm<sup>2</sup> are normal compact round for single and multi core cable.  
 800mm<sup>2</sup> and above are compact round segments for single core cable.  
 \*AWA : Aluminum Wire Armoured / \*\*DATA : Double Al. Tape Armoured / \*\*\*UnAr : Unarmoured  
 Only the halogen free cables shall be generally complied with IEC 61034 and 60754.

Construction Table (in accordance with IEC 60502-1, 61034 and 60754)

Nominal Cross-sectional Area	Approx. Outside Diameter of Conductor	Thickness of Insulation (nom.)	Thickness of Extruded Inner Covering		Diameter of Armour Wire (nom.)			Thickness of PVC Outer Sheath (nom.)			Approx. Overall Diameter			Approx. Weight of Cable						Nominal Drum Length				
			GSWA*	DSTA**	GSWA*	DSTA**	UnAr***	GSWA*	DSTA**	UnAr***	GSWA*	DSTA**	UnAr***	GSWA*	DSTA**	UnAr***	GSWA*	DSTA**	UnAr***	GSWA*	DSTA**	UnAr***	GSWA*	DSTA**
15	1.59	0.7	1.0	1.0	0.9	0.2	1.8	1.8	1.8	11	15	14	130	360	230				500	500	500			
25	2.01	0.7	1.0	1.0	0.9	0.2	1.8	1.8	1.8	12	15	15	170	430	320				500	500	500			
4	2.55	0.7	1.0	1.0	0.9	0.2	1.8	1.8	1.8	13	16	16	210	500	380				500	500	500			
6	3.12	0.7	1.0	1.0	0.9	0.2	1.8	1.8	1.8	14	17	17	280	570	440				500	500	500			
10	4.05	0.7	1.0	1.0	0.9	0.2	1.8	1.8	1.8	16	20	19	370	710	500				500	500	500			
16	4.7	0.7	1.0	1.0	0.9	0.2	1.8	1.8	1.8	17	21	21	500	850	630	300	650	430	500	500	500			
25	5.9	0.9	1.0	1.0	1.6	0.2	1.8	1.8	1.8	21	26	24	730	1,460	980	420	1,140	670	500	500	500			
35	6.9	0.9	1.0	1.0	1.6	0.2	1.8	1.8	1.8	23	28	26	960	1,750	1,220	530	1,310	790	500	500	500			
50	8.1	1.0	1.0	1.0	1.6	0.2	1.8	1.8	1.8	26	31	29	1,250	2,130	1,540	660	1,530	950	500	500	500			
70	9.8	1.1	1.0	1.0	1.6	0.2	1.8	2.0	1.9	29	35	33	1,730	2,760	2,080	870	1,910	1,220	500	500	500			
95	11.4	1.1	1.2	1.2	2.0	0.2	2.0	2.1	2.0	33	40	37	2,330	3,770	2,730	1,140	2,580	1,540	500	500	500			
120	12.8	1.2	1.2	1.2	2.0	0.5	2.1	2.2	2.2	37	43	43	2,920	4,530	3,870	1,400	3,010	2,350	500	500	500			
150	14.2	1.4	1.2	1.2	2.0	0.5	2.2	2.3	2.3	41	47	47	3,580	5,350	4,620	1,710	3,520	2,750	500	500	500			
185	15.8	1.6	1.4	1.4	2.5	0.5	2.3	2.5	2.4	45	53	52	4,450	6,940	5,640	2,110	4,600	3,300	500	500	500			
240	18.1	1.7	1.4	1.4	2.5	0.5	2.5	2.7	2.6	51	59	58	5,850	8,640	7,150	2,740	5,530	4,040	500	500	500			
300	20.4	1.8	1.6	1.6	2.5	0.5	2.7	2.8	2.8	57	65	63	7,270	10,440	8,730	3,360	6,530	4,830	500	250	500			
400	23.2	2.0	1.6	1.6	2.5	0.5	2.9	3.1	3.0	63	71	70	9,170	12,740	10,820	4,180	7,760	5,840	500	250	250			

16mm<sup>2</sup> to 800mm<sup>2</sup> are normal compact round for single and multi core cable.  
 800mm<sup>2</sup> and above are compact round segments for single core cable.  
 \*GSWA : Galvanized Steel Wire Armoured / \*\*DSTA : Double Steel Tape Armoured / \*\*\*UnAr : Unarmoured  
 Only the halogen free cables shall be generally complied with IEC 61034 and 60754.



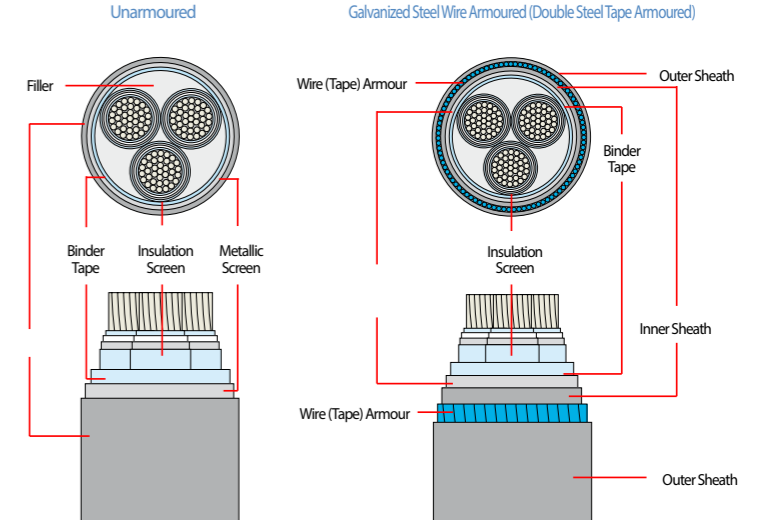
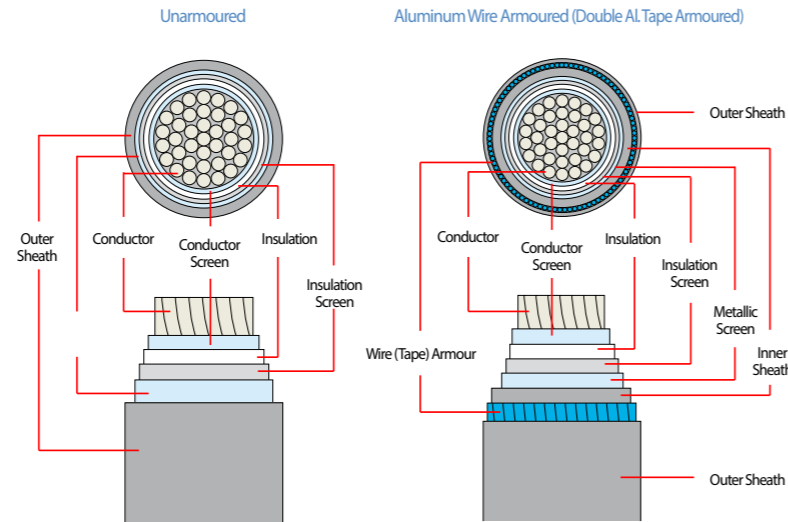






## 8.7/15kV 1 Core XLPE Cable

## 8.7/15kV 3 Cores XLPE Cable



Construction Table (in accordance with IEC 60502-2, 61034 and 60754)

Nominal Cross-sectional Area	Approx. Outside Diameter of Conductor	Thickness of Insulation (nom.)	Thickness of Extruded Inner Covering		Diameter of Armour Wire (nom.)		Thickness of PVC Outer Sheath (nom.)			Approx. Overall Diameter			Approx. Weight of Cable						Nominal Drum Length		
			AWA	DATA	AWA	DATA	UnAr	AWA	DATA	Copper Conductor			Aluminum Conductor			UnAr	AWA	DATA	UnAr	AWA	DATA
										UnAr	AWA	DATA	UnAr	AWA	DATA						
25	5.9	4.5	1.2	1.2	1.6	0.5	1.6	1.8	1.8	22	28	26	70	1,070	870	520	910	710	500	500	500
35	6.9	4.5	1.2	1.2	1.6	0.5	1.7	1.9	1.8	24	29	27	800	1,210	990	590	1,000	780	500	500	500
50	8.1	4.5	1.2	1.2	1.6	0.5	1.7	1.9	1.8	25	30	28	950	1,380	1,150	660	1,090	860	500	500	500
70	9.8	4.5	1.2	1.2	1.6	0.5	1.7	1.9	1.9	26	32	30	1,190	1,640	1,410	770	1,220	990	500	500	500
95	11.4	4.5	1.2	1.2	2.0	0.5	1.8	2.0	1.9	28	35	31	1,490	2,070	1,720	900	1,480	1,130	500	500	500
120	12.8	4.5	1.2	1.2	2.0	0.5	1.9	2.1	2.0	30	37	33	1,790	2,390	2,020	1,030	1,640	1,270	500	500	500
150	14.2	4.5	1.2	1.2	2.0	0.5	1.9	2.1	2.0	32	38	35	2,080	2,710	2,330	1,150	1,780	1,410	500	500	500
185	15.8	4.5	1.2	1.2	2.0	0.5	2.0	2.2	2.1	33	40	36	2,490	3,150	2,740	1,330	1,990	1,580	500	500	500
240	18.1	4.5	1.2	1.2	2.0	0.5	2.0	2.3	2.2	36	43	41	3,130	3,870	3,590	1,590	2,330	2,050	500	500	500
300	20.4	4.5	1.2	1.2	2.0	0.5	2.1	2.3	2.3	39	45	43	3,790	4,550	4,270	1,850	2,610	2,330	500	500	500
400	23.2	4.5	1.3	1.3	2.5	0.5	2.2	2.5	2.4	43	49	46	4,670	5,690	5,210	2,200	3,220	2,740	500	500	500
500	26.3	4.5	1.3	1.3	2.5	0.5	2.3	2.6	2.5	45	53	50	5,800	6,960	6,380	2,630	3,800	3,210	500	500	500
630	30.2	4.5	1.4	1.4	2.5	0.5	2.4	2.6	2.6	50	58	55	7,390	9,550	8,800	3,290	5,760	5,000	500	500	500
800	34.0	4.5	1.4	1.4	2.5	0.5	2.5	2.8	2.7	54	62	60	9,180	11,550	10,600	3,930	6,630	5,700	500	500	500
1,000	38.7	4.5	1.6	1.6	2.5	0.5	2.7	3.0	2.9	58	67	65	11,310	14,190	13,000	4,720	7,700	6,700	250	250	250

16mm<sup>2</sup> to 800mm<sup>2</sup> are normal compact round for single and multi core cable.  
 800mm<sup>2</sup> and above are compact round segments for single core cable.  
 \*AWA : Aluminum Wire Armoured / \*\*DATA : Double Al. Tape Armoured / \*\*\*UnAr : Unarmoured  
 Only the halogen free cables shall be generally complied with IEC 61034 and 60754.

Construction Table (in accordance with IEC 60502-2, 61034 and 60754)

Nominal Cross-sectional Area	Approx. Outside Diameter of Conductor	Thickness of Insulation (nom.)	Thickness of Extruded Inner Covering		Diameter of Armour Wire (nom.)		Thickness of PVC Outer Sheath (nom.)			Approx. Overall Diameter			Approx. Weight of Cable						Nominal Drum Length		
			GSA	DSTA	GSA	DSTA	UnAr	GSA	DSTA	UnAr	GSA	DSTA	Copper Conductor			Aluminum Conductor			UnAr	GSA	DSTA
													UnAr	GSA	DSTA	UnAr	GSA	DSTA			
25	5.9	4.5	1.4	1.4	2.5	0.5	2.4	2.6	2.5	45	53	49	2,280	4,770	3,420	1,810	4,310	2,950	500	500	500
35	6.9	4.5	1.4	1.4	2.5	0.5	2.4	2.7	2.6	47	55	52	2,680	5,330	3,900	2,030	4,680	3,340	500	500	500
50	8.1	4.5	1.5	1.5	2.5	0.5	2.5	2.8	2.7	50	58	55	3,190	6,020	4,500	2,290	5,120	3,610	500	500	500
70	9.8	4.5	1.5	1.5	2.5	0.5	2.7	2.9	2.8	54	62	59	4,030	7,060	5,410	2,740	5,780	4,120	500	500	500
95	11.4	4.5	1.6	1.6	2.5	0.5	2.8	3.1	3.0	58	66	63	5,000	8,270	6,530	3,210	6,490	4,740	500	500	500
120	12.8	4.5	1.7	1.7	2.5	0.5	2.9	3.2	3.1	61	70	66	5,930	9,430	7,580	3,660	7,150	5,310	500	500	500
150	14.2	4.5	1.7	1.7	3.15	0.5	3.0	3.3	3.2	64	74	70	6,920	11,470	8,650	4,110	8,670	5,840	500	500	500
185	15.8	4.5	1.8	1.8	3.15	0.5	3.1	3.4	3.3	68	78	74	8,190	13,070	10,060	4,680	9,560	6,550	500	250	250
240	18.1	4.5	1.9	1.9	3.15	0.5	3.3	3.6	3.5	75	85	80	10,390	15,800	12,460	5,720	11,140	7,800	250	250	250
300	20.4	4.5	2.0	2.0	3.15	0.8	3.4	3.8	3.7	80	90	87	12,470	18,270	15,720	6,610	12,410	9,860	250	250	250
400	23.2	4.5	2.1	2.1	3.15	0.8	3.6	4.0	3.9	86	98	93	15,330	21,800	18,860	7,850	14,320	11,380	250	250	250

16mm<sup>2</sup> to 800mm<sup>2</sup> are normal compact round for single and multi core cable.  
 800mm<sup>2</sup> and above are compact round segments for single core cable.  
 \*GSA : Galvanized Steel Wire Armoured / \*\*DSTA : Double Steel Tape Armoured / \*\*\*UnAr : Unarmoured  
 Only the halogen free cables shall be generally complied with IEC 61034 and 60754.





## Maximum Conductor Resistance (in accordance with IEC 60228)

## Current Carrying Capacity (in accordance with IEC 60287)

### Stranded Conductors for 1 Core and Multi Core Cables

Nominal Cross-sectional Area mm <sup>2</sup>	Maximum Conductor Resistance Ω/km	
	Copper	Aluminum
1.5	121	
25	7.41	
4	4.61	
6	3.08	
10	1.83	
16	1.15	1.91
25	0.727	1.20
35	0.524	0.868
50	0.387	0.641
70	0.268	0.443
95	0.193	0.320
120	0.153	0.253
150	0.124	0.206
185	0.0991	0.164
240	0.0754	0.125
300	0.0601	0.100
400	0.0470	0.0778
500	0.0366	0.0605
630	0.0283	0.0469
800	0.0221	0.0367
1,000	0.0176	0.0291

16mm<sup>2</sup> to 800mm<sup>2</sup> may be normal compact round for single and multi core cable.  
800mm<sup>2</sup> and above are compact round segments for single core cable.

The current carrying capacity is calculated according to the following conditions. One multi-conductor cable or one three phase group of single core cables.

Temperature of the ground : 25°C

Temperature of ambient air : 40°C

Laying depth : 1.4m

Thermal resistivity of the ground : 1.0°C m/w

Spacing between cables laid in flat formation: twice the cable's overall dia.

When conditions differ from these, the actual ratings are obtained by multiplying the values from table 1-6 by the rating factors from tables 7-13.

Table 1. 0.6/1KV Copper, Aluminum Conductor XLPE Insulated Cable

Conductor Size mm <sup>2</sup>	1 Core Cable								3 Core Cable							
	In Air				In Direct Burial (Underground)				In Air				In Direct Burial (Underground)			
	Flat		Trefoil		Flat		Trefoil		Unarmoured Cable		Armoured Cable		Unarmoured Cable		Armoured Cable	
	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum
15	25		20		35		30		20		20		30		30	
25	30		25		45		40		25		25		40		40	
4	45	35	35	30	60	50	55	45	35	30	35	30	50	40	50	40
6	55	45	45	35	70	55	65	50	45	35	40	35	65	55	60	50
10	75	60	60	50	95	75	90	70	60	50	55	45	85	70	105	65
16	100	80	85	70	125	100	120	95	80	65	75	60	110	90	105	85
25	140	115	115	95	160	130	150	120	110	90	105	85	145	120	140	115
35	175	140	140	115	190	150	180	145	135	110	125	100	170	140	165	135
50	210	170	170	135	225	180	215	175	165	135	155	125	205	165	195	155
70	270	215	220	175	280	225	265	215	210	170	200	160	250	200	240	195
95	340	275	275	220	335	270	315	250	265	215	245	200	300	240	285	230
120	400	320	320	255	380	305	360	290	310	250	285	230	340	275	325	260
150	460	370	375	300	425	340	400	320	355	285	330	265	385	310	365	295
185	540	435	435	350	485	390	455	365	415	335	380	305	435	350	410	330
240	650	520	525	420	565	455	530	425	495	400	450	360	500	400	475	380
300	755	605	610	490	640	515	595	475	570	460	520	415	565	455	535	430
400	900	720	720	575	730	585	675	540	665	535	600	480	640	515	600	480
500	1,040	835	830	665	825	660	750	600								
630	1,215	975	960	770	940	755	840	675								
800	1,410	1,130	1,095	875	1,060	850	930	745								
1,000	1,610	1,290	1,230	985	1,180	945	1,015	815								

## Current Carrying Capacity (in accordance with IEC 60287)

## Current Carrying Capacity (in accordance with IEC 60287)

Table 2. 3.6/6KV Copper, Aluminium Conductor XLPE Insulated Cable

Conductor Size mm <sup>2</sup>	1 Core Cable								3 Core Cable							
	In Air				In Direct Burial (Underground)				In Air				In Direct Burial (Underground)			
	Flat		Trefoil		Flat		Trefoil		Unarmoured Cable		Armoured Cable		Unarmoured Cable		Armoured Cable	
	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum
10	90	75	75	60	95	80	90	75	75	60	75	60	90	75	90	75
16	115	95	95	80	120	100	115	95	100	80	100	80	115	95	115	95
25	155	125	130	105	155	125	150	120	130	105	130	105	150	120	145	120
35	190	155	155	125	185	150	175	140	160	130	155	125	175	140	170	140
50	225	180	190	155	215	175	210	170	190	155	190	155	210	170	200	160
70	285	230	235	190	265	215	255	205	240	195	235	190	255	205	245	200
95	355	285	295	240	320	260	305	245	300	240	310	250	305	245	300	240
120	415	335	340	275	360	290	345	280	345	280	355	285	345	280	340	275
150	475	380	390	315	405	325	385	310	395	320	405	325	385	310	380	305
185	550	440	450	360	460	370	435	350	455	365	465	375	435	350	425	340
240	660	530	540	435	530	425	500	400	545	440	545	440	500	400	485	390
300	765	615	625	500	600	480	565	455	625	500	615	495	565	455	535	430
400	900	720	735	590	690	555	640	515	730	585	700	560	635	510	595	480
500	1,045	840	850	680	775	620	715	575								
630	1,220	960	975	780	885	710	800	640								
800	1,410	1,130	1,110	890	995	800	885	710								
1,000	1,600	1,280	1,245	1,000	1,100	880	960	770								

Table 3. 6/10KV Copper, Aluminium Conductor XLPE Insulated Cable

Conductor Size mm <sup>2</sup>	1 Core Cable								3 Core Cable							
	In Air				In Direct Burial (Underground)				In Air				In Direct Burial (Underground)			
	Flat		Trefoil		Flat		Trefoil		Unarmoured Cable		Armoured Cable		Unarmoured Cable		Armoured Cable	
	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum
16	120	100	100	80	120	100	115	95	105	85	100	80	115	95	115	95
25	160	130	135	110	155	125	150	120	140	115	135	110	150	120	145	120
35	195	160	160	130	185	150	175	140	165	135	165	135	180	145	175	140
50	235	190	195	160	215	175	210	170	200	160	195	160	210	170	205	165
70	295	240	245	200	265	215	255	205	250	200	260	210	255	205	250	200
95	360	290	300	240	320	260	305	245	305	245	315	255	305	245	300	240
120	420	340	350	280	360	290	345	280	355	285	365	295	345	280	340	275
150	480	385	400	320	405	325	385	310	405	325	410	330	385	310	375	300
185	555	445	460	370	460	370	435	350	465	375	465	375	435	350	420	340
240	660	530	550	440	530	425	500	400	550	440	545	440	505	405	480	385
300	765	615	635	510	600	480	565	455	635	510	615	495	565	455	535	430
400	900	720	740	595	690	555	640	515	740	595	700	560	640	515	595	480
500	1,045	840	850	680	775	620	715	575								
630	1,220	980	980	785	880	705	800	640								
800	1,410	1,130	1,115	895	990	795	885	710								
1,000	1,600	1,280	1,245	1,000	1,100	880	960	770								

Table 4. 8.7/15KV Copper, Aluminium Conductor XLPE Insulated Cable

Conductor Size mm <sup>2</sup>	1 Core Cable								3 Core Cable							
	In Air				In Direct Burial (Underground)				In Air				In Direct Burial (Underground)			
	Flat		Trefoil		Flat		Trefoil		Unarmoured Cable		Armoured Cable		Unarmoured Cable		Armoured Cable	
	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum
25	165	135	140	115	155	125	150	120	145	120	150	120	150	120	150	120
35	200	160	170	140	185	150	175	140	175	140	180	145	180	145	175	140
50	240	195	205	165	220	180	210	170	210	170	215	175	210	170	210	170
70	300	240	255	205	265	215	255	205	260	210	265	215	255	205	255	205
95	370	300	310	250	320	260	305	245	320	260	320	260	305	245	300	240
120	425	340	360	290	360	290	345	280	365	295	365	295	345	280	340	275
150	485	390	410	330	405	325	385	310	415	335	415	335	390	315	375	300
185	560	450	475	380	460	370	435	350	480	385	470	380	435	350	420	340
240	670	540	560	450	535	430	505	405	565	455	550	440	505	405	480	385
300	770	620	645	520	605	485	565	455	650	520	620	500	570	460	535	430
400	905	725	755	605	690	555	645	520	755	605	705	565	645	520	590	475
500	1,045	840	865	695	775	620	770	620								
630	1,215	975	995	800	885	710	805	645								
800	1,405	1,125	1,135	910	995	800	895	720								
1,000	1,595	1,280	1,265	1,015	1,105	885	975	780								

## Current Carrying Capacity (in accordance with IEC 60287)

## Rating Factors for Cables in the Ground

Table 5. 12/20KV Copper, Aluminium Conductor XLPE Insulated Cable

Conductor Size mm <sup>2</sup>	1 Core Cable								3 Core Cable							
	In Air				In Direct Burial (Underground)				In Air				In Direct Burial (Underground)			
	Flat		Trefoil		Flat		Trefoil		Unarmoured Cable		Armoured Cable		Unarmoured Cable		Armoured Cable	
	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum
35	200	160	175	140	185	150	175	140	180	145	185	150	180	145	175	140
50	250	195	210	170	220	180	210	170	215	175	220	180	210	170	210	170
70	305	245	260	210	265	215	255	205	265	215	270	220	255	205	255	205
95	370	300	315	255	320	260	305	245	325	260	325	260	305	245	300	240
120	430	345	365	295	360	290	345	280	370	300	370	300	345	280	340	275
150	490	395	415	335	405	325	385	310	420	340	420	340	390	315	375	300
185	560	450	480	385	460	370	435	350	485	390	475	380	440	355	420	340
240	670	540	570	460	535	430	505	405	570	460	555	445	505	405	480	385
300	770	620	655	525	605	485	565	455	655	525	625	500	570	460	535	430
400	905	725	760	610	690	555	645	520	760	610	705	565	645	520	590	475
500	1,045	840	875	700	780	625	720	580								
630	1,215	975	1,005	805	885	710	810	650								
800	1,400	1,120	1,145	920	995	800	900	720								
1,000	1,590	1,275	1,280	1,025	1,105	885	980	785								

Table 7. Rating Factors for Depth of Laying

Depth of Laying, (m)	0.6/1kV ~ 1.8/30kV
0.50 ~ 0.70	1.09
0.71 ~ 0.90	1.05
0.91 ~ 1.10	1.03
1.11 ~ 1.30	1.01
1.31 ~ 1.50	1.0

Table 8. Rating Factors for Ground Temperature

Ground Temperature (°C)	10	15	20	25	30	35	40	45
Rating Factors	1.11	1.08	1.04	1.0	0.96	0.91	0.87	0.83

Table 9. Rating Factors Thermal Resistivity of Ground

Thermal Resistivity °C m/W	0.7	1.0	1.2	1.5	2.0	2.5	3.0	3.5
Rating Factors	1.14	1.00	0.93	0.84	0.74	0.67	0.61	0.55

Table 6. 18/30KV Copper, Aluminium Conductor XLPE Insulated Cable

Conductor Size mm <sup>2</sup>	1 Core Cable								3 Core Cable							
	In Air				In Direct Burial (Underground)				In Air				In Direct Burial (Underground)			
	Flat		Trefoil		Flat		Trefoil		Unarmoured Cable		Armoured Cable		Unarmoured Cable		Armoured Cable	
	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum	Copper	Aluminum
50	245	200	215	175	220	180	210	170	220	180	225	180	210	170	210	170
70	310	250	270	220	265	215	255	205	275	220	275	220	260	210	255	205
95	375	300	325	260	320	260	305	245	330	265	330	265	305	245	300	240
120	430	345	375	300	360	290	345	280	380	305	375	300	350	280	340	275
150	490	395	425	340	405	325	385	310	435	350	425	340	390	315	375	300
185	565	455	490	395	460	370	435	350	495	400	480	385	440	355	420	340
240	670	540	580	465	535	430	505	405	580	465	555	445	510	410	480	385
300	770	620	665	535	600	480	570	460	665	535	625	500	570	460	530	425
400	900	720	770	620	690	555	645	520	770	620	710	570	650	520	590	475
500	1,040	835	985	710	780	625	725	580								
630	1,205	965	1,020	820	885	710	815	655								
800	1,390	1,115	1,160	930	1,000	800	905	725								
1,000	1,575	1,260	1,295	1,040	1,105	885	990	885								

Table 10. Group Rating Factors for Multi Core XLPE Cable in Flat Formation in Ground

Spacing	No. of Cables in Same Trench						
	2	3	4	5	6	8	10
Touching	0.79	0.69	0.63	0.58	0.55	0.50	0.46
0.07m	0.85	0.75	0.68	0.64	0.60	0.56	0.53
0.25m	0.87	0.79	0.75	0.72	0.69	0.66	0.64

The factors given in the above table can also be applied to several circuits of three single core cables in the same trench.

## Rating Factor for Cables in Pipes

The current ratings in tables 1-6 for cables laid in the ground shall be reduced by a rating factor of 0.80 if the cable is laid in an unfilled pipe of PVC or PE in the ground. The pipe diameter is assumed to be 2-5 times that of the cable. It is however possible to eliminate this rating reduction by filling the pipe, after the cable has been pulled in, with a material which is thermally equal to the ambient ground.

For parallel pipes, each containing a three-core cable or a group of three single core cables and with the cables equally loaded, the current ratings are decreased by using the following rating factors.

Table 11. Rating Factors for Cables in Pipes

Spacing	Number of pipes							
	1	2	3	4	5	6	8	10
Touching	0.80	0.75	0.65	0.60	0.60	0.55	0.55	0.50
0.07m		0.75	0.70	0.65	0.60	0.60	0.55	0.55
0.25m		0.75	0.70	0.70	0.70	0.65	0.65	0.65

If the factors in this table are used, the factors according to table 10 are not applicable.

## Rating Factor for Cables in Air

Table 12. Rating Factors for Cables in Air

Ambient Air Temperature (°C)	20	25	30	35	40	45	50
Rating Factors	1.18	1.14	1.10	1.05	1.00	0.95	0.90

## Rating Factors for Cables on Trays, Ladders, or Building Structures


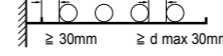
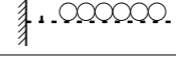
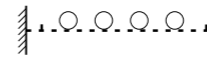
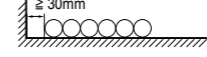
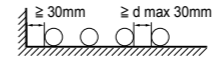
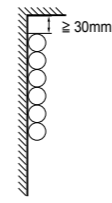
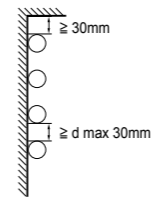
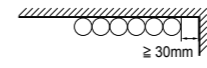
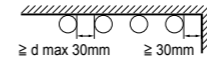
By cable ladder is meant a tray or similar with not more than 10% supporting structure.

The table values refer to cables laid in one layer, touching, or with a spacing of at least the cable diameter, (but max. 30mm).

The spacing between cable and wall, ceiling, floor or edge of tray (ladder) shall be at least 30mm.

The vertical distance between trays (ladders), tray and ceiling respectively tray and floor shall be at least 0.3m.

Table 13. Rating Factors for Cables on Trays, Ladders, or Building Structures

Type of Laying	Number of Ladders or Trays	Number of Cables			
		1	2	3	
On Metal Tray	Touching 	1	0.97	0.85	0.74
	$\geq 2$	0.97	0.84	0.71	
with Spacing 	1	0.97	0.96	0.93	
	$\geq 2$	0.97	0.94	0.90	
On Metal Ladder	Touching 	1	1.00	0.87	0.74
	$\geq 2$	1.00	0.86	0.71	
with Spacing 	1	1.00	1.00	1.00	
	$\geq 2$	1.00	1.00	1.00	
On Floor	Touching 		0.94	0.80	0.66
	with Spacing 		0.94	0.90	0.87
On Wall	Touching 		0.94	0.80	0.66
	with Spacing 		0.94	0.90	0.87
In Ceiling	Touching 		0.89	0.76	0.57
	with Spacing 		0.89	0.81	0.77

# Type Test/Pre-Qualification Test Certificates

# ISO Certificates



The reliability of XLPE cable systems are fully verified by internationally accredited independent laboratories, KEMA (Netherlands), CESI (Italy), Kinetrics (Canada) and KERI (Korea).

## Certificates for XLPE cable system over 345kV

Year	Voltage Grade	Spec.	Test Items	Certificate Issued by	Test
1999	400kV, 1200mm <sup>2</sup>	IEC62067	Cable, PJ, GIS & Outdoor Termination	KEMA	Type Test
2000	132kV, 630mm <sup>2</sup>	IEC60840	Cable, PMJ, GIS & Outdoor Termination	KEMA	Type Test
2001	230kV, 1200mm <sup>2</sup>	IEC62067	Cable, PMJ, GIS & Outdoor Termination	KEMA	Type Test
	345kV, 2000mm <sup>2</sup>		Cable, PJ, GIS & Outdoor Termination	KERI(KEPCO)	Type Test
2002	345kV, 2000mm <sup>2</sup>	IEC62067	Cable, PJ, GIS & Outdoor Termination	KERI(KEPCO)	PQ
	400kV, 1200mm <sup>2</sup>		Cable, PJ, GIS & Outdoor Termination	KEMA	PQ
2003	345kV, 2500mm <sup>2</sup>	IEC62067	Cable, PJ, GIS & Outdoor Termination	KEMA	Type Test
2004	345kV, 2500mm <sup>2</sup>	IEC62067	Cable, GIS & Outdoor Termination	KEMA	PQ
	400kV, 2500mm <sup>2</sup>		Cable, PMJ, GIS & Outdoor Termination	KEMA	Type Test



We do what it takes to earn quality certifications like ISO 14001, ISO 9001, and ISO/TS 16949 which sets standards for process control and manufacturing flow.



# BUSINESS AREAS

LS Cable & System supplies various cables and materials used for power grids and communication networks around the world across all industries providing its top class technology and excellent quality. The company has also developed state of the art products, such as superconductors, HVDC and submarine cables that will lead the future energy industry

## Energy

- Extra High Voltage Cable / HVDC Cable
- Super Conducting Cable
- Submarine Cable
- High Capacity Conductor
- Flame Retardant Water Resistance Cable
- Bus Duct



## Telecommunication

- Optical Cable
- Structured Cabling System
- RF Feeder System

## Industrial Materials

- Copper Rod
- Magnetic Wire



## Industrial Cable

- Industrial Devices & FA Cable
- Automotive Wire & Cable, Tubes
- Marine & Offshore Cable
- Railway & Rolling Stock Cable
- Wind Power & Photovoltaic Cable

# GLOBAL NETWORK

More than 60 Factories,  
Sales and Production Sites  
in 20 Countries.

- Factory
- Sales office
- Branch office



## KOREA



**Gumi Plant**  
EHV / MV / LV cable  
UTP, Coaxial cable  
SCR, Magnet wire  
Overhead cable, Bus duct



**Indong Plant**  
Optical fiber  
Optical cable



**Donghae Plant**  
Submarine cable  
Industrial specialty cable

## CHINA



**LSHQ(Yichang)**  
EHV / MV / LV cable  
Industrial specialty cable



**LSCW(Wuxi)**  
Industrial devices cable  
Automotive cable  
Harness & module  
Aluminum, Bus duct

## VIETNAM



**LS-VINA(Haiphong)**  
EHV / MV / LV cable  
SCR, ACSR  
Overhead cable



**LSCV(HO Chi Minh)**  
MV / LV cable  
UTP, Optical cable  
Overhead cable

## INDIA



**LSCI(Bawal)**  
EHV / MV / LV cable  
Coaxial cable  
Overhead cable

## USA



**LSCUS(Tarboro)**  
MV / LV cable  
Control, Instrument cable

## POLAND



**LS EV Poland./LSCP (Dzierzoniow)**  
Automotive battery components  
Optical cable



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