

XLPE INSULATED CABLES



Need Power Connections? We Have The Solutions!

TABLE		REFERENCE	SPECIFICATION
LOW VOLTAGE XLPE INSULATED POWER CABLES			
1A	Single-Core 600/1000V Unarmoured Cables (Copper Conductor)	12A-1N	BS 5467 / IEC 60502-1
1B	Single-Core 600/1000V Armoured Cables (Copper Conductor)	12A-1A	BS 5467 / IEC 60502-1
2A	Two-Core 600/1000V Unarmoured Cables (Copper Conductor)	12-2N	BS5467 / IEC 60502-1
2B	Two-Core 600/1000V Armoured Cables (Copper Conductor)	12-2S	BS5467 / IEC 60502-1
3A	Three-Core 600/1000V Unarmoured Cables (Copper Conductor)	12-3N	BS5467 / IEC 60502-1
3B	Three-Core 600/1000V Armoured Cables (Copper Conductor)	12-3S	BS5467 / IEC 60502-1
4A	Four-Core 600/1000V Unarmoured Cables (Copper Conductor)	12-4N	BS5467 / IEC 60502-1
4B	Four-Core 600/1000V Armoured Cables (Copper Conductor)	12-4S	BS5467 / IEC 60502-1
4C	Four-Core 600/1000V Armoured Cables (Aluminium Conductor)	T13-4S	BS5467 / IEC 60502-1
4D	Four-Core 600/1000V Copper Tapes Screened Cables (Aluminium Conductor)	T13-4C	TNB Specification

MEDIUM VOLTAGE XLPE INSULATED POWER CABLES			
5A	Single Core 6kV Unarmoured Cables (Copper Conductor)	TC-6-1-N	TNB Specification
6A	Single Core 11kV Unarmoured Cables (Copper Conductor)	GC-11-1-N	BS 6622 / IEC 60502-2
6B	Single Core 11kV Armoured Cables (Copper Conductor)	GC-11-1-A	BS 6622 / IEC 60502-2
7A	Single Core 11kV Unarmoured Cables (Aluminium Conductor)	GA-11-1-N	BS 6622 / IEC 60502-2
7B	Single Core 11kV Armoured Cables (Aluminium Conductor)	GA-11-1-A	BS 6622 / IEC 60502-2
8	Single Core 11kV Unarmoured Cables (Aluminium Conductor)	TA-11-1-N	TNB Specification
9A	Three Core 11kV Unarmoured Cables (Aluminium Conductor)	GC-11-3-N	BS 6622 / IEC 60502-2
9B	Three Core 11kV Armoured Cables (Copper Conductor)	GC-11-3-S	BS 6622 / IEC 60502-2
10A	Three Core 11kV Unarmoured Cables (Aluminium Conductor)	GA-11-3-N	BS 6622 / IEC 60502-2
10B	Three Core 11kV Armoured Cables (Aluminium Conductor)	GA-11-3-S	BS 6622 / IEC 60502-2
11	Three Core 11kV Armoured Cables (Aluminium Conductor)	TA-11-3-S	TNB Specification
12	Three Core 22kV Armoured Cables (Aluminium Conductor)	GA-22-3-S	BS 6622 / IEC 60502-2
13	Single Core 22kV Unarmoured Cables (Aluminium Conductor)	TA-22-1-N	TNB Specification
14A	Single Core 33kV Unarmoured Cables (Copper Conductor)	GC-33-1-N	BS 6622 / IEC 60502-2
14B	Three Core 33kV Armoured Cables (Copper Conductor)	GC-33-3-S	BS 6622 / IEC 60502-2
15	Single Core 33kV Copper Wire Screened Cables (Aluminium Conductor)	TA-33-1-W	TNB / KLIA Specification
16	Single Core 33kV Copper Wire Screened Cables (Copper Conductor)	TC-33-1-W	TNB / KLIA Specification
17	Single Core 11kV Copper Wire Screened Cables (Copper Conductor)	TC-11-1-W	TNB / KLIA Specification
18	Single Core 11kV Copper Wire Screened Cables (Aluminium Conductor)	TA-11-1-W	TNB / KLIA Specification
19	Single Core 11kV Double-sheathed Cables (Aluminium Conductor)	TA-11-1-DS	TNB Specification
20	Single Core 22kV Double-sheathed Cables (Aluminium Conductor)	TA-22-1-DS	TNB Specification
21	Three Core 11kV Double-sheathed Cables (Aluminium Conductor)	TA-11-3-DS	TNB Specification
22	Triplex 11kV XLPE-Insulated Cables (Aluminium Conductor)	TA-11-3-T	TNB Specification
A	Technical Data For Cable Installation		
A.1	Minimum Bending Radius		
A.2	Maximum Pulling Tension		
A.3	Maximum Side Wall Pressure		

AERIAL BUNDLED CABLES

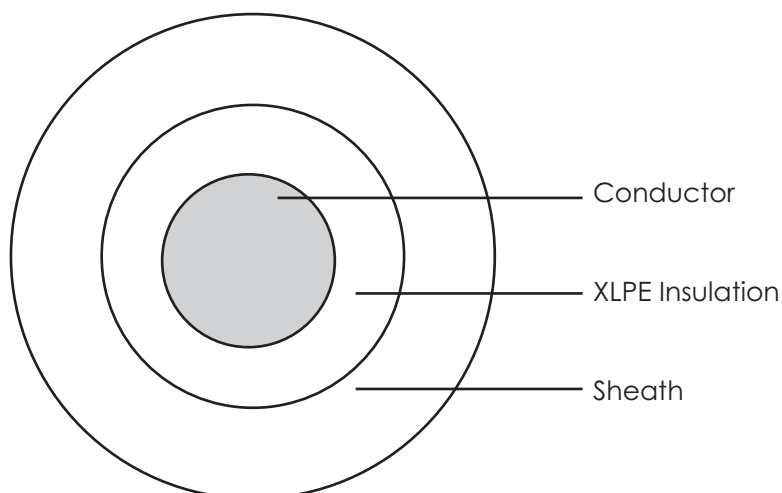
1	Low Voltage Aerial Bundled Cable
2	11kv Aerial Bundled Cable
3	33kv Aerial Bundled Cable

XLPE INSULATED CABLES

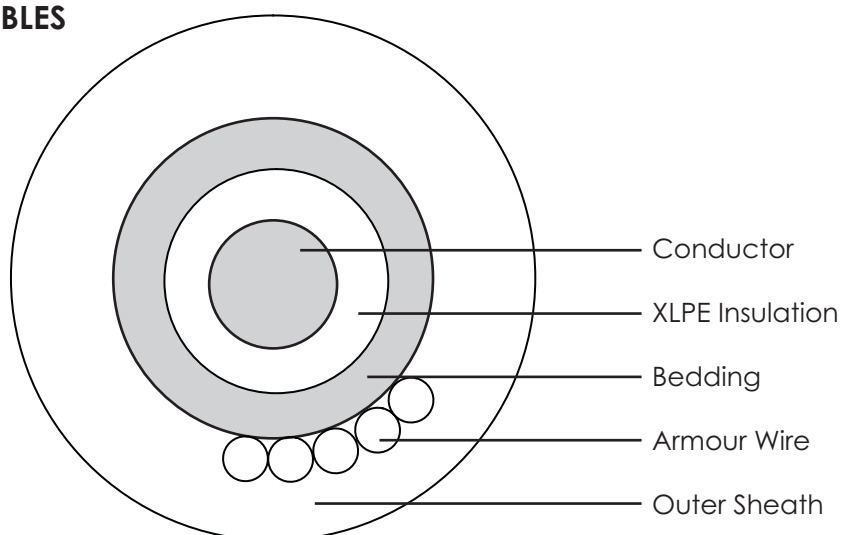
LOW VOLTAGE XLPE CABLES. MEDIUM VOLTAGE XLPE CABLES.

600/1000V SINGLE CORE XLPE INSULATED POWER CABLES

UNARMoured CABLES



ARMoured CABLES



BASIC CONSTRUCTION

CONDUCTOR	-	COPPER OR ALUMINIUM
CONDUCTOR SHAPE	-	ROUND CIRCULAR STRANDED OR COMPACTED CIRCULAR STRANDED
INSULATION	-	XLPE
BEDDING	-	PVC OR POLYETHYLENE
ARMOUR WIRE	-	ALUMINIUM WIRES
SHEATH MATERIAL	-	PVC OR POLYETHYLENE

**BS 5467
IEC 60502-1**

**REFERENCE
12A-1N**

LOW VOLTAGE XLPE INSULATED POWER CABLES

TABLE 1A SINGLE-CORE 600/1000V UNARMOURED CABLES (COPPER CONDUCTOR)

Conductor		Thickness of Insulation	Thickness of Sheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
Nominal Area	Shape					Current Rating		Conductor Resistance		Reactance at 50Hz	Short Circuit Current for 1 sec
						In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm		mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	kA
50	circular stranded	1.0	1.4	14.0	560	185	205	0.387	0.494	0.0905	7.15
70		1.1	1.4	15.8	770	235	250	0.268	0.342	0.0870	10.0
95		1.1	1.5	17.8	1020	290	295	0.193	0.247	0.0851	13.5
120		1.2	1.5	20.0	1310	340	340	0.153	0.196	0.0837	17.1
150		1.4	1.6	22.2	1600	390	380	0.124	0.160	0.0837	21.4
185	or	1.6	1.6	24.4	1980	455	430	0.0991	0.128	0.0826	26.4
240		1.7	1.7	27.5	2560	545	495	0.0754	0.0988	0.0812	34.3
300	circular compacted	1.8	1.8	30.3	3190	630	560	0.0601	0.0801	0.0801	42.9
400		2.0	1.9	33.9	4040	735	635	0.0470	0.0643	0.0792	57.2
500		2.2	2.0	37.7	5070	850	715	0.0366	0.0521	0.0785	71.5
630		2.4	2.2	42.6	6510	985	800	0.0283	0.0428	0.0776	90.0
800		2.6	2.3	47.5	8250	1150	895	0.0221	0.0363	0.0759	114.0
1000		2.8	2.4	52.6	10330	1280	970	0.0176	0.0317	0.0749	143.0

Black PVC sheath

**BS 5467
IEC 60502-1**

**REFERENCE
12A-1A**

LOW VOLTAGE XLPE INSULATED POWER CABLES

TABLE 1B SINGLE-CORE 600/1000V ARMoured CABLES (COPPER CONDUCTOR)

Conductor		Thickness of Insulation	Thickness of Extruded Bedding	Nominal of Armour Diameter	Thickness of Outer Sheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
Nominal Area	Shape							Current Rating		Conductor Resistance		Reactance at 50Hz	Short Circuit Current for 1 sec
								In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm		mm	mm	mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	kA
50	circular stranded	1.0	0.8	0.9	1.5	17.3	740	200	205	0.387	0.494	0.113	7.15
70		1.1	0.8	1.25	1.5	19.8	1020	255	250	0.268	0.342	0.107	10.0
95		1.1	0.8	1.25	1.6	21.9	1330	310	300	0.193	0.247	0.102	13.5
120		1.2	0.8	1.25	1.6	24.0	1610	365	340	0.153	0.196	0.101	17.1
150		1.4	1.0	1.6	1.7	27.1	2030	415	385	0.124	0.159	0.0999	21.4
185	or	1.6	1.0	1.6	1.8	29.6	2460	480	435	0.0991	0.128	0.0975	26.4
240		1.7	1.0	1.6	1.8	32.4	3080	570	500	0.0754	0.0982	0.0946	34.3
300	circular compacted	1.8	1.0	1.6	1.9	35.2	3750	650	565	0.0601	0.0793	0.0920	42.9
400		2.0	1.2	2.0	2.0	40.0	4830	760	635	0.0470	0.0632	0.0923	57.2
500		2.2	1.2	2.0	2.1	44.1	6040	870	715	0.0366	0.0509	0.0903	71.5
630		2.4	1.2	2.0	2.2	48.3	7430	995	800	0.0283	0.0415	0.0878	90.0
800		2.6	1.4	2.5	2.4	54.8	9550	1150	890	0.0221	0.0347	0.0863	114.0
1000		2.8	1.4	2.5	2.5	60.0	11750	1250	940	0.0176	0.0300	0.0847	143.0

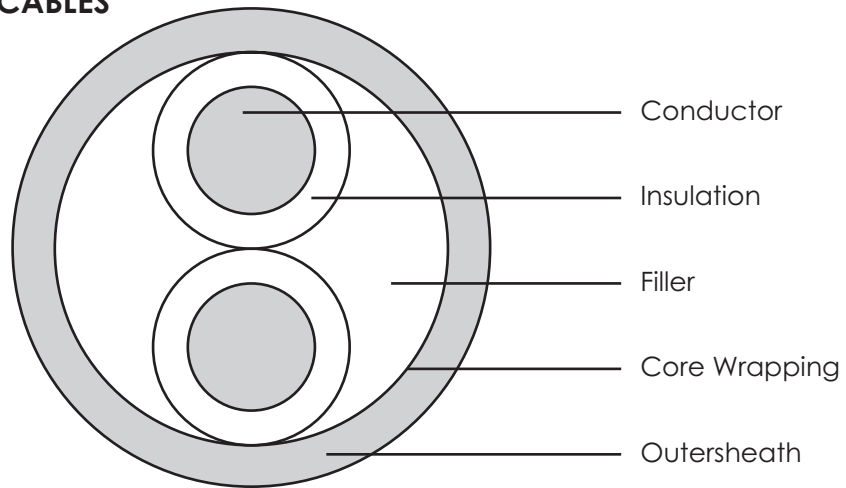
Black PVC sheath

Armouring : hard drawn Aluminium wire

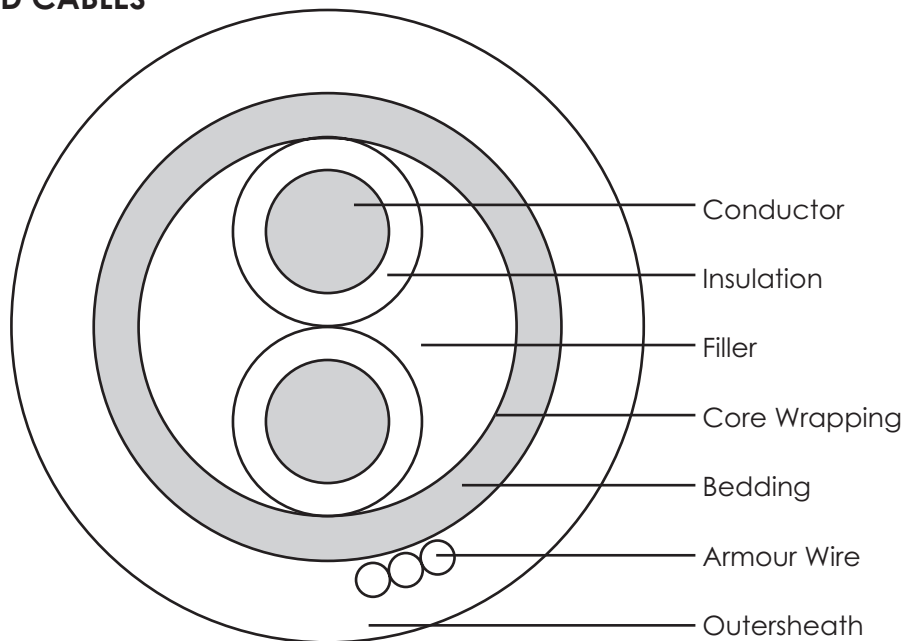
** In case of TAPED BEDDING : The thickness of taped bedding (approximately 0.8mm) need not be checked by measurement

600/1000V TWO-CORE XLPE INSULATED POWER CABLES

UNARMoured CABLES



ARMoured CABLES



BASIC CONSTRUCTION

CONDUCTOR	-	COPPER OR ALUMINIUM
CONDUCTOR SHAPE	-	CIRCULAR STRANDED OR COMPACTED CIRCULAR STRANDED
INSULATION	-	XLPE
BEDDING	-	PVC OR POLYETHYLENE
ARMOUR WIRE	-	GALVANISED STEEL WIRES
SHEATH MATERIAL	-	PVC OR POLYETHYLENE

**BS 5467
IEC 60502-1**

**REFERENCE
12A-2N**

LOW VOLTAGE XLPE INSULATED POWER CABLES

TABLE 2A TWO-CORE 600/1000V UNARMoured CABLES (COPPER CONDUCTOR)

Conductor		Thickness of Insulation	Thickness of Sheath	Overall Diameter	Approx. Weight	ELECTRICAL CHARACTERISTICS					
Nominal Area	Shape					Current Rating		Conductor Resistance		Reactance at 50Hz	Short Circuit Current for 1 sec
						In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm		mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	kA
50	circular stranded	1.0	1.8	21.0	1150	205	230	0.387	0.494	0.0651	7.15
70		1.1	1.8	24.0	1545	255	285	0.268	0.342	0.0637	10.0
95		1.1	1.9	26.9	2070	315	340	0.193	0.247	0.0616	13.5
120		1.2	2.0	29.9	2580	370	380	0.153	0.196	0.0613	17.1
150	or	1.4	2.2	33.4	3200	420	435	0.124	0.160	0.0618	21.4
185	circular compacted	1.6	2.3	37.1	3955	485	490	0.0991	0.129	0.0623	26.4
240		1.7	2.5	41.7	5150	580	565	0.0754	0.0993	0.0612	34.3
300		1.8	2.6	45.8	6340	665	640	0.0601	0.0807	0.0605	42.9
400		2.0	2.9	51.6	8150	770	725	0.0470	0.0650	0.0603	57.2

Black PVC sheath

**BS 5467
IEC 60502-1**

**REFERENCE
12A-2S**

LOW VOLTAGE XLPE INSULATED POWER CABLES

TABLE 2B TWO-CORE 600/1000V ARMoured CABLES (COPPER CONDUCTOR)

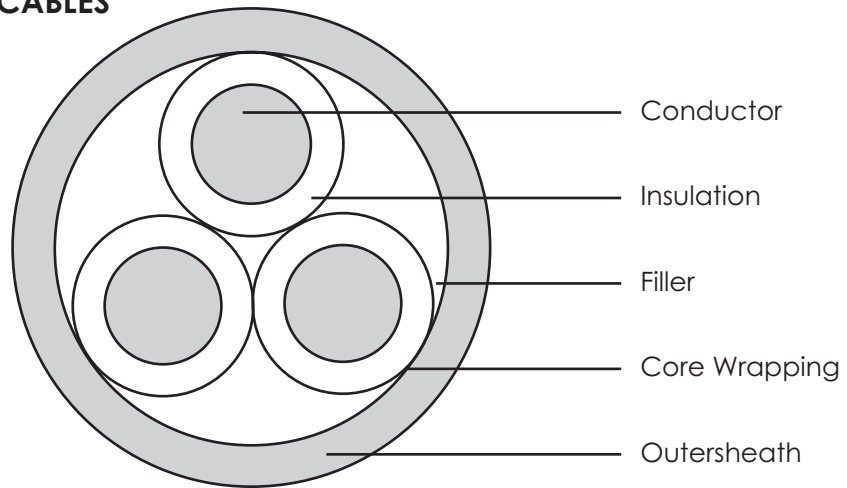
Conductor		Thickness of Insulation	Thickness of Extruded Bedding	Nominal of Armour Diameter	Thickness of Outer Sheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
Nominal Area	Shape							Current Rating		Conductor Resistance		Reactance at 50Hz	Short Circuit Current for 1 sec
								In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm		mm	mm	mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	kA
50	circular stranded	1.0	1.0	1.6	1.8	26.5	1840	210	230	0.387	0.494	0.0648	7.15
70		1.1	1.0	1.6	1.9	29.5	2450	260	280	0.268	0.342	0.0633	10.0
95		1.1	1.2	2.0	2.0	33.1	3210	315	335	0.193	0.247	0.0612	13.5
120		1.2	1.2	2.0	2.1	36.1	3850	370	380	0.153	0.196	0.0609	17.1
150	or	1.4	1.2	2.0	2.2	39.3	4650	425	425	0.124	0.160	0.0618	21.4
185	circular compacted	1.6	1.4	2.5	2.4	44.7	5880	485	480	0.0991	0.129	0.0623	26.4
240		1.7	1.4	2.5	2.5	49.0	7300	570	555	0.0754	0.0993	0.0612	34.3
300		1.8	1.6	2.5	2.6	53.5	8740	650	620	0.0601	0.0807	0.0605	42.9
400		2.0	1.6	2.5	2.8	59.0	11000	745	695	0.0470	0.0650	0.0603	57.2

Black PVC sheath

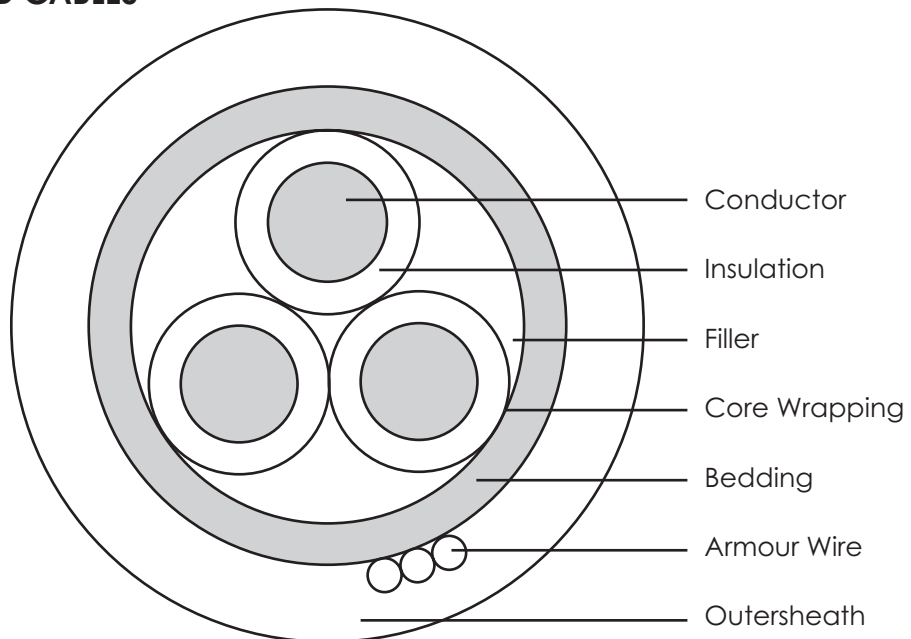
** In case of TAPED BEDDING : The thickness of taped bedding (approximately 0.8mm) need not be checked by measurement

600/1000V THREE-CORE XLPE INSULATED POWER CABLES

UNARMoured CABLES



ARMoured CABLES



BASIC CONSTRUCTION

CONDUCTOR	-	COPPER OR ALUMINIUM
CONDUCTOR SHAPE	-	CIRCULAR STRANDED OR COMPACTED CIRCULAR STRANDED
INSULATION	-	XLPE
BEDDING	-	PVC OR POLYETHYLENE
ARMOUR WIRE	-	GALVANISED STEEL WIRES
SHEATH MATERIAL	-	PVC OR POLYETHYLENE

**BS 5467
IEC 60502-1**

**REFERENCE
12A-3N**

LOW VOLTAGE XLPE INSULATED POWER CABLES

TABLE 3A THREE-CORE 600/1000V UNARMoured CABLES (COPPER CONDUCTOR)

Conductor		Thickness of Insulation	Thickness of Sheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
Nominal Area	Shape					Current Rating		Conductor Resistance		Reactance at 50Hz	Short Circuit Current for 1 sec
						In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm		mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	kA
50	circular stranded	1.0	1.8	24.0	1600	175	195	0.387	0.494	0.0651	7.15
70		1.1	1.9	27.5	2260	220	235	0.268	0.342	0.0637	10.0
95		1.1	2.0	31.0	3035	265	285	0.193	0.247	0.0616	13.5
120		1.2	2.1	34.2	3790	300	325	0.153	0.196	0.0613	17.1
150	or	1.4	2.2	37.9	4700	350	365	0.124	0.160	0.0618	21.4
185	circular compacted	1.6	2.4	42.5	5810	410	410	0.0991	0.129	0.0623	26.4
240		1.7	2.6	47.8	7600	480	475	0.0754	0.0996	0.0612	34.3
300		1.8	2.7	52.6	9350	570	535	0.0601	0.0809	0.0605	42.9

Black PVC sheath

**BS 5467
IEC 60502-1**

**REFERENCE
12A-3S**

LOW VOLTAGE XLPE INSULATED POWER CABLES

TABLE 3B THREE-CORE 600/1000V ARMoured CABLES (COPPER CONDUCTOR)

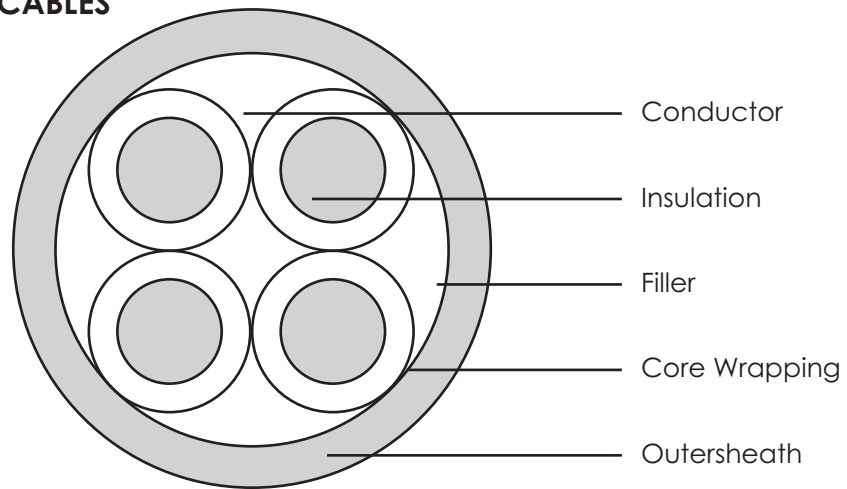
Conductor		Thickness of Insulation	Thickness of Extruded Bedding	Nominal of Armour Diameter	Thickness of Outer Sheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
Nominal Area	Shape							Current Rating		Conductor Resistance		Reactance at 50Hz	Short Circuit Current for 1 sec
								In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm		mm	mm	mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	kA
50	circular stranded	1.0	1.0	1.6	1.8	29.5	2450	175	190	0.387	0.494	0.0648	7.15
70		1.1	1.0	1.6	1.9	34.0	3440	220	235	0.268	0.342	0.0633	10.0
95		1.1	1.2	2.0	2.1	37.5	4380	265	285	0.193	0.247	0.0612	13.5
120		1.2	1.2	2.0	2.2	40.0	5250	300	325	0.153	0.196	0.0609	17.1
150	or	1.4	1.4	2.5	2.3	45.0	6680	350	365	0.124	0.160	0.0618	21.4
185	circular compacted	1.6	1.4	2.5	2.4	49.5	8050	410	410	0.0991	0.129	0.0623	26.4
240		1.7	1.4	2.5	2.6	55.0	10180	480	480	0.0754	0.0996	0.0612	34.3
300		1.8	1.6	2.5	2.7	59.5	12150	570	570	0.0601	0.0809	0.0605	42.9

Black PVC sheath

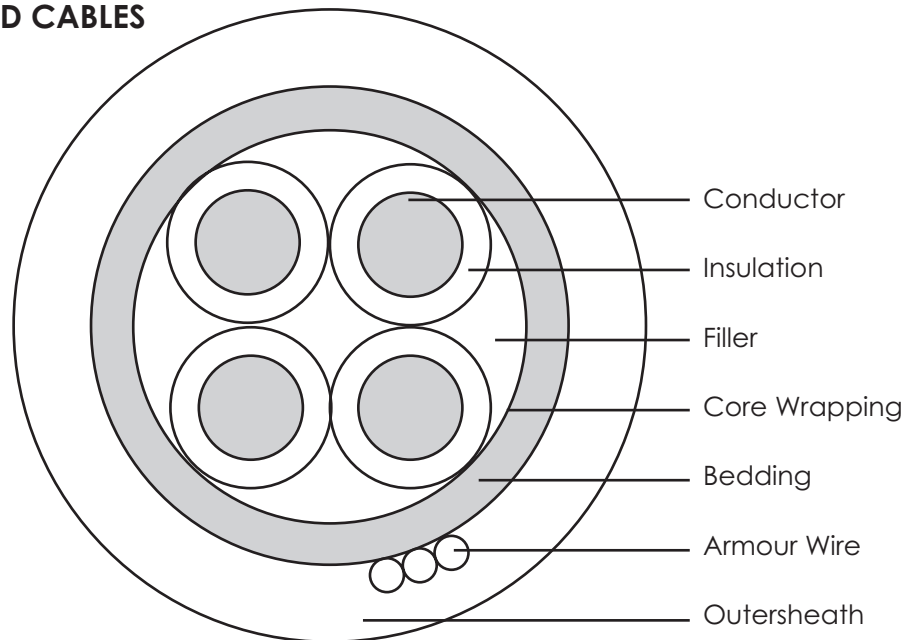
** In case of TAPED BEDDING : The thickness of taped bedding (approximately 0.8mm) need not be checked by measurement

600/1000V FOUR-CORE XLPE INSULATED POWER CABLES

UNARMoured CABLES



ARMoured CABLES



BASIC CONSTRUCTION

CONDUCTOR	-	COPPER OR ALUMINIUM
CONDUCTOR SHAPE	-	CIRCULAR STRANDED OR COMPACTED CIRCULAR STRANDED
INSULATION	-	XLPE
BEDDING	-	PVC OR POLYETHYLENE
ARMOUR WIRE	-	GALVANISED STEEL WIRES
SHEATH MATERIAL	-	PVC OR POLYETHYLENE

**BS 5467
IEC 60502-1**

**REFERENCE
12A-4N**

LOWVOLT VOLTAGE XLPE INSULATED POWER CABLES

TABLE 4A FOUR-CORE 600/1000V UNARMoured CABLES (COPPER CONDUCTOR)

Conductor		Thickness of Insulation	Thickness of Sheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
Nominal Area	Shape					Current Rating		Conductor Resistance		Reactance at 50Hz	Short Circuit Current for 1 sec
						In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm		mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	kA
16	circular compacted	0.7	1.8	18.4	820	88	100	1.15	1.47	0.0761	2.28
25		0.9	1.8	26.9	1440	115	135	0.727	0.927	0.0683	3.57
35		0.9	1.8	29.5	1880	140	160	0.524	0.669	0.0656	5.00
50		1.0	1.8	33.3	2470	175	195	0.387	0.494	0.0651	7.15
70		1.1	2.0	38.8	3480	220	235	0.268	0.342	0.0637	10.0
95	or	1.1	2.1	44.2	4600	265	285	0.193	0.247	0.0616	13.5
120		1.2	2.2	49.5	5900	300	325	0.153	0.196	0.0613	17.1
150	shaped stranded	1.4	2.4	55.0	7250	350	365	0.124	0.160	0.0618	21.4
185		1.6	2.6	61.4	9080	410	410	0.0991	0.129	0.0623	26.4
240		1.7	2.8	69.2	11790	480	475	0.0754	0.0996	0.0612	34.3
300		1.8	3.0	76.9	14680	570	535	0.0601	0.0809	0.0605	42.9
400		2.0	3.2	85.2	18440	660	610	0.0470	0.0653	0.0603	57.2

Black PVC sheath

**BS 5467
IEC 60502-1**

**REFERENCE
12A-4S**

LOW VOLTAGE XLPE INSULATED POWER CABLES

TABLE 4B FOUR-CORE 600/1000V ARMoured CABLES (COPPER CONDUCTOR)

Conductor		Thickness of Insulation	Thickness of Extruded Bedding	Nominal of Armour Diameter	Thickness of Outer Sheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
Nominal Area	Shape							Current Rating		Conductor Resistance		Reactance at 50Hz	Short Circuit Current for 1 sec
								In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm		mm	mm	mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	kA
1.5	circular stranded	0.7	0.8	0.9	1.4	13.1	380	23	29	12.1	15.4	0.1010	0.21
2.5		0.7	0.8	0.9	1.4	14.6	480	29	37	7.41	9.45	0.0930	0.36
4		0.7	0.8	0.9	1.4	15.9	580	38	49	4.61	5.88	0.0871	0.57
6		0.7	0.8	1.25	1.5	18.2	830	48	61	3.08	3.93	0.0828	0.85
10		0.7	0.8	1.25	1.5	20.4	1080	66	81	1.83	2.33	0.0780	1.42
16	circular compacted	0.7	0.8	1.25	1.6	21.4	1420	88	100	1.15	1.47	0.0761	2.28
25		0.9	1.0	1.6	1.7	25.4	1970	115	135	0.727	0.927	0.0679	3.57
35	or	0.9	1.0	1.6	1.8	27.9	2500	140	160	0.524	0.669	0.0652	5.00
50		1.0	1.0	1.6	1.9	30.8	3130	175	190	0.387	0.494	0.0648	7.15
70		1.1	1.2	2.0	2.1	36.1	4460	220	235	0.268	0.342	0.0633	10.0
95		1.1	1.2	2.0	2.2	40.0	5600	265	285	0.193	0.247	0.0612	13.5
120		1.2	1.4	2.5	2.3	45.0	7350	300	325	0.153	0.196	0.0609	17.1
150	shaped stranded	1.4	1.4	2.5	2.4	49.2	8750	350	365	0.124	0.160	0.0618	21.4
185		1.6	1.4	2.5	2.6	53.7	10530	410	410	0.0991	0.129	0.0623	26.4
240		1.7	1.6	2.5	2.7	59.5	13230	480	475	0.0754	0.0996	0.0612	34.3
300		1.8	1.6	2.5	2.9	65.6	16100	570	535	0.0601	0.0809	0.0605	42.9
400		2.0	1.8	3.15	3.2	79.3	21760	655	605	0.0470	0.0653	0.0603	57.2

Colours for core identification : red, yellow, blue and black
Black PVC sheath

** In case of TAPED BEDDING : The thickness of taped bedding (approximately 0.8mm) need not be checked by measurement

**TNB
SPECIFICATION**

**REFERENCE
T13-4S**

LOW VOLTAGE XLPE INSULATED POWER CABLES

TABLE 4C FOUR-CORE 600/1000V ARMoured CABLES (ALUMINIUM CONDUCTOR)

Nominal Area Conductors	Thickness of Insulation	Thickness of Extruded Bedding	Nominal of Armour Diameter	Thickness of Outer Sheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
							Current Rating		Conductor Resistance		Reactance at 50Hz	Voltage Drop
							In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm	mm	mm	mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	mV
25	0.9	1.2	1.6	1.8	29.9	1530	89	104	1.20	1.54	0.079	2.7
70	1.1	1.2	2.0	2.2	40.5	2880	166	180	0.443	0.568	0.075	0.99
120	1.2	1.3	2.5	2.5	48.8	4470	238	248	0.253	0.325	0.073	0.58
185	1.6	1.5	2.5	2.8	58.4	6060	315	315	0.164	0.211	0.073	0.39
300	1.8	1.7	2.5	3.3	71.6	9290	434	414	0.100	0.13	0.072	0.26

Core colour identification : Natural coloured insulation with red, yellow, blue and black tapes
Black PVC sheath

**TNB
SPECIFICATION**

**REFERENCE
T13-4C**

LOW VOLTAGE XLPE INSULATED POWER CABLES

TABLE 4D FOUR-CORE 600/1000V COPPER TAPES SCREENED CABLES (ALUMINIUM CONDUCTOR)

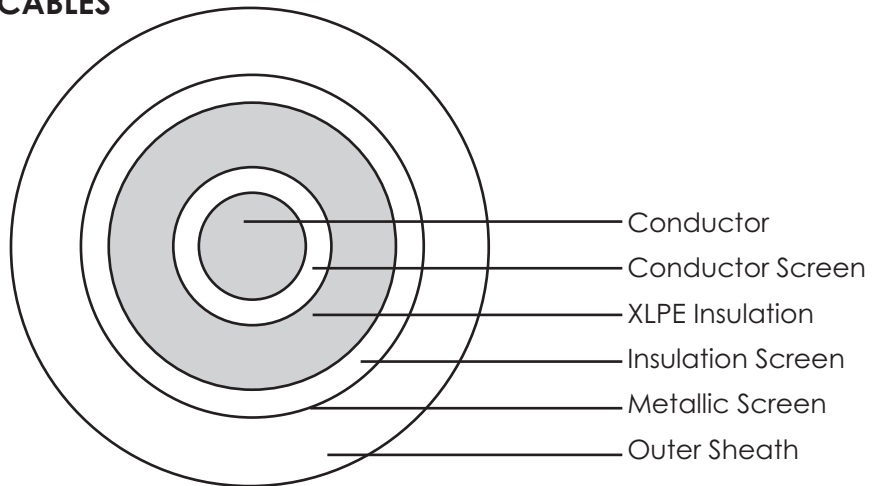
Nominal Area Conductors	Thickness of Insulation	Thickness of Extruded Bedding	Thickness of Outer Sheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
						Current Rating		Conductor Resistance		Reactance at 50Hz	Voltage Drop
						In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm	mm	mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	mV
25	0.9	1.0	1.7	25.2	820	89	104	1.20	1.54	0.079	2.7
70	1.1	1.2	2.1	36.6	1725	166	180	0.443	0.568	0.075	0.99
120	1.2	1.3	2.4	45.9	2700	238	248	0.253	0.325	0.073	0.58
185	1.6	1.5	2.7	56.4	4020	315	315	0.164	0.211	0.073	0.39
300	1.8	1.7	3.1	69.0	6100	434	414	0.100	0.13	0.072	0.26

Core colour identification : red, yellow, blue and black
Black PE sheath

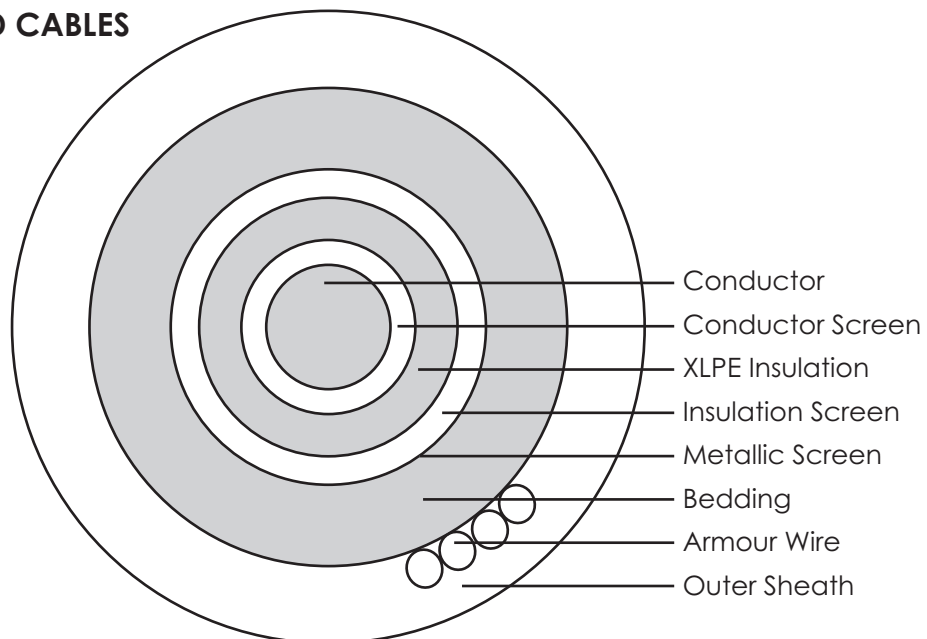
* Copper Tapes shall be applied over the bedding

MEDIUM VOLTAGE SINGLE CORE XLPE INSULATED POWER CABLE

UNARMoured CABLES



ARMoured CABLES



BASIC CONSTRUCTION

CONDUCTOR	-	COPPER OR ALUMINIUM
CONDUCTOR SHAPE	-	COMPACTED CIRCULAR STRANDED
INSULATION	-	XLPE
BEDDING	-	PVC OR POLYETHYLENE
ARMOUR WIRE	-	ALUMINIUM WIRES
SHEATH MATERIAL	-	PVC OR POLYETHYLENE

**TNB
SPECIFICATION**

**REFERENCE
TC-6-1-N**

MEDIUM VOLTAGE XLPE INSULATED POWER CABLES

TABLE 5A SINGLE-CORE 6kV UNARMOURED CABLES (COPPER CONDUCTOR)

Nominal Area of Conductors	Thickness of Insulation	Thickness of Outer Sheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
					Current Rating		Conductor Resistance		Reactance at 50Hz	Capacitance
					In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm	mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	μF/km
300	2.8	2.0	35.1	3560	629	540	0.0601	0.0791	0.094	0.64

**BS 662
IEC 60502-2**

**REFERENCE
GC-11-1-N**

MEDIUM VOLTAGE XLPE INSULATED POWER CABLES

TABLE 6A SINGLE-CORE 11kV UNARMOURED CABLES (COPPER CONDUCTOR)

Nominal Area of Conductors	Thickness of Insulation	Thickness of Outer Sheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
					Current Rating		Conductor Resistance		Reactance at 50Hz	Capacitance
					In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm	mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	μF/km
50	3.4	1.7	23.7	950	217	198	0.387	0.493	0.126	0.27
70	3.4	1.7	25.3	1180	242	243	0.268	0.342	0.119	0.31
95	3.4	1.8	27.1	1470	306	288	0.193	0.247	0.112	0.34
120	3.4	1.8	28.6	1740	353	324	0.153	0.196	0.108	0.37
150	3.4	1.9	30.0	2030	400	369	0.124	0.159	0.106	0.40
185	3.4	1.9	31.7	2420	459	414	0.0991	0.128	0.103	0.44
240	3.4	2.0	34.0	3010	544	477	0.0754	0.0980	0.099	0.49
300	3.4	2.1	36.4	3640	629	540	0.0601	0.0790	0.096	0.54
400	3.4	2.2	39.4	4510	714	612	0.0470	0.0633	0.093	0.59
500	3.4	2.3	42.7	5620	799	675	0.0366	0.0511	0.090	0.66
630	3.4	2.4	46.5	7070	944	752	0.0283	0.0416	0.087	0.74

**BS 6622
IEC 60502-2**

**REFERENCE
GC-11-1-A**

MEDIUM VOLTAGE XLPE INSULATED POWER CABLES

TABLE 6B SINGLE-CORE 11kV ARMOURED CABLES (COPPER CONDUCTOR)

Nominal Area of Conductors	Thickness of Insulation	Thickness of Extruded Bedding	Nominal armour wire diameter	Thickness of Outer Sheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
							Current Rating		Conductor Resistance		Reactance at 50Hz	Capacitance
							In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm	mm	mm	mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	μF/km
50	3.4	1.2	1.6	1.8	31.7	1600	217	198	0.387	0.493	0.126	0.27
70	3.4	1.2	1.6	1.9	33.3	1870	242	243	0.268	0.342	0.119	0.31
95	3.4	1.2	1.6	1.9	35.1	2210	306	288	0.193	0.247	0.112	0.34
120	3.4	1.2	1.6	2.0	36.6	2510	353	324	0.153	0.196	0.108	0.37
150	3.4	1.2	2.0	2.1	38.8	2950	400	369	0.124	0.159	0.106	0.40
185	3.4	1.2	2.0	2.1	40.5	3370	459	414	0.0991	0.128	0.103	0.44
240	3.4	1.2	2.0	2.2	42.8	4030	544	477	0.0754	0.0980	0.099	0.49
300	3.4	1.2	2.0	2.2	45.2	4720	629	540	0.0601	0.0790	0.096	0.54
400	3.4	1.2	2.0	2.4	47.9	5630	714	612	0.0470	0.0633	0.093	0.59
500	3.4	1.3	2.5	2.5	52.0	6990	799	675	0.0366	0.0511	0.090	0.66
630	3.4	1.4	2.5	2.6	55.6	8520	944	752	0.0283	0.0416	0.087	0.74

BS 6622
IEC 60502-2

REFERENCE
GA-11-1-N

MEDIUM VOLTAGE XLPE INSULATED POWER CABLES

TABLE 7A SINGLE-CORE 11kV UNARMOURED CABLES (ALUMINIUM CONDUCTOR)

Nominal Area of Conductors	Thickness of Insulation	Thickness of Outer Sheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
					Current Rating		Conductor Resistance		Reactance at 50Hz	Capacitance
					In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm	mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	µF/km
50	3.4	1.7	23.8	650	153	153	0.641	0.821	0.126	0.27
70	3.4	1.7	25.4	760	191	189	0.443	0.569	0.119	0.31
95	3.4	1.8	27.1	880	238	225	0.320	0.410	0.112	0.34
120	3.4	1.8	28.6	990	272	252	0.253	0.325	0.108	0.37
150	3.4	1.9	30.0	1110	310	288	0.206	0.265	0.106	0.40
185	3.4	1.9	31.7	1260	361	324	0.164	0.211	0.103	0.44
240	3.4	2.0	34.0	1490	425	374	0.125	0.161	0.099	0.49
300	3.4	2.1	36.2	1720	493	428	0.100	0.130	0.096	0.54
400	3.4	2.2	39.2	2060	570	486	0.0778	0.102	0.093	0.59
500	3.4	2.3	42.5	2480	672	549	0.0605	0.0816	0.090	0.66
630	3.4	2.4	46.3	3010	774	612	0.0469	0.0647	0.087	0.74

BS 6622
IEC 60502-2

REFERENCE
GA-11-1-A

MEDIUM VOLTAGE XLPE INSULATED POWER CABLES

TABLE 7B SINGLE-CORE 11kV ARMoured CABLES (ALUMINIUM CONDUCTOR)

Nominal Area of Conductors	Thickness of Insulation	Thickness of Extruded Bedding	Nominal Armour Wire Diameter	Thickness of Outer Sheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
							Current Rating		Conductor Resistance		Reactance at 50Hz	Capacitance
							In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm	mm	mm	mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	µF/km
50	3.4	1.2	1.6	1.8	31.8	1310	153	153	0.641	0.821	0.126	0.27
70	3.4	1.2	1.6	1.9	33.4	1450	191	189	0.443	0.569	0.119	0.31
95	3.4	1.2	1.6	1.9	35.1	1610	238	225	0.320	0.410	0.112	0.34
120	3.4	1.2	1.6	2.0	36.6	1760	272	252	0.253	0.325	0.108	0.37
150	3.4	1.2	2.0	2.1	38.8	2020	310	288	0.206	0.265	0.106	0.40
185	3.4	1.2	2.0	2.1	40.5	2220	361	324	0.164	0.211	0.103	0.44
240	3.4	1.2	2.0	2.2	42.8	2510	425	374	0.125	0.161	0.099	0.49
300	3.4	1.2	2.0	2.2	45.0	2790	493	428	0.100	0.130	0.096	0.54
400	3.4	1.2	2.0	2.4	47.7	3180	570	486	0.0778	0.102	0.093	0.59
500	3.4	1.3	2.5	2.5	51.8	3840	672	549	0.0605	0.0816	0.090	0.66
630	3.4	1.4	2.5	2.6	55.4	4460	774	612	0.0469	0.0647	0.087	0.74

TNB
SPECIFICATION

REFERENCE
TA-11-1-N

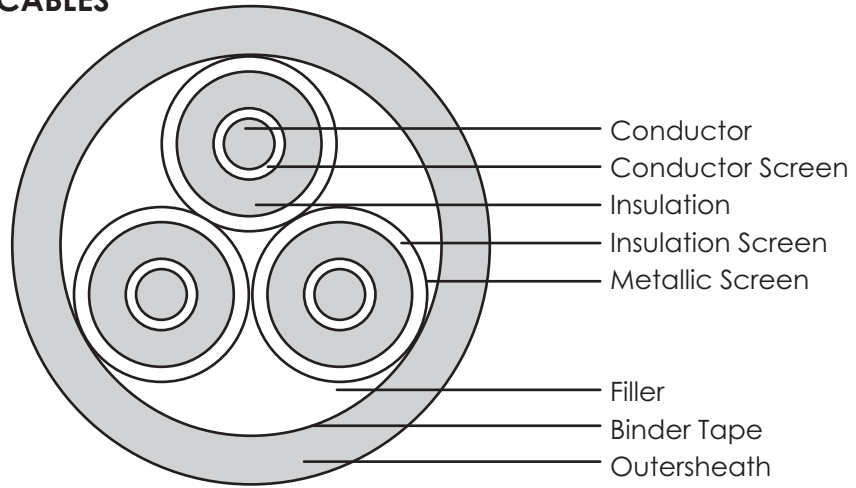
MEDIUM VOLTAGE XLPE INSULATED POWER CABLES

TABLE 8 SINGLE-CORE 11kV UNARMOURED CABLES (ALUMINIUM CONDUCTOR)

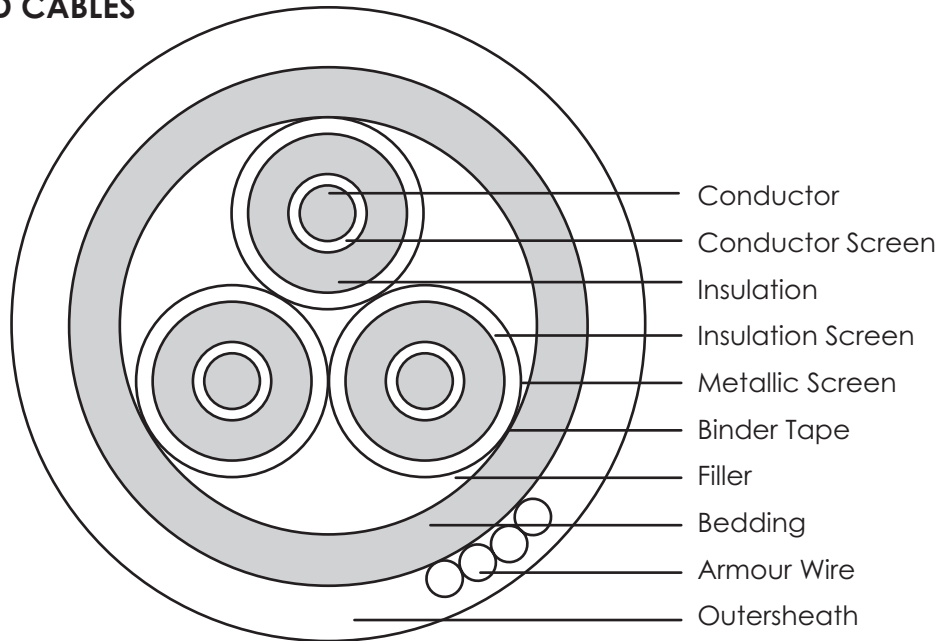
Nominal Area of Conductors	Thickness of Insulation	Thickness of Outer Sheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
					Current Rating		Conductor Resistance		Reactance at 50Hz	Capacitance
					In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm	mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	µF/km
500	3.4	4.0	46.7	2740	672	549	0.0605	0.0816	0.090	0.66

MEDIUM VOLTAGE THREE CORE XLPE INSULATED POWERD R CABLE

UNARMoured CABLES



ARMoured CABLES



BASIC CONSTRUCTION

CONDUCTOR	-	COPPER OR ALUMINIUM
CONDUCTOR SHAPE	-	COMPACTED CIRCULAR STRANDED
INSULATION	-	XLPE
BEDDING	-	PVC OR POLYETHYLENE
ARMOUR WIRE	-	GALVANISED STEEL WIRES
SHEATH MATERIAL	-	PVC OR POLYETHYLENE

BS 6622
IEC 60502-2

REFERENCE
GC-11-3-N

MEDIUM VOLTAGE XLPE INSULATED POWER CABLES

TABLE 9A THREE-CORE 11kV UNARMOURED CABLES (COPPER CONDUCTOR)

Nominal Area of Conductors	Thickness of Insulation	Thickness of Outer Sheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
					Current Rating		Conductor Resistance		Reactance at 50Hz	Capacitance
					In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm	mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	μF/km
16	3.4	2.2	38.7	1660	111	114	1.15	1.47	0.140	0.20
25	3.4	2.2	41.3	2040	123	126	0.727	0.927	0.124	0.22
35	3.4	2.3	43.7	2440	149	153	0.524	0.668	0.116	0.24
50	3.4	2.4	46.4	2910	187	189	0.387	0.493	0.111	0.27
70	3.4	2.5	50.1	3680	230	230	0.268	0.342	0.106	0.30
95	3.4	2.7	54.2	4650	281	270	0.193	0.247	0.100	0.34
120	3.4	2.8	57.6	5530	319	306	0.153	0.196	0.097	0.37
150	3.4	2.9	60.9	6490	366	342	0.124	0.159	0.094	0.40
185	3.4	3.0	64.7	7730	417	387	0.0991	0.128	0.092	0.43
240	3.4	3.1	70.0	9650	485	441	0.0754	0.0984	0.089	0.48
300	3.4	3.3	75.6	11710	553	486	0.0601	0.0797	0.086	0.53
400	3.4	3.5	81.8	14460	629	540	0.0470	0.0639	0.083	0.59

BS 6622
IEC 60502-2

REFERENCE
GC-11-3-S

MEDIUM VOLTAGE XLPE INSULATED POWER CABLES

TABLE 9B THREE-CORE 11kV ARMoured CABLES (COPPER CONDUCTOR)

Nominal Area of Conductors	Thickness of Insulation	Thickness of Extruded Bedding	Nominal Armour Wire Diameter	Thickness of Outer Sheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
							Current Rating		Conductor Resistance		Reactance at 50Hz	Capacitance
							In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm	mm	mm	mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	μF/km
16	3.4	1.2	2.0	2.3	47.2	3750	111	114	1.15	1.47	0.140	0.20
25	3.4	1.3	2.5	2.4	50.8	4750	123	126	0.727	0.927	0.124	0.22
35	3.4	1.3	2.5	2.5	53.0	5270	149	153	0.524	0.668	0.116	0.24
50	3.4	1.4	2.5	2.6	55.5	5870	187	189	0.387	0.493	0.111	0.27
70	3.4	1.4	2.5	2.7	59.0	6830	230	230	0.268	0.342	0.106	0.30
95	3.4	1.5	2.5	2.8	62.9	7990	281	270	0.193	0.247	0.100	0.34
120	3.4	1.6	2.5	3.0	66.4	9080	319	306	0.153	0.196	0.097	0.37
150	3.4	1.6	2.5	3.1	69.7	10220	366	342	0.124	0.159	0.094	0.40
185	3.4	1.7	2.5	3.2	73.5	11690	417	387	0.0991	0.128	0.092	0.43
240	3.4	1.8	3.15	3.4	80.2	14990	485	441	0.0754	0.0984	0.089	0.48
300	3.4	1.9	3.15	3.6	85.7	17320	553	486	0.0601	0.0797	0.086	0.53
400	3.4	2.0	3.15	3.8	90.9	20500	629	540	0.0470	0.0639	0.083	0.59

**BS 6622
IEC 60502-2**

**REFERENCE
GA-11-3-N**

MEDIUM VOLTAGE XLPE INSULATED POWER CABLES

TABLE 10A THREE-CORE 11kV UNARMoured CABLES (ALUMINIUM CONDUCTOR)

Nominal Area of Conductors	Thickness of Insulation	Thickness of Outer Sheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
					Current Rating		Conductor Resistance		Reactance at 50Hz	Capacitance
					In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm	mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	μF/km
16	3.4	2.2	38.7	1360	80	87	1.91	2.44	0.130	0.20
25	3.4	2.2	41.3	1570	98	104	1.20	1.54	0.124	0.22
35	3.4	2.3	43.8	1780	119	122	0.868	1.11	0.116	0.24
50	3.4	2.4	46.5	2020	145	144	0.641	0.822	0.111	0.27
70	3.4	2.5	50.2	2400	179	176	0.443	0.568	0.106	0.30
95	3.4	2.7	54.2	2860	213	207	0.320	0.410	0.100	0.34
120	3.4	2.8	57.6	3270	251	239	0.253	0.325	0.097	0.37
150	3.4	2.9	60.9	3690	281	270	0.206	0.265	0.094	0.40
185	3.4	3.0	64.7	4240	327	302	0.164	0.211	0.092	0.43
240	3.4	3.1	70.0	5060	383	342	0.125	0.161	0.089	0.48
300	3.4	3.3	75.2	5910	434	392	0.100	0.130	0.086	0.53
400	3.4	3.55	81.4	7070	502	441	0.0778	0.102	0.083	0.59

**BS 6622
IEC 60502-2**

**REFERENCE
GA-11-3-S**

MEDIUM VOLTAGE XLPE INSULATED POWER CABLES

TABLE 10B THREE-CORE 11kV ARMoured CABLES (ALUMINIUM CONDUCTOR)

Nominal Area of Conductors	Thickness of Insulation	Thickness of Extruded Bedding	Nominal Armour Wire Diameter	Thickness of Outer Sheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
							Current Rating		Conductor Resistance		Reactance at 50Hz	Capacitance
							In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm	mm	mm	mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	μF/km
16	3.4	1.2	2.0	2.3	47.2	3780	80	87	1.91	2.44	0.130	0.20
25	3.4	1.3	2.5	2.4	50.8	4280	98	104	1.20	1.54	0.124	0.22
35	3.4	1.3	2.5	2.5	53.1	4610	119	122	0.868	1.11	0.116	0.24
50	3.4	1.4	2.5	2.6	55.6	4990	145	144	0.641	0.822	0.111	0.27
70	3.4	1.4	2.5	2.7	59.1	5550	179	176	0.443	0.568	0.106	0.30
95	3.4	1.5	2.5	2.8	62.9	6200	213	207	0.320	0.410	0.100	0.34
120	3.4	1.6	2.5	3.0	66.4	6820	251	239	0.253	0.325	0.097	0.37
150	3.4	1.6	2.5	3.1	69.7	7420	281	270	0.206	0.265	0.094	0.40
185	3.4	1.7	2.5	3.2	73.5	8200	327	302	0.164	0.211	0.092	0.43
240	3.4	1.8	3.15	3.4	80.2	10300	383	342	0.125	0.161	0.089	0.48
300	3.4	1.9	3.15	3.6	85.3	11490	434	392	0.100	0.130	0.086	0.53
400	3.4	2.0	3.15	3.8	91.5	13070	502	441	0.0778	0.102	0.083	0.59

**TNB
SPECIFICATION**

**REFERENCE
TA-11-3-S**

MEDIUM VOLTAGE XLPE INSULATED POWER CABLES

TABLE 11 THREE-CORE 11KV ARMoured CABLES (ALUMINIUM CONDUCTOR)

Nominal Area of Conductors	Thickness of Insulation	Thickness of Extruded Bedding	Nominal Armour Wire Diameter	Thickness of Outer Sheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
							Current Rating		Conductor Resistance		Reactance at 50Hz	Capacitance
							In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm	mm	mm	mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	μF/km
95	3.4	1.5	2.5	2.8	63.8	5790	213	207	0.320	0.410	0.100	0.34
150	3.4	1.6	2.5	3.1	70.5	6940	281	270	0.206	0.265	0.094	0.40
240	3.4	1.8	3.15	3.4	81.1	9650	383	342	0.125	0.161	0.089	0.48

**BS 6622
IEC 60502-2**

**REFERENCE
GA-22-3-S**

MEDIUM VOLTAGE XLPE INSULATED POWER CABLES

TABLE 12 THREE-CORE 22KV ARMoured CABLES (ALUMINIUM CONDUCTOR)

Nominal Area of Conductors	Thickness of Insulation	Thickness of Extruded Bedding	Nominal Armour Wire Diameter	Thickness of Outer Sheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
							Current Rating		Conductor Resistance		Reactance at 50Hz	Capacitance
							In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm	mm	mm	mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	μF/km
35	5.5	1.5	2.5	2.8	62.8	5870	123	122	0.868	1.11	0.133	0.178
50	5.5	1.5	2.5	2.9	65.5	6310	149	144	0.641	0.821	0.127	0.194
70	5.5	1.6	2.5	3.0	69.1	6930	183	176	0.443	0.569	0.119	0.216
95	5.5	1.7	2.5	3.2	73.1	7670	221	207	0.320	0.409	0.113	0.240
120	5.5	1.7	3.2	3.3	77.9	9270	255	234	0.253	0.324	0.109	0.261
150	5.5	1.8	3.2	3.4	81.1	9950	285	261	0.206	0.265	0.105	0.28
185	5.5	1.9	3.2	3.6	85.0	10850	332	297	0.164	0.211	0.102	0.303
240	5.5	2.0	3.2	3.7	90.2	12080	391	342	0.125	0.160	0.098	0.334
300	5.5	2.0	3.2	3.9	95.4	13360	442	383	0.100	0.129	0.094	0.367

**TNB
SPECIFICATION**

**REFERENCE
TA-22-1-N**

MEDIUM VOLTAGE XLPE INSULATED POWER CABLES

TABLE 13 SINGLE-CORE 22KV UNARMoured CABLES (ALUMINIUM CONDUCTOR)

Nominal Area of Conductors	Thickness of Insulation	Thickness of Outer Sheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
					Current Rating		Conductor Resistance		Reactance at 50Hz	Capacitance
					In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm	mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	μF/km
500	5.5	4.0	51.3	3080	672	549	0.0605	0.0790	0.096	0.44

BS 6622
IEC 60502-2

REFERENCE
GC-33-1-N

MEDIUM VOLTAGE XLPE INSULATED POWER CABLES

TABLE 14A SINGLE-CORE 33kV UNARMoured CABLES (COPPER CONDUCTOR)

Nominal Area of Conductors	Thickness of Insulation	Thickness of Outer Sheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
					Current Rating		Conductor Resistance		Reactance at 50Hz	Capacitance
					In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm	mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	μF/km
630	8.0	2.7	57.9	8050	961	765	0.0283	0.0405	0.099	0.35

BS 6622
IEC 60502-2

REFERENCE
GC-33-3-S

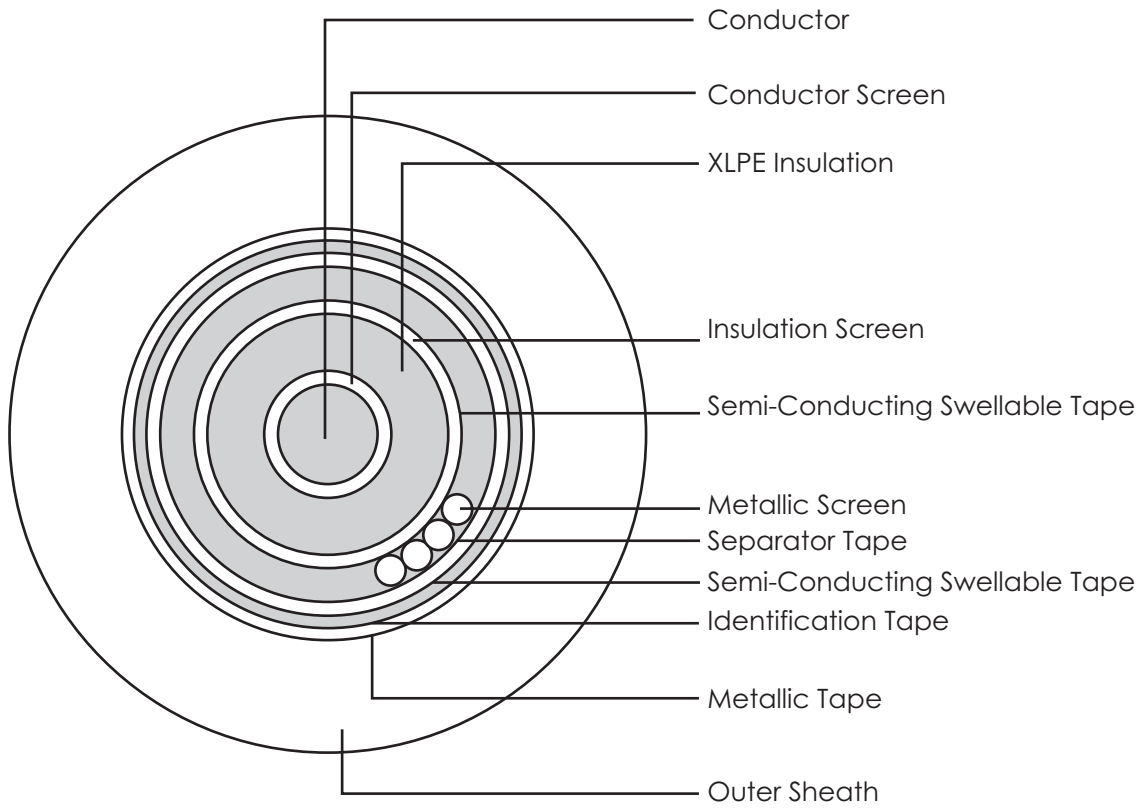
MEDIUM VOLTAGE XLPE INSULATED POWER CABLES

TABLE 14B THREE-CORE 33kV ARMoured CABLES (COPPER CONDUCTOR)

Nominal Area of Conductors	Thickness of Insulation	Thickness of Extruded Bedding	Nominal Armour Wire Diameter	Thickness of Outer Sheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
							Current Rating		Conductor Resistance		Reactance at 50Hz	Capacitance
							In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm	mm	mm	mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	μF/km
50	8.0	1.2	2.0	2.2	44.1	2590	191	189	0.387	0.494	0.143	0.155
70	8.0	1.2	2.0	2.2	45.7	2900	234	230	0.268	0.342	0.135	0.171
95	8.0	1.2	2.0	2.3	47.5	3260	281	266	0.193	0.246	0.128	0.188
120	8.0	1.2	2.0	2.3	49.0	3600	323	304	0.153	0.196	0.123	0.202
150	8.0	1.3	2.5	2.4	51.4	4130	366	338	0.124	0.159	0.119	0.216

TNB/KLIA SPECIFICATION MEDIUM VOLTAGE XLPE INSULATED POWER CABLE

SINGLE CORE COPPER WIRE SCREEN CABLE



BASIC CONSTRUCTION

CONDUCTOR	-	COPPER OR ALUMINIUM
CONDUCTOR SHAPE	-	COMPACTED CIRCULAR STRANDED
INSULATION	-	XLPE
METALLIC SCREEN	-	COPPER WIRE SCREEN
METALLIC TAPE	-	LAMINATED ALUMINIUM TAPE
SHEATH MATERIAL	-	POLYETHYLENE

TNB SPECIFICATRION
KLIA/D/UTØ6/Ø58/95

REFERENCE
TA-33-1-W

MEDIUM VOLTAGE XLPE INSULATED POWER CABLES

TABLE 15 SINGLE-CORE 33kV COPPER WIRE SCREEN CABLES (ALUMINIUM CONDUCTOR)

Nominal Area of Conductors	Thickness of Insulation	Nominal of PACW Diameter	Thickness of Outer Sheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
						Current Rating		Conductor Resistance		Reactance at 50Hz	Capacitance
						In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm	mm	mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	µF/km
630	9.0	2.52	5.0	71.4	7220	782	621	0.0469	0.0630	0.099	0.35

TNB SPECIFICATRION
KLIA/D/UTØ6/Ø58/95

REFERENCE
TC-33-1-W

MEDIUM VOLTAGE XLPE INSULATED POWER CABLES

TABLE 16 SINGLE-CORE 33kV COPPER WIRE SCREEN CABLES (COBLES CONDUCTOR)

Nominal Area of Conductors	Thickness of Insulation	Nominal of PACW Diameter	Thickness of Outer Sheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
						Current Rating		Conductor Resistance		Reactance at 50Hz	Capacitance
						In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm	mm	mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	µF/km
300	9.0	2.52	5.0	71.4	7220	629	540	0.0601	0.0785	0.112	0.22
630	9.0	2.52	5.0	72.1	11320	961	765	0.0283	0.0405	0.099	0.35

TNB SPECIFICATRION
KLIA/D/UTØ6/Ø58/95

REFERENCE
TC-11-1-W

MEDIUM VOLTAGE XLPE INSULATED POWER CABLES

TABLE 17 SINGLE-CORE 11kV COPPER WIRE SCREEN CABLES (ALUMINIUM CONDUCTOR)

Nominal Area of Conductors	Thickness of Insulation	Nominal of PACW Diameter	Thickness of Outer Sheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
						Current Rating		Conductor Resistance		Reactance at 50Hz	Capacitance
						In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm	mm	mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	µF/km
500	3.4	2.52	4.0	54.4	8100	799	675	0.0366	0.0511	0.090	0.66

TNB SPECIFICATRION
KLIA/D/UTØ6/Ø58/95

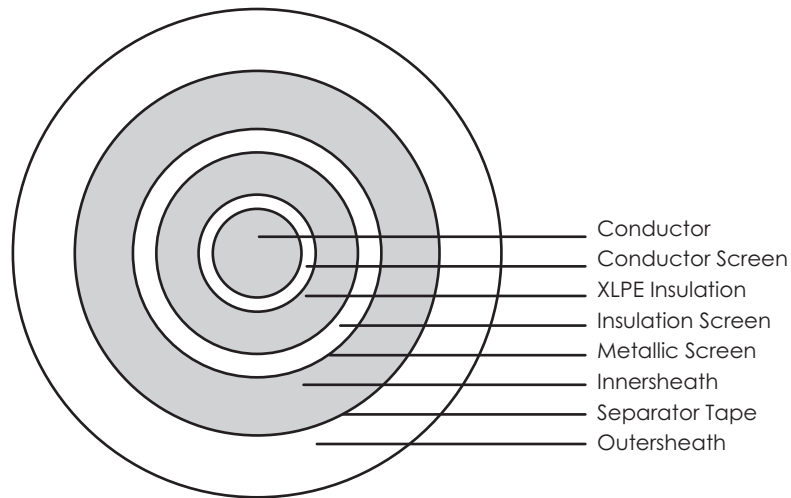
REFERENCE
TA-11-1-W

MEDIUM VOLTAGE XLPE INSULATED POWER CABLES

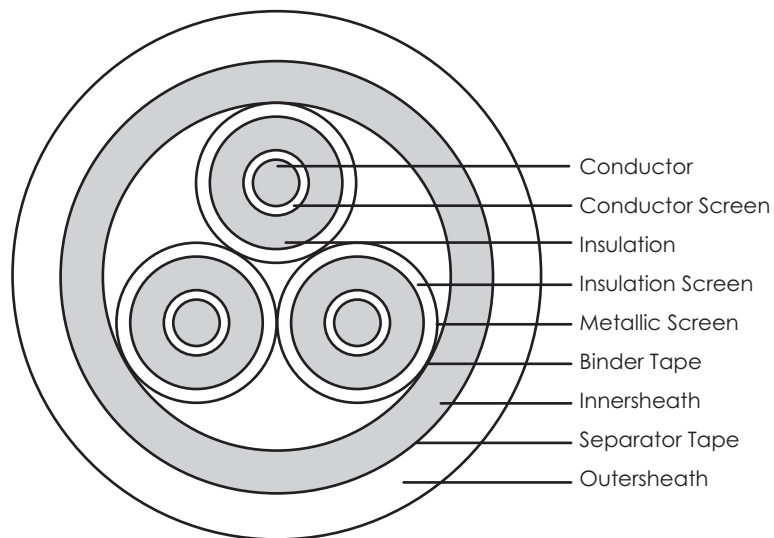
TABLE 18 SINGLE-CORE 11kV COPPER WIRE SCREEN CABLES (ALUMINIUM CONDUCTOR)

Nominal Area of Conductors	Thickness of Insulation	Nominal of PACW Diameter	Thickness of Outer Sheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
						Current Rating		Conductor Resistance		Reactance at 50Hz	Capacitance
						In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm	mm	mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	µF/km
300	3.4	3.00	4.0	49.4	4250	493	428	0.100	0.130	0.096	0.54
500	3.4	2.52	4.0	54.2	4970	672	549	0.0605	0.0816	0.090	0.66

**TNB SPECIFICATION MEDIUM VOLTAGE SINGLE-CORE XLPE INSULATED
DOUBLE-SHEATHD POWER CABLE**



**TNB SPECIFICATION MEDIUM VOLTAGE THREE-CORE XLPE INSULATED
DOUBLE-SHEATHD POWER CABLE**



BASIC CONSTRUCTION

- | | |
|----------------------|-------------------------------|
| CONDUCTOR | - COPPER OR ALUMINIUM |
| MATERIAL SHAPE | - COMPACTED CIRCULAR STRANDED |
| INSULATION | - XLPE |
| INNERSHEATH MATERIAL | - POLYETHYLENE |
| OUTERSHEATH MATERIAL | - POLYETHYLENE |

**TNB
SPECIFICATION**

**REFERENCE
TA-11-1-DS**

MEDIUM VOLTAGE XLPE INSULATED POWER CABLES

TABLE 19 SINGLE-CORE 11kV DOUBLE-SHEATHED CABLES (ALUMINIUM CONDUCTOR)

Nominal Area of Conductors	Thickness of Insulation	Thickness of Outer Sheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
					Current Rating		Conductor Resistance		Reactance at 50Hz	Capacitance
					In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm	mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	μF/km
500	3.4	2.4	47.8	2780	672	549	0.0606	0.0816	0.090	0.66

**TNB
SPECIFICATION**

**REFERENCE
TA-22-1-DS**

MEDIUM VOLTAGE XLPE INSULATED POWER CABLES

TABLE 20 SINGLE-CORE 22kV DOUBLE-SHEATHED CABLES (ALUMINIUM CONDUCTOR)

Nominal Area of Conductors	Thickness of Insulation	Thickness of Outer Sheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
					Current Rating		Conductor Resistance		Reactance at 50Hz	Capacitance
					In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm	mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	μF/km
500	5.5	2.5	52.4	3145	672	549	0.0605	0.0816	0.090	0.66

**TNB
SPECIFICATION**

**REFERENCE
TA-11-3-DS**

MEDIUM VOLTAGE XLPE INSULATED POWER CABLES

TABLE 21 THREE-CORE 11kV DOUBLE-SHEATHED CABLES (ALUMINIUM CONDUCTOR)

Nominal Area of Conductors	Thickness of Insulation	Thickness of Outer Sheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
					Current Rating		Conductor Resistance		Reactance at 50Hz	Capacitance
					In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm	mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	μF/km
95	3.4	2.7	59.2	3325	238	225	0.320	0.410	0.112	0.34
150	3.4	2.9	66.1	4095	310	288	0.206	0.265	0.106	0.40
240	3.4	3.2	79.0	5565	425	374	0.125	0.161	0.099	0.49

Minimum thickness of the innersheath shall be 2.0mm

**TNB
SPECIFICATION**

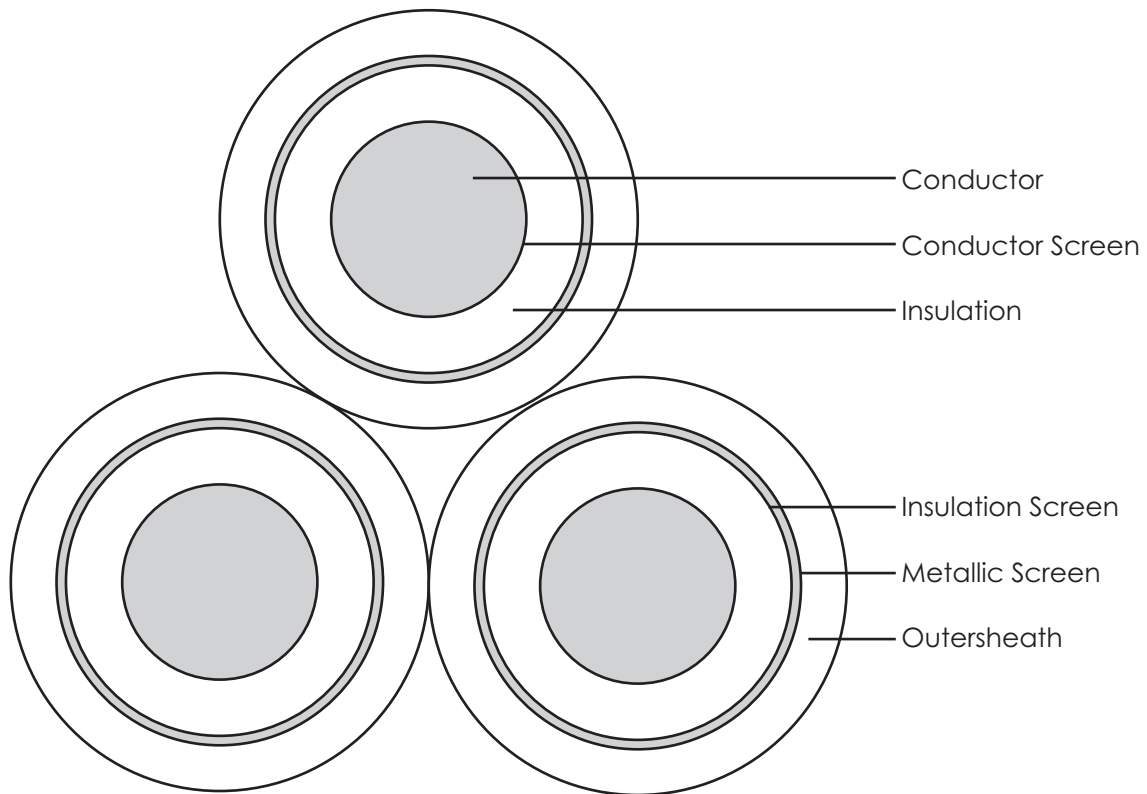
**REFERENCE
TA-11-3-T**

MEDIUM VOLTAGE XLPE INSULATED POWER CABLES

TABLE 22 TRIPLEX 11kV XLPE INSULATED CABLES (ALUMINIUM CONDUCTOR)

Nominal Area of Conductors	Thickness of Insulation	Thickness of Outer Sheath	Overall Diameter Over Oversheath	Overall Diameter	Approx. Weight	Electrical Characteristics					
						Current Rating		Conductor Resistance		Reactance at 50Hz	Capacitance
						In Air at 40°C	In Ground at 25°C	dc at 20°C	50Hz at 90°C		
sq. mm	mm	mm	mm	mm	kg/km	amp	amp	Ω/km	Ω/km	Ω/km	μF/km
240	3.4	3.0	35.8	77.3	4680	500	435	0.125	0.1611	0.1023	0.5490

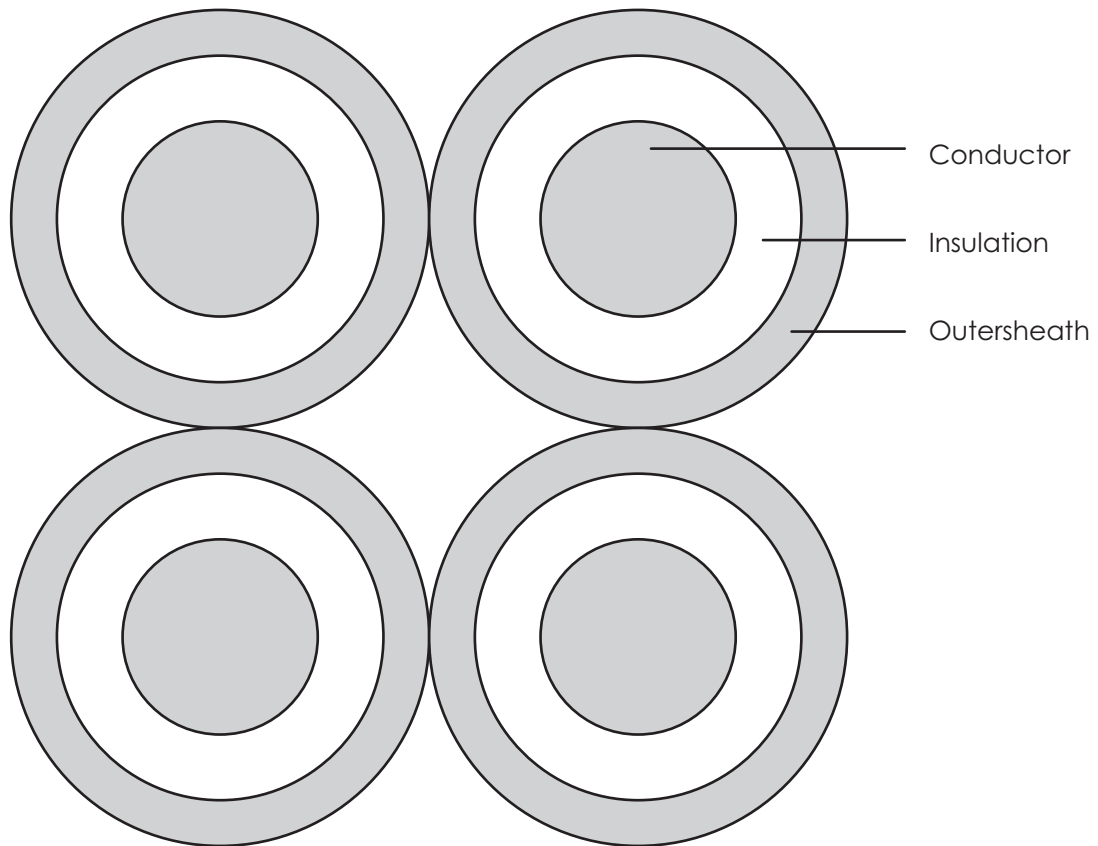
MEDIUM VOLTAGE XLPE INSULATED, MDPE OUTERSHEATHED, TRIPLEX CABLE



BASIC CONSTRUCTION

CONDUCTOR	- ALUMINIUM
MATERIAL SHAPE	- COMPACTED CIRCULAR STRANDED
INSULATION	- XLPE
METALLIC SCREEN	- COPPER TAPES
SHEATH MATERIAL	- POLYETHYLENE

600/1000V XLPE INSULATED, PVC OUTERSHEATHED, QUADRUPLIX CABLE



BASIC CONSTRUCTION

CONDUCTOR	-	ALUMINIUM
CONDUCTOR SHAPE	-	COMPACTED CIRCULAR STRANDED
INSULATION	-	XLPE
SHEATH MATERIAL	-	PVC

TABLE A TECHNICAL DATA FOR CABLE INSTALLATION

A.1 MINIMUM BENDING RADIUS

CABLE TYPE	SINGLE-CORE	MULTI-CORE
Unarmoured	20D	15D
Wire Armoured	15D	12D
Tape Armoured	15D	12D

A.1 MINIMUM PULLING TENSION

PULLING METHOD	MAXIMUM PULLING TENSION, T IN KG
Pulling Eye Attached to the Conductors	$T = K \times S$
Pulling Grip Over the Cable Sheath	$T = 500$

A.3 MAXIMUM SIDE WALL PRESSURE

The side wall pressure of the cable should not exceed 500kg/m.

The calculation:-

$$P = T/R$$

Where

P = Side Wall Pressure (kg/m)

T = Pulling Tension (kg)

R = Bending Radius (m)

D = Cable Overall Diameter

S = Total Cross Sectional Area of Conductors (mm²)

K = 7kg/mm² for Copper Conductor; 4kg/mm² for Aluminium Conductor

INSTALLATION CONDITIONS AND CORRECTION FACTORS FOR CONTINUOUS CURRENT RATING FOR:

1. XLPE Insulated & PVC Sheathed Cables
0.6/1kV IEC: 502
2. XLPE Insulated, Wire Armoured & PVC Sheathed Cables
0.6/1kV IEC: 502

CALCULATION BASE FOR ELECTRICAL CHARACTERISTICS

INSTALLATION

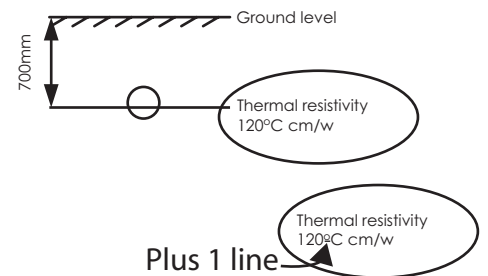
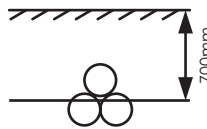
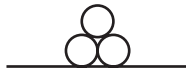
In Air (Ambient Temperature: 40°C)

In the Ground (Ambient Temperature: 25°C)

Single-core cable Multi-core cable

Single-core cable

Multi-core cable



CALCULATION BASE FOR ELECTRICAL CHARACTERISTICS

Ambient Temperature (°C) / Installation	15	20	25	30	35	40	45	50	55
In Air	1.22	1.18	1.14	1.10	1.05	1.0	0.95	0.89	0.84
In the Ground	1.07	1.04	1.0	0.96	0.92	0.88	0.83	0.78	0.73

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SHORT CIRCUIT CURRENT

The thermally permissible short circuit current for a Conductor of specified size may be calculated from the equations below. For the purposes of calculated, the standard short circuit duration period is up to 5 sec.

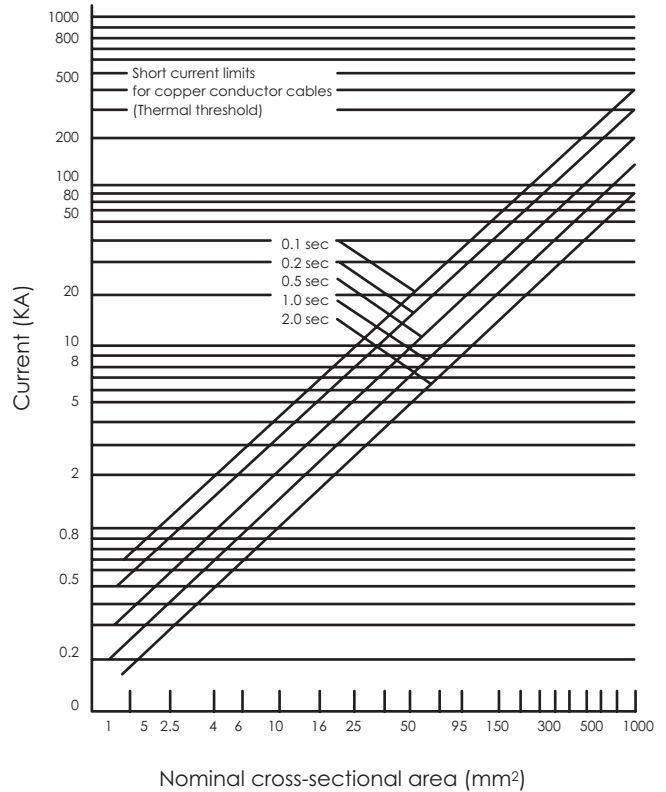
$$1. \text{ Copper conductor } I = \frac{143 \cdot S}{\sqrt{t}} \text{ (A)}$$

$$2. \text{ Aluminium conductor } I = \frac{94 \cdot S}{\sqrt{t}} \text{ (A)}$$

where

S = Conductor size (mm²)

t = Short circuit (seconds)



XLPE PROPERTIES

Cross linked Polyethylene – (XLPE) materials are derived through processes which cause a cross-bonding activity among conventional polyethylene (PE) molecules. Such cross-bonded PE matrixes, while retaining the same outstanding electrical properties as conventional PE, demonstrate, in this new form, vastly improved thermal and mechanical properties, especially with regard to high temperatures strength.

Figure 1 represents the structure of a conventional PE molecule. Such molecules will, in actuality, comprise somewhere between 1000 – 4000 carbon atoms. By causing the formation of cross-bonds (cross-linking Fig.2) between such enormous molecules, a very tough material will result (as is the case with vulcanized rubber), where only a slight deformation can possibly occur even at high temperature. This is the reason why XLPE is superior in heat resistance.

Today, there are several methods that can be applied to vulcanize polyethylene, and any one process is selected according to the kind of cable involved. For high voltage cable, chemical vulcanization is used, wherein a low density polyethylene is mixed with a vulcanizing (cross-linking) agent and heated to let the chemical reaction take place.

Fig 1 PE

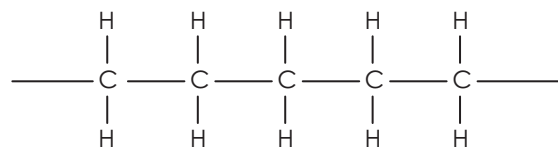
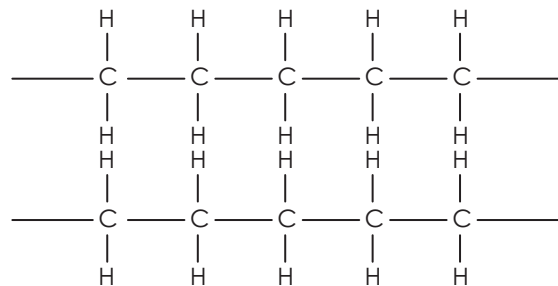


Fig 2 XLPE



TNB SPECIFICATION

TABLE 1 LOW VOLTAGE AERIAL BUNDLE CABLE (ALUMINIUM)

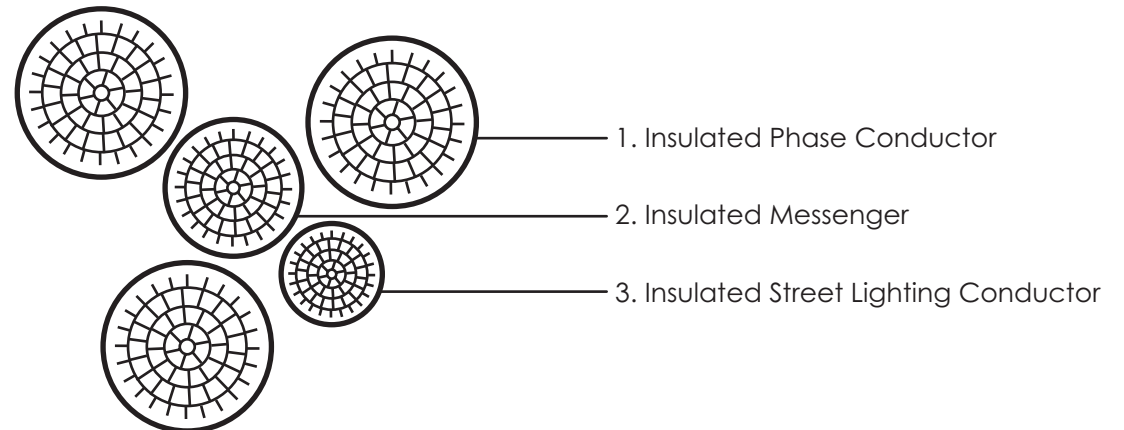
PHYSICAL PROPERTIES AND DIMENSIONS

SIZES OF AERIAL BUNDLED CABLES	PHASE CONDUCTORS						MESSENGER CONDUCTOR						MESSENGER CONDUCTORS						NOMINAL DIAMETER OF CABLE					
	CONDUCTOR SIZE	NUMBER & DIAMETER OF STRANDS	NOMINAL DIAMETER OF CONDUCTOR	NOMINAL THICKNESS OF INSULATION	NOMINAL DIAMETER OF INSULATED CONDUCTOR	MAX. AC RESISTANCE AT 30°C	CONDUCTOR SIZE	NUMBER & DIAMETER OF STRANDS	NOMINAL DIAMETER OF CONDUCTOR	NOMINAL THICKNESS OF INSULATION	NOMINAL DIAMETER OF INSULATED CONDUCTOR	MAX. AC RESISTANCE AT 30°C	CONDUCTOR SIZE	NUMBER & DIAMETER OF STRANDS	NOMINAL DIAMETER OF CONDUCTOR	NOMINAL THICKNESS OF INSULATION	NOMINAL DIAMETER OF INSULATED CONDUCTOR	MAX. AC RESISTANCE AT 30°C		MODULUS OF ELASTICITY	TEMPERATURE COEFFICIENT OF EXPANSION	BREAKING LOAD		
	(No./mm & sq.mm)	(sq.mm)	(No./mm)	(mm)	(mm)	(mm)	(Ω/km)	(sq.mm)	(No./mm)	(mm)	(mm)	(mm)	(mm)	(Ω/km)	(sq.mm)	(No./mm)	(mm)	(mm)		(mm)	(mm)	(Ω/km)	(kg/sq.mm)	(1/°C)
1x16+25	3x16	7/1.78	4.7	1.0	6.8	1.99	-	-	-	-	-	-	25	7/2.34	7.0	1.2	9.5	1.430	6 000	2.30E + 05	8.44	16.4		
3x16+25	3x16	7/1.78	4.7	1.0	6.8	1.99	-	-	-	-	-	-	25	7/2.34	7.0	1.2	9.5	1.430	6 000	2.30E + 05	8.44	23.3		
3x95+70+16	3x95	19/2.60	11.4	1.6	14.8	0.333	16	7/1.78	4.7	1.0	6.8	1.99	70	19/2.14	10.7	1.4	13.8	0.511	5 700	2.30E + 05	19.6	43.5		
3x185+120+16	3x185	37/2.60	16.1	2.0	20.3	0.171	16	7/1.78	4.7	1.0	6.8	1.99	120	19/2.85	14.3	1.6	17.6	0.322	5 700	2.30E + 05	33.6	58.2		

CURRENT RATING

SIZES OF AERIAL BUNDLED CABLES	CONTINUOUS CURRENT RATING WITH AN AMBIENT TEMPERATURE OF 30°C	MAXIMUM PERMISSIBLE SHORT-TIME CURRENT AT:			
		(kA)			
		0.1 SEC	0.5 SEC	1 SEC	3 SEC
(No./mm & sq.mm)	(A)				
1x16+25	97.7	3.65	1.63	1.15	0.67
3x16+25	71.5	3.65	1.63	1.15	0.67
3x95+70+16	186	21.7	9.70	6.86	3.96
3x185+120+16	275	42.2	18.9	13.4	7.71

BASIC CONSTRUCTION



TNB SPECIFICATION

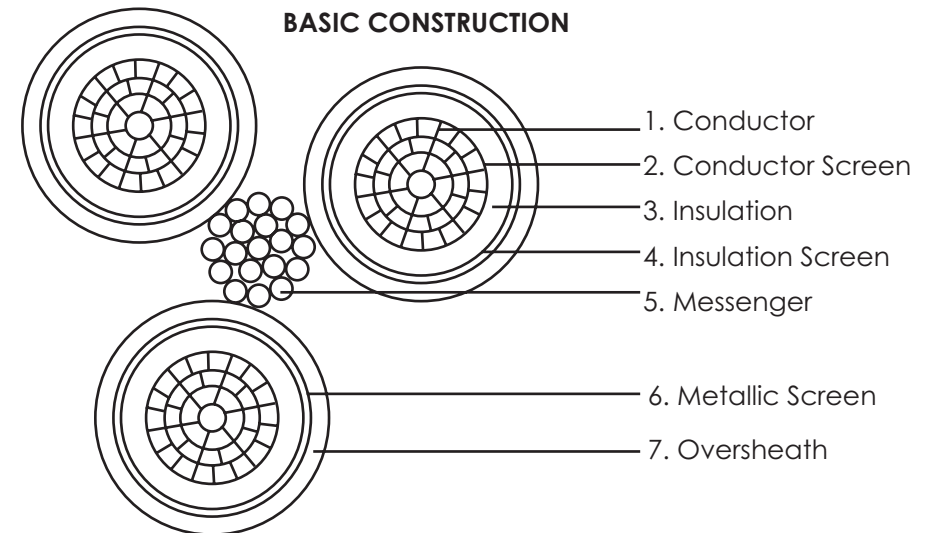
TABLE 2 11kV AERIAL BUNDLED CABLE (ALUMINIUM)

PHYSICAL PROPERTIES AND DIMENSIONS

SIZES OF AERIAL BUNDLED CABLES	PHASE CONDUCTORS									MESSENGER CONDUCTORS						NOMINAL OVERALL DIAMETER OF CABLE
	CONDUCTOR SIZE	NUMBER & DIAMETER OF STRANDS	NOMINAL DIAMETER OF CONDUCTOR	NOMINAL THICKNESS OF INSULATION	NOMINAL DIAMETER OF INSULATED CONDUCTOR	MAX. DC RESISTANCE AT 20°C	MAX. AC RESISTANCE AT 90°C	EQUIVALENT STAR CAPACITANCE	STAR REACTANCE AT 50Hz	CONDUCTOR SIZE	NUMBER & DIAMETER OF STRANDS	NOMINAL DIAMETER OF CONDUCTOR	MINIMUM TENSILE STRENGTH	MINIMUM ELONGATION	MINIMUM ZINC COATING	
(No./mm & sq.mm)	(sq.mm)	(No./mm)	(mm)	(mm)	(mm)	(Ω/km)	(Ω/km)	(Ω/km)	(Ω/km)	(sq.mm)	(No./mm)	(mm)	(N/mm ²)	(%)	(g/mm ²)	(mm)
3x50+50	3x50	7/3.06	8.09	3.4	18.5	0.641	0.822	0.300	0.133	50	7/3.00	9.0	1280	3.5	240	52.8
3x70+50	3x70	19W	9.73	3.4	20.1	0.443	0.443	0.338	0.123	50	7/3.00	9.0	1280	3.5	240	56.3

CURRENT RATING

SIZES OF AERIAL CABLES	CONTINUOUS CURRENT RATING WITH AN AMBIENT TEMPERATURE OF 30°C	MAXIMUM PERMISSIBLE SHORT-TIME CURRENT AT:		COPPER TAPE EARTH FAULT RATING AT INITIAL TEMPERATURE : 75°C AT FINAL TEMPERATURE : 180°C		MAXIMUM VOLTAGE DROP AT 90°C FOR 1 PHASE CIRCUIT
		(kA)	(kA)	0.1 SEC	3 SEC	
(No./mm & sq.mm)	(A)	0.1 SEC	3 SEC	0.1 SEC	3 SEC	(mV/A.m)
3x50+50	140	4.5	2.6	1.78	1.03	1.665
3x70+50	175	6.5	3.7	1.94	1.12	1.162



TNB SPECIFICATION

TABLE 3 33kV AERIAL BUNDLED CABLE (ALUMINIUM)

PHYSICAL PROPERTIES AND DIMENSIONS

SIZES OF AERIAL BUNDLED CABLES	PHASE CONDUCTORS									MESSENGER CONDUCTORS						NOMINAL OVERALL DIAMETER OF CABLE
	CONDUCTOR SIZE	NUMBER & DIAMETER OF STRANDS	NOMINAL DIAMETER OF CONDUCTOR	NOMINAL THICKNESS OF INSULATION	NOMINAL DIAMETER OF INSULATED CONDUCTOR	MAX. DC RESISTANCE AT 20°C	MAX. AC RESISTANCE AT 90°C	EQUIVALENT STAR CAPACITANCE	STAR REACTANCE AT 50Hz	CONDUCTOR SIZE	NUMBER & DIAMETER OF STRANDS	NOMINAL DIAMETER OF CONDUCTOR	MINIMUM TENSILE STRENGTH	MINIMUM ELONGATION	MINIMUM ZINC COATING	
	(No./mm & sq.mm)	(sq.mm)	(No./mm)	(mm)	(mm)	(Ω/km)	(Ω/km)	(Ω/km)	(Ω/km)	(sq.mm)	(No./mm)	(mm)	(N/mm ²)	(%)	(g/mm ²)	
3x50+50	3x50	7/3.06	8.09	8.0	29.3	0.641	0.822	0.158	0.156	50	7/3.00	9.0	1280	3.5	240	79.3
3x150+50	3x150	37W	14.40	8.0	35.6	0.206	0.205	0.221	0.127	50	7/3.00	9.0	1280	3.5	240	89.6
3x185+50	3x185	37W	16.10	8.0	37.3	0.164	0.211	0.238	0.122	50	7/3.00	9.0	1280	3.5	240	93.3

CURRENT RATING

SIZES OF AERIAL CABLES	CONTINUOUS CURRENT RATING WITH AN AMBIENT TEMPERATURE OF 30°C	MAXIMUM PERMISSIBLE SHORT-TIME CURRENT AT:		COPPER TAPE EARTH FAULT RATING AT INITIAL TEMPERATURE : 75°C AT FINAL TEMPERATURE : 180°C		MAXIMUM VOLTAGE DROP AT 90°C FOR 1 PHASE CIRCUIT (mV/A.m)
		(kA)		(kA)		
		0.1 SEC	3 SEC	0.1 SEC	3 SEC	
(No./mm & sq.mm)	(A)					
3x50+50	165	4.5	2.6	2.82	1.63	1.673
3x150+50	315	14.0	17.5	3.56	2.05	0.587
3x185+50	355	8.1	10.1	3.73	2.15	0.487

