

PE AND XLPE INSULATED AERIAL BUNDLE CABLES

The concept of insulated aerial cables was developed in the early 1960's in Europe to provide a reliable, safe and economical alternative system of electrification.

The development was accelerated due to progress achieved in the field of synthetic insulating materials such as polyvinyl (PVC) and polyethylene (PE). Crosslinked polyethylene (XLPE) was later added to the list.

National standards from a few European countries have been issued specifically for insulated aerial cable employing designs from experiences and research. Although these are mainly for low voltage installation standards for high voltage cables have been derived from specifications such as IEC 60502 which incorporates several extruded dielectrics for cables up to 30 kV.

Aluminium and its alloys are used universally as conductors or neutral supports due to their inherent light weight; steel wires traditionally used in ACSR constructions are used as the supporting catenary especially for heavier medium to high voltage cables.

This cables permit longer spans, lower mounting, minimum support, and simplified installation, particularly among trees or in congested areas. It also offers maximum personnel safety and protection against outage. Resistance to abrasion, flexing, and effects of heat, moisture, sunlight and cold assure high dependability through long years of services.

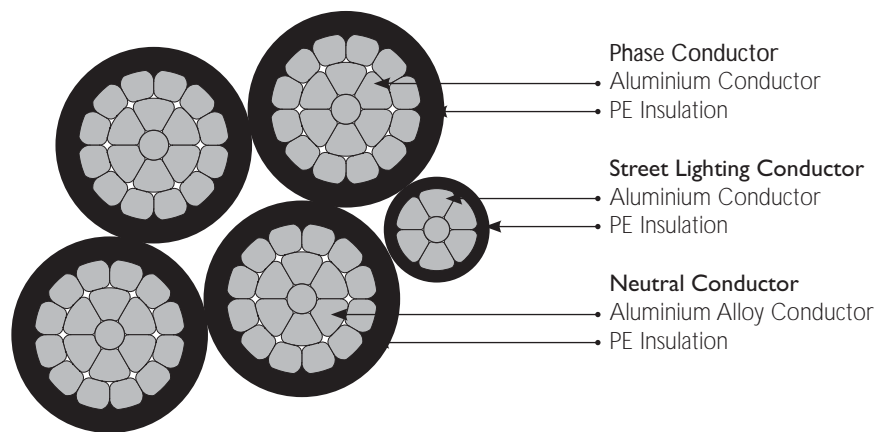


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AL/PE INSULATED AERIAL BUNDLED CABLES AL/PE INSULATED

IEC 60502 & TNB Specification 0.6/1 (1.2) kV



DESCRIPTION

The aerial bundled cables designed for overhead distribution lines have an insulated neutral messenger made of AAAC, which the insulated aluminium phase conductors are helically wound over it. Cables are rated at 0.6/1 (1.2) kV and conform to IEC 60502 & TNB Specification.

CONSTRUCTION

- 1 Conductor :
 - a) Phase - The phase conductors shall be of H68 Condition aluminium conductor and compacted circular stranded.
 - b) Neutral or messenger - The neutral or messenger conductor shall be of aluminium alloy conductor and compacted circular stranded.
 - c) Street Lighting - The street lighting conductors shall be of H68 Condition aluminium conductor and compacted circular stranded.
- 2 Insulation :

The phase, neutral and street lighting conductors shall be extruded with Polyethylene (PE) as insulation.
- 3 Assembly :

The cable consists of insulated phase and street lighting aluminium conductors, shall be held firmly onto the insulated neutral messenger aluminium alloy conductor in a right hand (Z) lay.

Cables without street lighting

Phase conductor

Nominal cross-sectional area	mm ²	16 *	16 *	25	35	50	70	95	120	150	185
Number of cores		1	3	3	3	3	3	3	3	3	3
Minimum number of wires		6	6	6	6	6	12	15	15	30	30
Nominal insulation thickness	mm	1.0	1.0	1.2	1.2	1.4	1.4	1.6	1.6	1.8	2.0
Diameter of insulated core	mm	6.8	6.8	8.5	9.5	11.2	13.0	15.1	16.6	18.4	20.6
Max. dc resistance at 20°C	ohm/km	1.91	1.91	1.20	0.868	0.641	0.443	0.320	0.253	0.206	0.164
Current rating at still wind, ambient temperature = 30°C, conductor temperature = 75°C	A	61	61	84	104	129	167	209	246	283	332
Maximum voltage drop	mV/A/m	4.67	4.05	2.54	1.84	1.36	0.95	0.69	0.55	0.46	0.37

Messenger conductor

Nominal cross-sectional area	mm ²	25	25	25	25	35	50	70	70	95	120
Minimum number of wires		6	6	6	6	6	6	12	12	15	15
Nominal insulation thickness	mm	1.2	1.2	1.2	1.2	1.2	1.4	1.4	1.4	1.6	1.6
Diameter of insulated core	mm	8.5	8.5	8.5	8.5	9.5	11.2	13.1	13.1	15.1	16.6
Max. dc resistance at 20°C	ohm/km	1.312	1.312	1.312	1.312	0.943	0.693	0.469	0.469	0.349	0.273
Calculated breaking load	kN	6.4	6.4	6.4	6.4	8.9	12.1	18.0	18.0	24.2	30.8

Completed cable

Approx. overall diameter	mm	15.3	19.0	23.2	25.6	30.0	34.9	40.6	44.1	49.2	54.9
Approx. weight of cable	kg/km	160	290	400	500	680	920	1,270	1,510	1,870	2,340
Packing length	m/drum	1,000	1,000	1,000	1,000	1,000	1,000	500	500	500	500

Cables with street lighting

Phase conductor

Nominal cross-sectional area	mm ²	25	35	50	70	95 *	120	150	185 *
Number of cores		3	3	3	3	3	3	3	3
Minimum number of wires		6	6	6	12	15	15	30	30
Nominal insulation thickness	mm	1.2	1.2	1.4	1.4	1.6	1.6	1.8	2.0
Diameter of insulated core	mm	8.5	9.5	11.2	13.0	15.1	16.6	18.4	20.6
Max. dc resistance at 20°C	ohm/km	1.20	0.868	0.641	0.443	0.320	0.253	0.206	0.164
Current rating at still wind, ambient temperature = 30°C, conductor temperature = 75°C	A	84	104	129	167	209	246	283	332
Maximum voltage drop	mV/A/m	2.54	1.84	1.36	0.95	0.69	0.55	0.46	0.37

Messenger conductor

Nominal cross-sectional area	mm ²	25	25	35	50	70	70	95	120
Minimum number of wires		6	6	6	6	12	12	15	15
Nominal insulation thickness	mm	1.2	1.2	1.2	1.4	1.4	1.4	1.6	1.6
Diameter of insulated core	mm	8.5	8.5	9.5	11.2	13.1	13.1	15.1	16.6
Max. dc resistance at 20°C	ohm/km	1.312	1.312	0.943	0.693	0.469	0.469	0.349	0.273
Calculated breaking load	kN	6.4	6.4	8.9	12.1	18.0	18.0	24.2	30.8

Street lighting conductor

Nominal cross-sectional area	mm ²	16	16	16	16	16	16	16	16
Minimum number of wires		6	6	6	6	6	6	6	6
Nominal insulation thickness	mm	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Diameter of insulated core	mm	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8
Max. dc resistance at 20°C	ohm/km	1.91	1.91	1.91	1.91	1.91	1.91	1.91	1.91

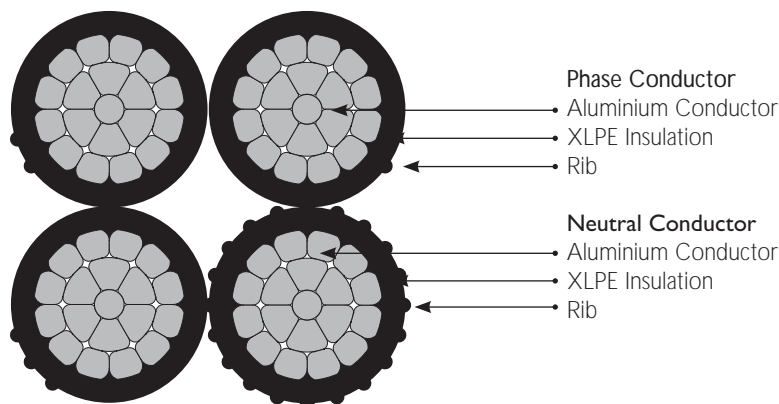
Completed cable

Approx. overall diameter	mm	23.2	25.6	30.0	34.9	40.6	44.1	49.2	54.9
Approx. weight of cable	kg/km	470	560	740	980	1,330	1,580	1,940	2,410
Packing length	m/drum	1,000	1,000	1,000	1,000	500	500	500	500

Remarks : *Standard size in the TNB Specification .

AL/XLPE INSULATED AERIAL BUNDLED CABLES AL/XLPE INSULATED

AS/NZS 3560.1 0.6/1 (1.2) kV



DESCRIPTION

The aerial bundled cables designed for overhead distribution lines have all conductors made of aluminium 1350 and are insulated with XLPE. Phase and neutral cores are laid up in a bundle with a left hand lay. Cables are rated at 0.6/1 (1.2) kV and conform to AS/NZS 3560.1.

The main advantage of aerial bundled cables include :

1. Ease of erection and stringing
2. Practically no tree - trimming required
3. Less maintenance

CONSTRUCTION

- 1 **Conductor (For both phase and neutral) :**
The conductors shall be of aluminium 1350 wires and are compacted circular stranded.
- 2 **Insulation :**
The conductors shall be extruded with Cross-linked Polyethylene (XLPE) material as insulation. Each phase core is marked with numerals and letters 1 ONE, 2 TWO or 3 THREE and with one rib, two ribs or three ribs to denote the phases. The neutral core carries equally spaced ribs right round the circumference.
- 3 **Assembly :**
The cores shall be laid up with a left hand (S) lay.

AS/NZS 3560.1

0.6/1 (1.2) kV

Phase conductor

Nominal cross-sectional area	mm ²	16	25	35	50	95	25	35	50
Number of cores		1	1	1	1	1	2	2	2
Minimum number of wires		6	6	6	6	15	6	6	6
Nominal insulation thickness	mm	1.3	1.3	1.3	1.5	1.7	1.3	1.3	1.5
Diameter of insulated core	mm	7.5	8.8	9.8	11.4	15.3	8.8	9.8	11.4
Max. dc resistance at 20°C	ohm/km	1.91	1.20	0.868	0.641	0.320	1.20	0.868	0.641
Current rating for typical Australian installation conditions Conductor temperature = 80°C	A	78	105	125	150	230	97	120	140

Neutral conductor

Nominal cross-sectional area	mm ²	16	25	35	50	95	25	35	50
Minimum number of wires		6	6	6	6	15	6	6	6
Nominal insulation thickness	mm	1.3	1.3	1.3	1.5	1.7	1.3	1.3	1.5
Diameter of insulated core	mm	7.5	8.8	9.8	11.4	15.3	8.8	9.8	11.4
Max. dc resistance at 20°C	ohm/km	1.91	1.20	0.868	0.641	0.320	1.20	0.868	0.641

Completed cable

Minimum breaking load	kN	4.4	7.0	9.8	14.0	26.6	10.5	14.7	21.0
Approx. overall diameter	mm	15.0	17.6	19.6	22.8	30.6	19.0	21.1	24.6
Approx. weight of cable	kg/km	140	210	270	370	680	310	410	550
Packing length	m/drum	1,000	1,000	1,000	1,000	500	1,000	1,000	1,000

Phase conductor

Nominal cross-sectional area	mm ²	16	25	35	50	70	95	120	150
Number of cores		3	3	3	3	3	3	3	3
Minimum number of wires		6	6	6	6	12	15	15	15
Nominal insulation thickness	mm	1.3	1.3	1.3	1.5	1.5	1.7	1.7	1.7
Diameter of insulated core	mm	7.5	8.8	9.8	11.4	13.2	15.3	16.8	18.2
Max. dc resistance at 20°C	ohm/km	1.91	1.20	0.868	0.641	0.443	0.320	0.253	0.206
Current rating for typical Australian installation conditions Conductor temperature = 80°C	A	74	97	120	140	175	215	250	280

Neutral conductor

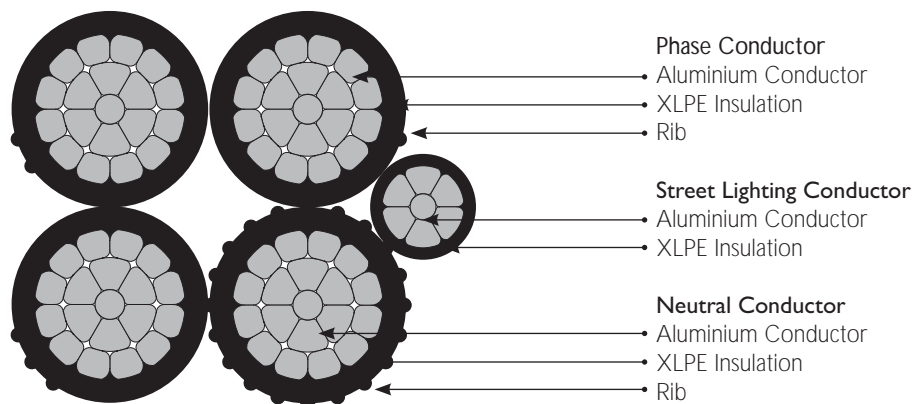
Nominal cross-sectional area	mm ²	16	25	35	50	70	95	120	150
Minimum number of wires		6	6	6	6	12	15	15	15
Nominal insulation thickness	mm	1.3	1.3	1.3	1.5	1.5	1.7	1.7	1.7
Diameter of insulated core	mm	7.5	8.8	9.8	11.4	13.2	15.3	16.8	18.2
Max. dc resistance at 20°C	ohm/km	1.91	1.20	0.868	0.641	0.443	0.320	0.253	0.206

Completed cable

Minimum breaking load	kN	8.8	14.0	19.6	28.0	39.2	53.2	67.2	84.0
Approx. overall diameter	mm	18.1	21.2	23.7	27.5	31.9	36.9	40.6	43.9
Approx. weight of cable	kg/km	290	410	550	740	1,000	1,370	1,690	2,020
Packing length	m/drum	1,000	1,000	1,000	1,000	1,000	500	500	500

AL/XLPE INSULATED AERIAL BUNDLED CABLES AL/XLPE INSULATED

BS 7870-5 0.6/1 (1.2) kV



DESCRIPTION

The aerial bundled cables designed for overhead distribution lines have all conductors made of aluminium 1350 and are insulated with XLPE . Phase and neutral cores are laid up in a bundle with a left hand lay. Cables are rated at 0.6/1 (1.2) kV and conform to BS 7870-5.

The main advantage of aerial bundled cables include :

1. Ease of erection and stringing
2. Practically no tree - trimming required
3. Less maintenance

CONSTRUCTION

- 1 Conductor (For either phase, neutral or street lighting) :
The conductors shall be of aluminium 1350 wires and are compacted circular stranded.
- 2 Insulation :
The conductors shall be extruded with Cross-linked Polyethylene (XLPE) material as insulation. Each phase core is marked with numerals and letters 1 ONE, 2 TWO or 3 THREE and with one rib, two ribs or three ribs to denote the phases. The neutral core carries equally spaced ribs right round the circumference.
- 3 Assembly :
The cores shall be laid up with a left hand (S) lay.

Cables without street lighting

Phase conductor

Nominal cross-sectional area	mm ²	25	35	50	70	95	25	35	50	70	95	120
Number of cores		1	1	1	1	1	3	3	3	3	3	3
Minimum number of wires		6	6	6	12	15	6	6	6	12	15	15
Nominal insulation thickness	mm	1.3	1.3	1.5	1.5	1.7	1.3	1.3	1.5	1.5	1.7	1.7
Diameter of insulated core	mm	8.8	9.8	11.5	13.2	15.3	8.8	9.8	11.5	13.2	15.3	16.8
Max. dc resistance at 20°C	ohm/km	1.20	0.868	0.641	0.443	0.320	1.20	0.868	0.641	0.443	0.320	0.253
Current rating at still wind ambient temperature = 30°C Conductor temperature = 75°C	A	84	104	129	167	209	84	104	129	167	209	283

Neutral conductor

Nominal cross-sectional area	mm ²	25	35	50	70	95	25	35	50	70	95	120
Minimum number of wires		6	6	6	12	15	6	6	6	12	15	15
Nominal insulation thickness	mm	1.3	1.3	1.5	1.5	1.7	1.3	1.3	1.5	1.5	1.7	1.7
Diameter of insulated core	mm	8.8	9.8	11.5	13.2	15.3	8.8	9.8	11.5	13.2	15.3	16.8
Max. dc resistance at 20°C	ohm/km	1.20	0.868	0.641	0.443	0.320	1.20	0.868	0.641	0.443	0.320	0.253

Completed cable

Minimum breaking load	kN	8.2	11.2	15.2	22.0	30.6	16.4	22.4	30.4	44.0	61.2	77.6
Approx. overall diameter	mm	17.6	19.6	23.0	26.4	30.6	21.2	23.7	27.8	31.9	36.9	40.6
Approx. weight of cable	kg/km	210	270	360	500	680	410	550	730	1000	1370	1690
Packing length	m/drum	1,000	1,000	1,000	1,000	500	1,000	1,000	1,000	1,000	500	500

Cables with street lighting

Phase conductor

Nominal cross-sectional area	mm ²	50	70	95
Number of cores		3	3	3
Minimum number of wires		6	12	15
Nominal insulation thickness	mm	1.5	1.5	1.7
Diameter of insulated core	mm	11.5	13.2	15.3
Max. dc resistance at 20°C	ohm/km	0.641	0.443	0.320
Current rating at still wind, ambient temperature = 30°C conductor temperature = 75°C	A	129	167	209

Neutral conductor

Nominal cross-sectional area	mm ²	50	70	95
Minimum number of wires		6	12	15
Nominal insulation thickness	mm	1.5	1.5	1.7
Diameter of insulated core	mm	11.5	11.5	15.3
Max. dc resistance at 20°C	ohm/km	0.641	0.443	0.320

Street lighting conductor

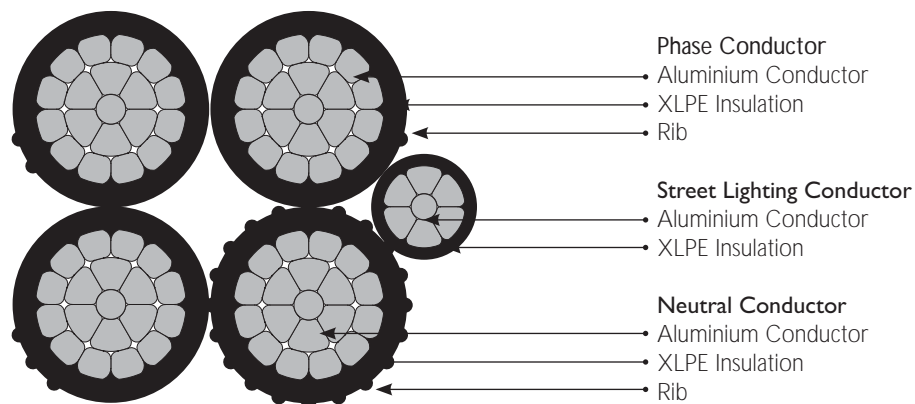
Nominal cross-sectional area	mm ²	25	25	25
Minimum number of wires		6	6	6
Nominal insulation thickness	mm	1.3	1.3	1.3
Diameter of insulated core	mm	8.8	8.8	8.8
Max. dc resistance at 20°C	ohm/km	1.20	1.20	1.20

Completed cable

Minimum breaking load	kN	34.5	48.1	65.3
Approx. overall diameter	mm	29.8	33.6	38.2
Approx. weight of cable	kg/km	830	1100	1470
Packing length	m/drum	1,000	1,000	500

AL/XLPE INSULATED AERIAL BUNDLED CABLES AL/XLPE INSULATED

IEC 60502 & DES/LV/ABC 0.6/1 (1.2) kV



DESCRIPTION

The aerial bundled cables designed for overhead distribution lines have all conductors made of aluminium 1350 and are insulated with XLPE. Phase and neutral cores are laid up in a bundle with a left hand lay. Cables are rated at 0.6/1(1.2) kV and conform to IEC 60502 & DES/LV/ABC.

The main advantage of aerial bundled cables include :

1. Ease of erection and stringing
2. Practically no tree - trimming required
3. Less maintenance

CONSTRUCTION

- 1 **Conductor (For either phase, neutral or street lighting) :**
The conductors shall be of H68 condition aluminium conductor and compacted circular stranded.
- 2 **Insulation :**
The conductors shall be extruded with Cross-linked Polyethylene (XLPE) material as insulation. Each phase core is marked with one rib, two ribs or three ribs to denote the phases .The neutral core carries equally spaced ribs right round the circumference.The street lighting core is marked with the letter " S/L " .
- 3 **Assembly :**
The cores shall be laid up with a left hand (S) lay.

Cables without street lighting

Phase conductor

Nominal cross-sectional area	mm ²	25	35
Number of cores		3	3
Minimum number of wires		6	6
Nominal insulation thickness	mm	1.4	1.4
Diameter of insulated core	mm	8.9	9.9
Max. dc resistance at 20°C	ohm/km	1.20	0.868
Minimum breaking load	kN	3.5	4.9
Current rating at still wind, ambient temperature = 30°C, conductor temperature = 75°C	A	84	104

Neutral Conductor

Nominal cross-sectional area	mm ²	25	35
Minimum number of wires		6	6
Nominal insulation thickness	mm	1.4	1.4
Diameter of insulated core	mm	8.9	9.9
Max. dc resistance at 20°C	ohm/km	1.2	0.868
Minimum breaking load	kN	3.5	4.9

Completed cable

Approx. overall diameter	mm	21.5	23.9
Approx. weight of cable	kg/km	420	550
Packing length	m/drum	1,000	1,000

Cables with street lighting

Phase conductor

Nominal cross-sectional area	mm ²	120	185
Number of cores		3	3
Minimum number of wires		15	30
Nominal insulation thickness	mm	1.7	2.2
Diameter of insulated core	mm	17.0	21.0
Max. dc resistance at 20°C	ohm/km	0.253	0.164
Minimum breaking load	kN	16.8	25.9
Current rating at still wind, ambient temperature = 30°C, conductor temperature = 75°C	A	246	332

Neutral conductor

Nominal cross-sectional area	mm ²	120	185
Minimum number of wires		15	30
Nominal insulation thickness	mm	1.7	2.2
Diameter of insulated core	mm	17.0	21.0
Max. dc resistance at 20°C	ohm/km	0.253	0.164
Minimum breaking load	kN	16.8	25.9

Street lighting conductor

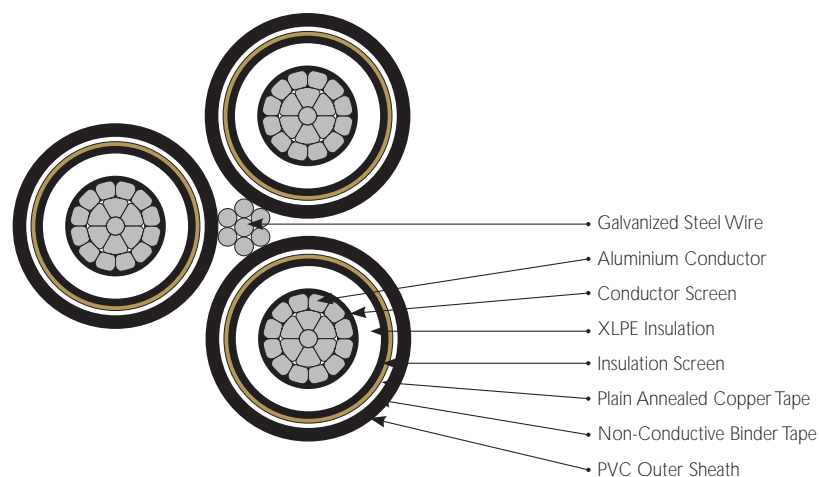
Nominal cross-sectional area	mm ²	25	25
Minimum number of wires		6	6
Nominal insulation thickness	mm	1.4	1.4
Diameter of insulated core	mm	8.9	8.9
Max. dc resistance at 20°C	ohm/km	1.2	1.2

Completed cable

Approx. overall diameter	mm	43.8	50.7
Approx. weight of cable	kg/km	1,800	2,700
Packing length	m/drum	500	500

AL/XLPE INSULATED, PVC OUTER SHEATHED AERIAL BUNDLED CABLES AL/XLPE/SCT/PVC CABLES , MEDIUM VOLTAGE

IEC 60502 & TNB Specification



DESCRIPTION

Circular compacted stranded aluminium conductor; XLPE insulated, copper tape screened and PVC outer sheathed cable. The three XLPE insulated and copper tape screened single core cables are bundled around the galvanized steel wires in a right hand lay.

CONSTRUCTION

- 1 Conductor Phase conductors are circular compacted stranded H68 aluminium to BS2627.
- 2 Conductor screen Extruded layer of semi-conductive compound.
- 3 Insulation XLPE (cross-linked polyethylene) rated at 90°C.
- 4 Insulation screen
 - a Non-metallic part
Extruded layer of semi-conductive compound.
 - b Metallic part
Copper tape screen (SCT).
- 5 Colour for core identification Red, yellow and blue tapes shall be applied between non metallic and metallic part of insulation screen.
- 6 Separator Polypropylene laminated tape.
- 7 Outer sheath PVC type ST2 to IEC 60502 colour black. The outer sheath shall be embossed with figures 1, 2, 3 corresponding to red, yellow, blue phase.
- 8 Support wire The support wire shall comprise a stranded galvanized steel wires
- 9 Assembly The three XLPE insulated and copper wire screened single core cables are bundled around the galvanized steel steel wires in a right hand (Z) lay.

IEC 60502 & TNB Specification

6.35/11 (12) kV

Phase conductor

Nominal cross-sectional area	mm ²	50	70	95	120	150	185	240
Number of cores		3	3	3	3	3	3	3
Minimum number of wires		6	12	15	15	15	30	30
Nominal diameter of conductor	mm	8.1	9.7	11.5	12.9	14.3	16.1	18.4
Nominal thickness of XLPE insulation	mm	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Metallic screening approx. thickness of copper tape	mm	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nominal thickness of outer sheath	mm	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Nominal diameter over sheathing	mm	23.0	24.6	26.3	27.8	29.2	30.9	33.3
Max. dc resistance at 20°C	ohm/km	0.641	0.443	0.320	0.253	0.206	0.164	0.125
Earth fault current carrying capacity of metallic screen at								
-1 second (1 Core)	kA	1.57	1.72	1.88	2.01	2.14	2.30	2.52
-3 seconds (1 Core)	kA	0.90	0.99	1.08	1.16	1.23	1.33	1.45

Messenger - Galvanized steel wire

Nominal cross-sectional area	mm ²	50	50	50	50	50	50	50
Stranding	No./mm	7/3.15	7/3.15	7/3.15	7/3.15	7/3.15	7/3.15	7/3.15
Direction of the outermost layer		Right-hand (Z)						
Overall diameter	mm	9.45	9.45	9.45	9.45	9.45	9.45	9.45
Minimum breaking load	kg	6270	6270	6270	6270	6270	6270	6270

Completed cable

Approx. overall diameter	mm	55	59	62	65	67	71	75
Approx. weight of cable	kg/km	2540	2890	3300	3660	4040	4540	5290
Packing length	m/drum	500	500	500	500	500	500	500

IEC 60502 & TNB Specification

12.7/22 (24) kV

Phase conductor

Nominal cross-sectional area	mm ²	50	70	95	120	150	185	240
Number of cores		3	3	3	3	3	3	3
Minimum number of wires		6	12	15	15	15	30	30
Nominal diameter of conductor	mm	8.1	9.7	11.5	12.9	14.3	16.1	18.4
Nominal thickness of XLPE insulation	mm	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Metallic screening approx. thickness of copper tape	mm	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nominal thickness of outer sheath	mm	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Nominal diameter over sheathing	mm	27.2	28.8	30.5	32.0	33.4	35.1	37.5
Max. dc resistance at 20°C	ohm/km	0.641	0.443	0.320	0.253	0.206	0.164	0.125
Earth fault current carrying capacity of metallic screen at								
-1 second (1 Core)	kA	1.96	2.11	2.26	2.40	2.53	2.68	2.90
-3 seconds (1 Core)	kA	1.13	1.21	1.31	1.38	1.46	1.55	1.67

Messenger - Galvanized steel wire

Nominal cross-sectional area	mm ²	50	50	50	50	50	50	50
Stranding	No./mm	7/3.15	7/3.15	7/3.15	7/3.15	7/3.15	7/3.15	7/3.15
Direction of the outermost layer		Right-hand (Z)						
Overall diameter	mm	9.45	9.45	9.45	9.45	9.45	9.45	9.45
Minimum breaking load	kg	6270	6270	6270	6270	6270	6270	6270

Completed cable

Approx. overall diameter	mm	64	67	70	73	75	78	83
Approx. weight of cable	kg/km	3150	3540	3980	4360	4770	5300	6100
Packing length	m/drum	500	500	500	500	500	250	250

Phase conductor

Nominal cross-sectional area	mm ²	50	70	95	120	150	185	240
Number of cores		3	3	3	3	3	3	3
Minimum number of wires		6	12	15	15	15	30	30
Nominal diameter of conductor	mm	8.1	9.7	11.5	12.9	14.3	16.1	18.4
Nominal thickness of XLPE insulation	mm	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Metallic screening approx. thickness of copper tape	mm	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Nominal thickness of outer sheath	mm	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Nominal diameter over sheathing	mm	32.2	33.8	35.5	37.0	38.4	40.1	42.5
Max. dc resistance at 20°C	ohm/km	0.641	0.443	0.320	0.253	0.206	0.164	0.125
Earth fault current carrying capacity of metallic screen at								
-1 second (1 Core)	kA	2.41	2.56	2.72	2.86	2.99	3.14	3.36
-3 seconds (1 Core)	kA	1.39	1.48	1.57	1.65	1.72	1.81	1.94

Messenger - Galvanized steel wire

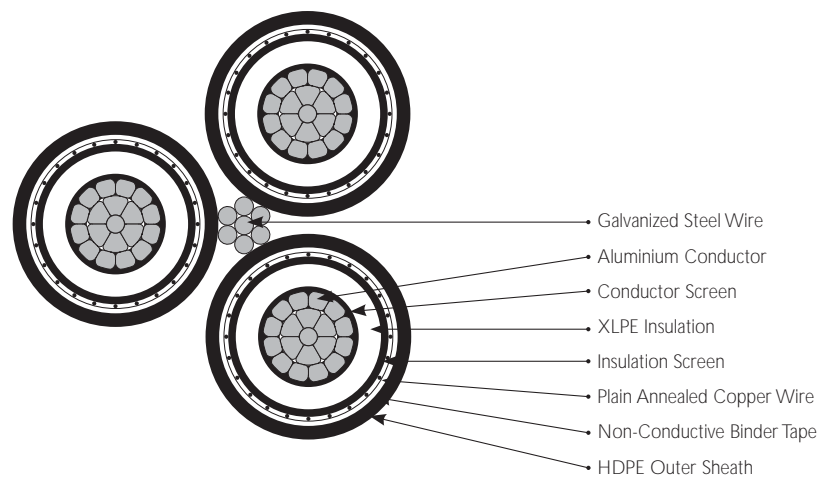
Nominal cross-sectional area	mm ²	50	50	50	50	50	50	50
Stranding	No./mm	7/3.15	7/3.15	7/3.15	7/3.15	7/3.15	7/3.15	7/3.15
Direction of the outermost layer		Right-hand (Z)						
Overall diameter	mm	9.45	9.45	9.45	9.45	9.45	9.45	9.45
Minimum breaking load	kg	6270	6270	6270	6270	6270	6270	6270

Completed cable

Approx. overall diameter	mm	73	76	79	82	84	87	91
Approx. weight of cable	kg/km	3980	4400	4880	5300	5740	6310	7160
Packing length	m/drum	500	500	500	250	250	250	250

AL/XLPE INSULATED, PE OUTER SHEATHED AERIAL BUNDLED CABLES AL/XLPE/SCW/HDPE AERIAL CABLES , MEDIUM VOLTAGE

AS/NZS 3599.1



DESCRIPTION

Circular compacted stranded aluminium conductor, XLPE insulated, copper wire screened and HDPE outer sheathed cable. The three XLPE insulated and copper wire screened single core cables are bundled around the galvanized steel wires in a right hand lay.

CONSTRUCTION

- 1 Conductor Phase conductors are circular compacted stranded H68 aluminium to BS2627.
- 2 Conductor screen Extruded layer of semi-conductive compound.
- 3 Insulation XLPE (cross-linked polyethylene) rated at 90°C.
- 4 Insulation screen
 - a Non-metallic part
Extruded layer of semi-conductive compound.
 - b Metallic part
Copper wire screen (SCW).
- 5 Separator Non conductive swellable binder tape Note :A semi-conductive swellable tape may be applied in between the non-metallic and metallic part.
- 6 Outer sheath High density polyethylene (HDPE) colour black. The outer sheath shall be printed with figures 1 ONE, 2 TWO, 3 THREE which corresponding to the three different phases.
- 7 Support wire The support wire shall comprise a stranded galvanized steel wires.
- 8 Assembly The three XLPE insulated and copper wire screened single core cables are bundled around the galvanized steel wires in a right hand (Z) lay.

AS/NZS 3599.1 (Light Duty Screen)

6.35/11 (12) kV

Phase conductor

Nominal cross-sectional area	mm ²	35	35	50	70	95	120	150	185
Number of cores		3	3	3	3	3	3	3	3
Minimum number of wires		6	6	6	12	15	18	18	30
Nominal diameter of conductor	mm	7.0	7.0	8.1	9.7	14.5	12.9	14.3	16.1
Minimum thickness of conductor screen	mm	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Nominal thickness of XLPE insulation	mm	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Minimum thickness of insulation screen	mm	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
No. and diameter of metallic screening approx. of copper wire	no./mm	24/0.85	24/0.85	24/0.85	24/0.85	24/0.85	24/0.85	24/0.85	24/0.85
Nominal thickness of outer sheath	mm	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9
Nominal diameter over sheathing	mm	24.2	24.2	25.1	26.7	28.4	29.9	31.3	33.2
Max. dc resistance at 20°C	ohm/km	0.868	0.868	0.641	0.443	0.320	0.253	0.206	0.164
Current rating at									
Ambient temperature = 30°C	A	185	185	210	260	315	365	415	475
Ambient temperature = 40°C	A	155	155	185	230	280	325	370	425
Solar radiation = 1000w/m ²									
Wind speed = 1m/s									
Earth fault current carrying capacity of metallic screen at -1 second (1 core)	kA	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0

Messenger - Galvanized steel wire

Stranding	No./mm	7/2.0	19/2.0	19/2.0	19/2.0	19/2.0	19/2.0	19/2.0	19/2.0
Direction of the outermost layer		Right-hand (Z)							
Overall diameter	mm	6.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Completed cable									
Approx. overall diameter	mm	54.4	58.4	60.1	63.4	66.8	69.8	72.6	76.4
Approx. weight of cable	kg/km	1890	2190	2320	2610	2960	3260	3590	4060
Packing length	m/drum	500	500	500	500	500	500	250	250

AS/NZS 3599.1 (Heavy Duty Screen)

6.35/11 (12) kV

Phase conductor

Nominal cross-sectional area	mm ²	35	35	50	70	95	120	150	185
Number of cores		3	3	3	3	3	3	3	3
Minimum number of wires		6	6	6	12	15	18	18	30
Nominal diameter of conductor	mm	7.0	7.0	8.1	9.7	11.5	12.9	14.3	16.1
Minimum thickness of conductor screen	mm	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Nominal thickness of XLPE insulation	mm	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Minimum thickness of insulation screen	mm	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
No. and diameter of metallic screening approx. of copper wire	no./mm	40/0.85	40/0.85	23/1.35	32/1.35	38/1.35	38/1.35	38/1.35	38/1.35
Nominal thickness of outer sheath	mm	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.9
Nominal diameter over sheathing	mm	24.2	24.2	26.1	27.7	29.4	30.9	32.3	34.2
Max. dc resistance at 20°C	ohm/km	0.868	0.868	0.641	0.443	0.320	0.253	0.206	0.164
Current rating at									
Ambient temperature = 30°C	A	185	185	210	260	315	365	415	475
Ambient temperature = 40°C	A	155	155	185	230	280	325	370	425
Solar radiation = 1000w/m ²									
Wind speed = 1m/s									
Earth fault current carrying capacity of metallic screen at -1 second (1 Core)	kA	3.3 *	3.3 *	4.8 *	6.8 *	8.0	8.0	8.0	8.0

Messenger - Galvanized steel wire

Stranding	No./mm	7/2.0	19/2.0	19/2.0	19/2.0	19/2.0	19/2.0	19/2.0	19/2.0
Direction of the outermost layer		Right-hand (Z)							
Overall diameter	mm	6.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Completed cable									
Approx. overall diameter	mm	54.4	58.4	62.1	65.4	68.8	71.8	74.6	78.4
Approx. weight of cable	kg/km	2150	2440	2880	3540	4130	4440	4770	5240
Packing length	m/drum	500	500	500	500	500	500	250	250

* The screen earth fault current rating is limited by the short circuit current rating of conductor.

AS/NZS 3599.1 (Light Duty Screen)

12.7/22 (24) kV

Phase conductor

Nominal cross-sectional area	mm ²	35	35	50	70	95	120	150	185
Number of cores		3	3	3	3	3	3	3	3
Minimum number of wires		6	6	6	12	15	18	18	30
Nominal diameter of conductor	mm	7.0	7.0	8.1	9.7	11.5	12.9	14.3	16.1
Minimum thickness of conductor screen	mm	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Nominal thickness of XLPE insulation	mm	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Minimum thickness of insulation screen	mm	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
No. and diameter of metallic screening approx. of copper wire	no./mm	24/0.85	24/0.85	24/0.85	24/0.85	24/0.85	24/0.85	24/0.85	24/0.85
Nominal thickness of outer sheath	mm	1.8	1.8	1.8	1.8	1.9	1.9	2.0	2.0
Nominal diameter over sheathing	mm	28.4	28.4	29.3	30.9	32.8	34.3	35.9	37.6
Max. dc resistance at 20°C	ohm/km	0.868	0.868	0.641	0.443	0.320	0.253	0.206	0.164
Current rating at									
Ambient temperature = 30°C	A	170	170	205	260	315	360	410	470
Ambient temperature = 40°C	A	150	150	185	230	280	320	365	415
Solar radiation = 1000w/m ²									
Wind speed = 1m/s									
Earth fault current carrying capacity of metallic screen at -1 second (1 Core)	kA	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0

Messenger - Galvanized steel wire

Stranding	No./mm	7/2.0	19/2.0	19/2.0	19/2.0	19/2.0	19/2.0	19/2.0	19/2.0
Direction of the outermost layer		Right-hand (Z)							
Overall diameter	mm	6.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Completed cable									
Approx. overall diameter	mm	62.8	66.8	68.5	71.8	75.6	78.6	81.8	85.2
Approx. weight of cable	kg/km	2340	2640	2780	3100	3510	3850	4240	4710
Packing length	m/drum	500	500	500	250	250	250	250	250

AS/NZS 3599.1 (Heavy Duty Screen)

12.7/22 (24) kV

Phase conductor

Nominal cross-sectional area	mm ²	35	35	50	70	95	120	150	185
Number of cores		3	3	3	3	3	3	3	3
Minimum number of wires		6	6	6	12	15	18	18	30
Nominal diameter of conductor	mm	7.0	7.0	8.1	9.7	11.5	12.9	14.3	16.1
Minimum thickness of conductor screen	mm	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Nominal thickness of XLPE insulation	mm	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Minimum thickness of insulation screen	mm	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
No. and diameter of metallic screening approx. of copper wire	no./mm	40/0.85	40/0.85	23/1.35	32/1.35	38/1.35	38/1.35	38/1.35	38/1.35
Nominal thickness of outer sheath	mm	1.8	1.8	1.8	1.8	1.9	1.9	2.0	2.0
Nominal diameter over sheathing	mm	28.4	28.4	30.3	31.9	33.8	35.3	36.9	38.6
Max. dc resistance at 20°C	ohm/km	0.868	0.868	0.641	0.443	0.320	0.253	0.206	0.164
Current rating at									
Ambient temperature = 30°C	A	170	170	205	260	315	360	410	470
Ambient temperature = 40°C	A	150	150	185	230	280	320	365	415
Solar radiation = 1000w/m ²									
Wind speed = 1m/s									
Earth fault current carrying capacity of metallic screen at -1 second (1 Core)	kA	3.3 *	3.3 *	4.8 *	6.8 *	8.0	8.0	8.0	8.0

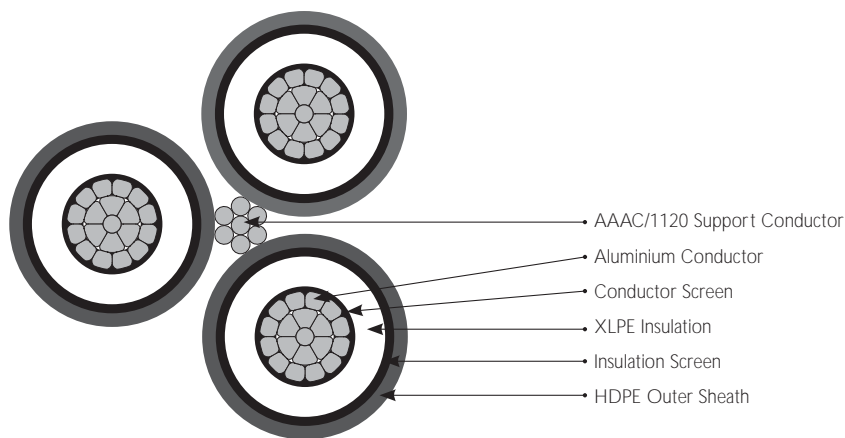
Messenger - Galvanized steel wire

Stranding	No./mm	7/2.0	19/2.0	19/2.0	19/2.0	19/2.0	19/2.0	19/2.0	19/2.0
Direction of the outermost layer		Right-hand (Z)							
Overall diameter	mm	6.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Completed cable									
Approx. overall diameter	mm	62.8	66.8	70.5	73.8	77.6	80.6	83.8	87.2
Approx. weight of cable	kg/km	2600	2900	3350	4030	4680	5020	5410	5880
Packing length	m/drum	500	500	500	250	250	250	250	250

* The screen earth fault current rating is limited by the short circuit current rating of conductor.

AL/XLPE INSULATED, PE OUTER SHEATHED AERIAL BUNDLED CABLES AL/XLPE/HDPE AERIAL CABLES, MEDIUM VOLTAGE

AS/NZS 3599.2



DESCRIPTION

Circular compacted stranded aluminium conductor, XLPE insulated, copper wire screened and HDPE outer sheathed cable. The three XLPE insulated and copper wire screened single core cables are bundled around the AAAC/1120 support conductor in a right hand lay.

CONSTRUCTION

- 1 Conductor Phase conductors are circular compacted stranded H68 aluminium to BS2627.
- 2 Conductor screen Extruded layer of semi-conductive compound.
- 3 Insulation XLPE (cross-linked polyethylene) rated at 90°C.
- 4 Insulation screen Extruded layer of semi-conductive cross-linked compound.
- 5 Outer sheath Extruded layer of semi-conductive HDPE compound colour black. The outer sheath shall be printed with figures 1 ONE, 2 TWO, 3 THREE which corresponding to the three different phases.
- 6 Support conductor The support conductor shall comprise a compacted all aluminium alloy conductor (AAAC/1120).
- 7 Assembly The three XLPE insulated cores shall be bundled around the AAAC/1120 support conductor in a right hand (Z) lay.

AS/NZS 3599.2

6.35/11 (12) kV

Phase conductor

Nominal cross-sectional area	mm ²	35	50	70	95	120	150	185
Number of cores		3	3	3	3	3	3	3
Minimum number of wires		6	6	12	15	18	18	30
Nominal diameter of conductor	mm	7.0	8.1	9.7	11.5	12.9	14.3	16.1
Minimum thickness of conductor screen	mm	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Nominal thickness of XLPE insulation	mm	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Nominal thickness of cross-linked screen layer	mm	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Nominal thickness of semi-conductive HDPE layer	mm	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Max. dc resistance at 20°C	ohm/km	0.868	0.641	0.443	0.320	0.253	0.206	0.164
Current rating at Ambient temperature = 40°C Solar radiation = 1000w/m ² Wind speed = 1m/s	A	165	200	245	300	345	390	450

Messenger - AAAC 1120

Stranding	No./mm	7/5.0	7/5.0	7/5.0	7/5.0	19/3.65	19/3.65	19/3.65
Direction of the outermost layer		Right-hand (Z)						
Overall diameter	mm	14.3	14.3	14.3	14.3	17.3	17.3	17.3

Completed cable

Approx. overall diameter	mm	52.2	53.5	56.7	60.2	66.2	69.0	72.4
Approx. weight of cable	kg/km	1470	1580	1850	2180	2640	2960	3380
Packing length	m/drum	500	500	500	500	500	500	250

AS/NZS 3599.2

12.7/22 (24) kV

Phase conductor

Nominal cross-sectional area	mm ²	35	50	70	95	120	150	185
Number of cores		3	3	3	3	3	3	3
Minimum number of wires		6	6	12	15	18	18	30
Nominal diameter of conductor	mm	7.0	8.1	9.7	11.5	12.9	14.3	16.1
Minimum thickness of conductor screen	mm	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Nominal thickness of XLPE insulation	mm	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Nominal thickness of cross-linked screen layer	mm	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Nominal thickness of semi-conductive HDPE layer	mm	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Max. dc resistance at 20°C	ohm/km	0.868	0.641	0.443	0.320	0.253	0.206	0.164
Current rating at Ambient temperature = 40°C Solar radiation = 1000w/m ² Wind speed = 1m/s	A	165	195	245	295	340	385	440

Messenger - AAAC 1120

Stranding	No./mm	7/5.0	7/5.0	7/5.0	7/5.0	19/3.65	19/3.65	19/3.65
Direction of the outermost layer		Right-hand (Z)						
Overall diameter	mm	14.3	14.3	14.3	14.3	17.3	17.3	17.3

Completed cable

Approx. overall diameter	mm	60.6	61.9	65.1	68.6	74.6	77.4	80.8
Approx. weight of cable	kg/km	1890	2000	2300	2670	3160	3500	3950
Packing length	m/drum	500	500	500	500	250	250	250

PUBLICATIONS REFERRED TO

IEC 60502-1	Power Cables With Extruded Insulation And Their Accessories For Rated Voltages From 1 kV (Um = 1.2 kV) Up To 30 kV (Um = 36 kV).
TNB	Specification for Low Voltage Aerial Bundle Cable
AS/NZS 3560.1	Electric cables - Cross-linked polyethylene insulated - Aerial bundled - For working voltage up to and including 0.6/1(1.2) kV
BS 7870-5	Polymeric insulated aerial bundled conductors (ABC) of rated voltage 0.6/1 kV for overhead distribution
DES/LV/ABC	Specification for Low Voltage Aerial Bundle Conductor (Aluminium)
AS/NZS 3599.1	Electric cables - Aerial bundled - Polymeric insulated - Voltages 6.35/11 (12) kV and 12.7/22 (24) kV
AS/NZS 3599.2	Electric cables - Aerial bundled - Polymeric insulated - Voltages 6.35/11 (12) kV and 12.7/22 (24) kV

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