

AERIAL BUNCHED CABLES - an Introduction

Crystal Cable who have been manufacturing Aerial Bunched Cables and accessories can now supply the full range of Aerial Bunched Cable systems upto 33KV.

Aerial Bunched Cables are a better alternative to bare overhead wires in distribution networks, particularly in rural and suburban areas. Since the cores are insulated they are intrinsically and reliable.

Experience has shown that, even through the initial cost of installation of an Aerial Bunched Cable line is slightly higher than that of the "bare overhead wire" line, the ultimate cost of this type of cable systems is less if the following points are taken into consideration.

- Ease of installation.
- The inductance in Aerial Bunched Cables is much less than in bare wire systems, because of the proximity of the phase conductors, making the voltage drop lower per unit of length.
- Trees require less trimming where lines run through wooded areas. Costs for repair and maintenance are less since there is no risk of damage due to fallen trees or accidental contact between conductors in high winds.
- The poles can be used for additional power or telephone lines. Several feeders can be installed on the same pole.
- Aerial Bunched Cables can be attached to any kind of pole or wall and can safely be installed in narrow streets.
- Aerial Bunched Cables are very versatile as they can be re-used in conjunction with temporary services, camps, construction sites, etc.
- Additional branch connections can be easily and safely made by linesmen using insulation piercing connectors and insulated tools.

CONSTRUCTION

XLPE insulated power conductors of Aluminium (Neutral Conductor and street lighting conductors, if and when necessary) are laid together (twisted) around a high tensile stranded and galvanized steel (Aluminium Alloy may be used but sparingly) insulated messenger wire to form the Aerial Bunched Cable. This assembly is directly strung on to distribution poles/towers by means of standard hardwares available in the market but care shall be taken to render the messenger wire completely insulated from earthing at any point of distribution in case of HT ABC.

The XLPE (Cross-linked Polyethylene) insulation is black in colour and is stabilized against deterioration caused by exposure to direct sunlight and ultraviolet radiation.

MATERIALS:

- i. Aluminium conductors conforming to IS:8130 (Class-II).
- ii. Standard high tensile galvanized steel/ aluminium alloy messenger wire conforming to IS:398 (Part-II or Part-IV).
- iii. XLPE insulation of power conductors conforming to IS:7098 (Part-I & Part-II).

Since, the tension from the current carrying conductor is totally removed by introduction of messenger wire the operating temperature of the conductor is 90°C as against 75°C of the bare conductor under tension thereby allowing ABC to carry current higher to that of bare conductors of the same size.

STRINGING:

No difficulty is envisaged during stringing of ABC in the conventional method but care shall be taken that insulated conductors do not get damaged during installation. Dragging the ABC on the ground is to be avoided.

AERIAL BUNCHED CABLES - TECHNICAL PARTICULARS LT 1100 V

Reference Standard: Generally as per IS : 14255/95

Construction	Power Core (mm ²)	3x16	3x25	3X35	3x50	3x70	3x95
Street Lighting Core (mm ²)	1x16	1x16	1X16	1x16	1x16	1x16	1x16
Messenger Core (mm ²)	1x25	1x25	1X25	1x35	1x50	1x70	

POWER / STREET LIGHTING CORE

Conductor

I. Material : H2 OR H4 GRADE AL. WIRES, CLASS - 2 OF IS: 8130:1984

ii. Normal Cross Selection Area

Power Conductor (mm ²)	: 16	25	35	50	70	95
Street Lighting Conductor (mm ²)	: 16	16	16	16	16	16

iii. Max. D. C. Resistance at 20°C

Power Conductor (Ohms/km)	: 1.91	1.20	0.868	0.641	0.443	0.32
StreetLighting Conductor (Ohms/km)	: 1.91	1.91	1.91	1.91	1.91	1.91

iv. Approx. Dia of Conductor

Power Conductor (mm)	: 4.7	6.0	7.0	8.0	9.7	11.5
Street Lighting Conductor(mm)	: 4.6	4.6	4.6	4.6	4.6	4.6

v. Shape of Conductor

Power Conductor (mm)	: Stranded Compacted Circular
Street Lighting Conductor(mm)	: Stranded Compacted Circular

Insulation

I. Material : Black XLPE to IS:14255/95

ii. Minimum Thickness

Power Conductor (mm)	: 1.2	1.2	1.2	1.5	1.5	1.5
Street Lighting Conductor (mm)	: 1.2	1.2	1.2	1.2	1.2	1.2

iii. Core Identification : By Ridges One, Two and Three (Street Lighting Core-shall have no core identification)

Messenger Wire

i. Material : Al. Alloy wires generally conforming to IS:398(part iv)1979

ii. Min. Cross Sectional Area (mm²) : 25 25 25 35 50 70

iii. Min. Breaking Load (KN) : 7 7 7 9.8 14 19.7

iv. Max. D. C. Resistance at 20°C (Ohms/km) : 1.38 1.38 1.38 0.986 0.689 0.492

Insulation (if required)

i) Material : Black XLPE to IS:14255/95

ii) Minimum Thickness (mm) : 1.2 1.2 1.2 1.2 1.5 1.5

iii) Core Identification : Shall have no identification mark if insulated

Laying up

: Three power cores having ridges one, two and three and one street lighting core over twisted over bare (or insulated) Al. Alloy messenger wire with right hand direction of Lay

Current rating

I. Continuous current carrying capacity of Cable in air at ambient temp. 40°C (Amp)

75	105	125	150	190	235
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AERIAL BUNCHED CABLES - TECHNICAL PARTICULARS HT 11KV

Reference Standard: Generally to IS: 7098(PT-II)1985

Construction	Power Core (mm ²)	: 3x25	3x35	3x50	3x70	3x95	3x120	3x150	3x185
			+	+	+	+	+	+	+
	Messenger Core (mm ²)	: 1x105	1x105	1x105	1x180	1x1081x180	1x210	1x210	

Power Cores Conductors

i.	Materials	: H2 or H4 Grade Aluminium wires
ii.	Flexibility class	: As per IS: 8130 1984 Class 2
iii.	Shape of Conductor	: Stranded Compacted Circular
iv.	Nominal cross sectional area (mm ²)	: 25 35 50 70 95 120 150 185
v.	Approx. Dia of Conductor (mm)	: 5.8 6.8 7.8 9.5 11.1 12.5 13.9 15.5
vi.	Max DC resistance at 20°C (Ohm/km)	: 1.2 0.868 0.641 0.443 0.32 0.253 0.206 0.164

Conductor Screening

i.	Material	: Extruded semi-conducting compound (Black)
ii.	Approx. thickness (mm)	: 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4

Insulation

i.	Material	: XLPE to IS: 7098(PT-II) 1985 (Natural colour)
ii.	Normal thickness (mm)	: 3.6 3.6 3.6 3.6 3.6 3.6 3.6 3.6
iii.	Minimum Volume Resistivity (Ohm-mm)	: 1×10^{14} at 27°C and 1×10^{12} at 90°C

Insulation Screening

Non-metallic part

i.	Material	: Extruded semi-conducting compound (Black)
ii.	Approx. thickness (mm)	: 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3

Metallic Part

i.	Material	: One layer of Copper Tape
ii.	Approx. thickness (mm)	: 0.04 0.04 0.04 0.04 0.04 0.04 0.04 0.04

Covering Over Copper Tape

i.	Material	: Black PVC, Type-ST2 of IS:5831/1984
ii.	Approx. thickness (mm)	: 1.8 1.8 1.8 1.8 1.8 2.0 2.0 2.0
iii.	Core Identification	: By Ridges One, Two and Three on power cores

Messenger Wire

i.	Material	: Combination of Galv. Steel wires and Al. Alloy as per to IS: 398 (PT-II/1976 and PT-IV/1979)
ii.	Shape of conductor	: Stranded circular (Central wires of Galv. Steel and outer layer of Al Alloy wires)
iii.	Total Nominal cross sectional area (mm ²)	: 105 105 105 180 180 180 210 210
iv.	Approx. breaking load (KN)	: 58 58 58 100 100 100 115 115
Laying Up		: Three power cores having ridges one, two and three are twisted over bare (or insulated) Al. Alloy messenger wire with right hand direction of Lay

Current Rating

i.	Continuous current carrying capacity of cable in air at ambient temp. 40°C (Amp)	: 115 140 165 195 240 275 315 365
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