



**PRODUCT MANUAL FOR  
AERIAL BUNCHED CABLES FOR WORKING VOLTAGES UP TO AND  
INCLUDING 1100 V  
ACCORDING TO IS 14255: 1995**

*This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure coherence of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification licence/certificate.*

1.	<b>Product Standard</b>	:	IS 14255: 1995	
	<b>Title</b>	:	Aerial Bunched Cables for working voltages up to and including 1100 V	
	<b>No. of Amendments</b>	:	1	
2.	<b>Sampling Guidelines:</b>			
a)	<b>Raw material</b>	:	H2 or H4 grade aluminium conductor	IS 8130
			Al-Mg-Si Alloy wire	IS 398 (Pt 4)
b)	<b>Grouping guidelines</b>	:	Please refer <a href="#">ANNEX – A</a>	
c)	<b>Sample Size</b>	:	(i) H2 or H4 grade aluminium conductor - 5 meters (ii) Al-Mg-Si Alloy wire – 5 meters (iii) Aerial Bunched Cable - 15 meters	
3.	<b>List of Test Equipment</b>	:	Please refer <a href="#">ANNEX – B</a>	
4.	<b>Scheme of Inspection and Testing</b>	:	Please refer <a href="#">ANNEX – C</a>	
5.	<b>Possible tests in a day</b>	:	Please refer <a href="#">ANNEX - D</a>	
6.	<b>Scope of the Licence :</b>			
	Aerial Bunched Cables – for working voltages up to and including 1100V, XLPE/ PE insulated, Three/Single phase conductor with insulated neutral conductor (if applicable) and Street Lighting Conductor (if applicable), with Nominal cross sectional areas of phase conductor- upto and including _____mm <sup>2</sup> .			

**ANNEX A****Grouping Guidelines**

1. Cables with XLPE & PE insulation shall be tested separately for GoL/CSoL.
2. The following relaxation may be given when a variety is tested for all the requirements:

<b>Variety Tested</b>	<b>Additional Variety that may be covered</b>
Three phase	Single phase
With neutral conductor	Without neutral conductor
With street lighting conductor	Without street lighting conductor

3. The Firm shall declare the Varieties and Sizes of various Cables they intend to cover in the Licence. Cable of any Size i.e Nominal Cross Sectional Area of Phase Conductor (preferably the largest) intended to be covered in the Licence may be drawn for Testing. The Scope of Licence may be restricted based on the Manufacturing and Testing capabilities of the Manufacturer.
4. During the operation of the Licence, BO shall ensure that all the Varieties covered in the Licence are tested in rotation, to the extent possible.

**ANNEX B****List Of Test Equipment***Major test equipment required to test as per the Indian Standard*

<b>Sl. No.</b>	<b>Description Of the Test Equipment</b>	<b>Tests used in with Clause Reference</b>
<b>1</b>	Digital Vernier Calliper	Measurement of thickness & Outer Dia. For Cl. 5.1,7.2
<b>2</b>	Steel Scale	Measurement of dimensions for Cl. 5.1, 7.2
<b>3</b>	Digital Micro meter	Measurement of Wire Dia. For Cl. 5.1, 7.2
<b>4</b>	Measuring Microscope	Measurement of thickness for Cl. 5.1, 7.2
<b>5</b>	Graduate Magnifying Glass	Measurement of dimensions for Cl. 5.1, 7.2
<b>6</b>	Tensile Testing Machine	Tensile Strength, Elongation Test & Annealing Test for Cl. 4.1, 5.1, 6.5
<b>7</b>	Dumb-Bell Cutting Machine with Die	Tensile Strength & Elongation Test for Cl. 5.1
<b>8</b>	Hot Air oven with thermostatic Temp. controller	Hot Set, water absorption test & Shrinkage Test for Cl. 5.1
<b>9</b>	Thermal Ageing Oven with Thermostatic Temperature control, Air flow Meter & Hour Meter	After Ageing Tensile Strength, Elongation Test for Cl. 5.1
<b>10</b>	Water Bath with thermostatic temp. control Stirrer & Hour Meter	Water immersion A.C. Test, Insulation Resistance Constant & Volume Resistivity Test for Cl. 10.1(g) and 10.1(f)
<b>11</b>	Million Mega ohm Meter	Insulation Resistance constant/ Volume Resistivity Test for Cl. 10.1(f)
<b>12</b>	Bend Mandrels	Bending Test for Cl. 11.4 (optional test)
<b>13</b>	Double Kelvin Bridge with galvanometer, D.C. Source & Conductivity attachment	Conductor Resistance Test for Cl. 4.1
<b>14</b>	Conditioning chamber & Defreezer with Humidity Indicator	Tensile Strength, Elongation Test Cl. 5.1
<b>15</b>	A C. high voltage	A.C. High Voltage Test for Cl. 11.2
<b>16</b>	H.V. Mega Ohm Box	Insulation Resistance Test for Cl. 5.1
<b>17</b>	Room Thermometer	Annealing & Elongation Test for Cl. 4.1 & 5.1
<b>18</b>	Balance, Desiccators, Distilled Water, Calcium Chloride, Clean dry Cloth or Filter paper	Water Absorption test for Cl. 5.1
<b>19</b>	Air Conditioner	For Maintain Room Temp.

*The above list is indicative only and may not be treated as exhaustive.*

**ANNEX C**

**Scheme of Inspection And Testing**

**1. LABORATORY** - A laboratory shall be maintained which shall be suitably equipped (as per the requirement given in column 2 of Table 1) and staffed, where different tests given in the specification shall be carried out in accordance with the methods given in the specification.

**1.1** The manufacturer shall prepare a calibration plan for the test equipment.

**2. TEST RECORDS** – The manufacturer shall maintain test records for the tests carried out to establish conformity.

**3. LABELLING AND MARKING** – In addition to the requirements of IS 14255: 1995, information in code or otherwise to enable the date and lot of manufacture to be traced back to factory records shall be either stencilled on drum or contained in the label attached to the drum.

**4. LEVELS OF CONTROL** - The tests as indicated in column 1 of [Table 1](#) and the levels of control in column 3 of [Table 1](#), shall be carried out on the whole production of the factory which is covered by this plan and appropriate records maintained in accordance with paragraph 2 above.

**4.1** All the production which conforms to the Indian Standards and covered by the licence should be marked with Standard Mark.

**5. REJECTIONS** – Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of BIS Act, 2016.

**TABLE 1**

<b>(1)</b>					<b>(2)</b>	<b>(3)</b>	
<b>Test Details</b>					<b>Test equipment requirement</b> R: required (or) S: Subcontracting permitted	<b>Levels of Control</b>	
Cl.	Requirement	Test		Test Methods		No. of Sample	Frequency
		Cl.	Ref	Part Ref of IS 10810			
7	Thickness of insulation	7, Table 4	IS 14255	8	R	one	Each length of finished cable
7.4	Application of insulation	7.4	IS 14255	-	-	one	
8	Core identification	8	IS 14255	-	-	one	
9	Assembly(Laying up)	9	IS 14255	-	-	one	One from 25 delivery length or less of the same size & type of cable manufactured in a week
10.1(a)	<b><i>Tests on phase/ street light conductor</i></b>						
i	Tensile test	7.2.1	IS 8130	2	R	one	Every 10 spools of wire drawn or received (before stranding) and one from 25 delivery lengths or less of the same size & type of cable manufactured in a week
ii	Wrapping test	7.2.2		3	R	one	
iii	Resistance test	7.3, Table 2		5	R		Each length of finished cable
10.1(b)	<b><i>Tests on messenger conductor</i></b>						
i	Breaking load	Table 3	IS 14255	2	R	one	One from 25 delivery lengths or less of the same size & type of cable manufactured in a week
ii	Elongation test (before stranding)	11.3		-	R	one	Every 10 spools of wire drawn or received (before stranding)
iii	Resistance test	Table 3		5	R	one	Each length of finished cable

10.1(c)	<b>Physical tests for XLPE insulation</b>						
i	Tensile strength and elongation at break	5.1, Table 1	IS 14255	7	R	one	Cables of each size and type manufactured in a month from each consignment of XLPE compound.
ii	Aging in air oven	5.1, Table 1		11	R		
iii	Hot set test	5.1, Table 1		30	R		
iv	Shrinkage test	5.1, Table 1		12	R		
v	Water absorption (Gravimetric) test	5.1, Table 1		33	S		
vi	Carbon black	5.1, Table 1		Under consideration			
10.1(d)	<b>Physical tests for PE insulation</b>						
i	Tensile strength and elongation at break	5.1, Table 2	IS 14255	7	R	One	Cables of each size and type manufactured in a month from each consignment of PE compound.
ii	Melt flow index	5.1, Table 2		23	S		
iii	Carbon black 1. Content 2. Dispersion	5.1, Table 2		32	S		
				Under consideration			
iv	Vicat softening point	5.1, Table 2		22	S		
v	Environmental stress cracking	5.1, Table 2	29	S			
10.1(f)	Insulation resistance (Volume resistivity) test	Table 1 & 2	IS 14255	43	R	One	Cable of each size and type manufactured in a month from each consignment of insulating compound
10.1(g)	High Voltage test	11.2	IS 14255	45	R		Each length of finished cable
10.4	Bending test (Optional)	11.4	IS 14255	-	As per agreement between purchaser and supplier		

Note-1: Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empanelled by the Bureau.

Note-2: Levels of control given in column 3 are only recommendatory in nature. The manufacturer may define the control unit/batch/lot and submit his own levels of control in column 3 with proper justification for approval by BO Head.

**ANNEX D**

**Possible Tests in a day**

- a. Dimensions
- b. Tensile Test
- c. Wrapping test
- d. Conductor Resistance
- e. Tensile Test (before ageing) on Insulation
- f. Breaking Load for Messenger Conductor
- g. Insulation Resistance Test
- h. HV Test (at Room Temp.)