

**SHAHID GHANDI COMMUNICATION CABLE CO.**

**CODE: 0107-000**

**TECHNICAL SPECIFICATION FOR  
SELF SUPPORTING CABLE – SOLID INSULATION  
(SSC-S)**



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**SPECIFICATION FOR**  
***SELF SUPPORTING CABLE – SOLID INSULATION***

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## **1. GENERAL**

This specification details the construction of self supporting aerial telecommunication cables. The conductors are solid copper, covered with a solid plastic insulating compound. The insulated conductors are twisted into pairs which are stranded into subgroups or groups and which in turn are assembled into a cable core. After the core is wrapped, the cable structure is completed with Aluminum and LDPE jacket. The cable is fully color coded so that each pair in the cable is Distinguishable from every other pair. The color coding provides different color combinations of insulation for each pair in a 25 pair group or (subgroup) and provides colored bindings to distinguish individual groups from each other.

## **2. ASSOCIATED DOCUMENTS**

This specification is in accordance with REA'ASTM (American society for testing and material) , BS (British Standard Institute ) , IP (Institute of Petroleum ) and ISO (International Organization for Standardization ) have been specified .

## **3. TEMPERATURE AND ENVIRONMENT**

The cables shall without detriment, perform suitably throughout a temperature range of -40 to +70 C. The cables shall suffer no deterioration from corrosive elements found naturally in the ground.

## **4. CONDUCTOR**

Each conductor is a solid wire of commercially pure annealed copper, smoothly drawn, circular in cross section, uniform in quality and free from defects. Conductors meet the quality requirements of ASTM B3. The maximum resistance for a cross section area of 1 mm<sup>2</sup> and a length of 1 km is 17.241 ohms when measured at 20±2 °C. The nominal conductor diameters may be 0.4 to 0.9 mm.

## **5. CONDUCTOR INSULATION**

Each conductor is uniformly covered with solid polyethylene conforming to ASTM D-1248 Type III class B category 4 or 5 Grade E8. Insulation contains a suitable antioxidant system including a copper inhibitor.

The insulation will be uniform, smooth and The Eccentricity of the insulation according the procedure described in ASTM D-4565 is less than 0.1.

The insulation colors are in accordance with the following table (1):

TABLE (1)

PAIR NUMBER	CONDUCTOR A	CONDUCTOR B
1	White	Blue
2	White	Orange
3	White	Green
4	White	Brown
5	White	Grey
6	Red	Blue
7	Red	Orange
8	Red	Green
9	Red	Brown
10	Red	Grey
11	Black	Blue
12	Black	Orange
13	Black	Green
14	Black	Brown
15	Black	Grey
16	Yellow	Blue
17	Yellow	Orange
18	Yellow	Green
19	Yellow	Brown
20	Yellow	Grey
21	Violet	Blue
22	Violet	Orange
23	Violet	Green
24	Violet	Brown
25	Violet	Grey

## 6. TWISTING

Two appropriately colored insulated conductors are uniformly twisted together to form a pair. The lays of all pairs are in the same direction and different for each pair in a unit.

## 7. STRANDING

In cables having 25 pairs or less, the pairs colored according to the table (1) are stranded to form a cylindrical core. Stranding may be accomplished by using a concentric stranding or by using cross stranding where the pairs will change positions according to the change in direction of lay. In cables having more than 25 pairs the pairs colored according to table (1) form groups which are divided into two or more sub-groups according to tables (2). The colored binders are used for binding and identifying each group or subgroup according to tables (4, 5). Each cable of 100 pairs will have one (1) spare pairs according to tables (3).

7-1. The cables construction are in accordance with the following tables (2):

TABLE (2)

pairs in cable	CENTER LAYER		FIRST LAYER		SECOND LAYER	
	subgroup or group No.	Pairs in subgroup or group	subgroup or group No.	Pairs in subgroup or group	subgroup or group No.	Pairs in subgroup or group
10	1	10	-	-	-	-
20	1	20	-	-	-	-
30	1	12	-	-	-	-
	1	13	-	-	-	-
	2	5	-	-	-	-
40	1	12	-	-	-	-
	1	13	-	-	-	-
	2	15	-	-	-	-
* 50	1	12	-	-	-	-
	1	13	-	-	-	-
	2	12	-	-	-	-
	2	13	-	-	-	-
70	1	25	-	-	-	-
	2	25	-	-	-	-
	3	20	-	-	-	-
100	1	25	-	-	-	-
	2	25	-	-	-	-
	3	25	-	-	-	-
	4	25	-	-	-	-

\* 50 pairs group made by two 25 pair unit

7-2. Each cable of 100 pairs will have one (1) spare pairs according to tables (3).

TABLE (3)

SPARE PAIR NUMBER	CONDUCTOR A	CONDUCTOR B
1	White	Red

7-3. The binder colors for subgroup are in accordance with the following table (4,5):

TABLE (4)

Subgroup No.	Color of binding	Pair count
1	White -Blue	1-10 OR 1-20 OR 1-12 OR 13-25 OR 1-25
2	White - Orange	1-5 OR 1-15 OR 1-12 OR 13-25 OR 1-25
3	White -Green	1-20 OR 1-25
4	White -Brown	1-25

TABLE (5)

Subgroup No.	Color of binding	Pair count
1	White -Blue	1-25
2	White - Orange	26-50
3	White -Green	51-75
4	White -Brown	76-100

## **8. CORE WRAP**

The core is completely covered with one layer of non-hygroscopic non-wicking, dielectric tape. The tape may be applied helically or longitudinally and have a minimum over lap of 30% of the width of the wrapping or 5 mm whichever is the least .The core wrap provide a sufficient heat barrier to prevent visible evidence of conductor insulation deformation or adhesion between conductors caused by adverse heat transfer during the jacketing operation .

## **9. ALUMINUM SHIELD**

An aluminum tape with copolymer coating on both sides will be applied longitudinally with an adequate overlap for the cables with a core diameter of 20mm or less the overlap shall be 3mm minimum and for the cables with a core diameter greater them 20mm the overlap shall be 6mm minimum . The Aluminum thickness is 200 micron and the copolymer coating on each side has the thickness about 38 microns.

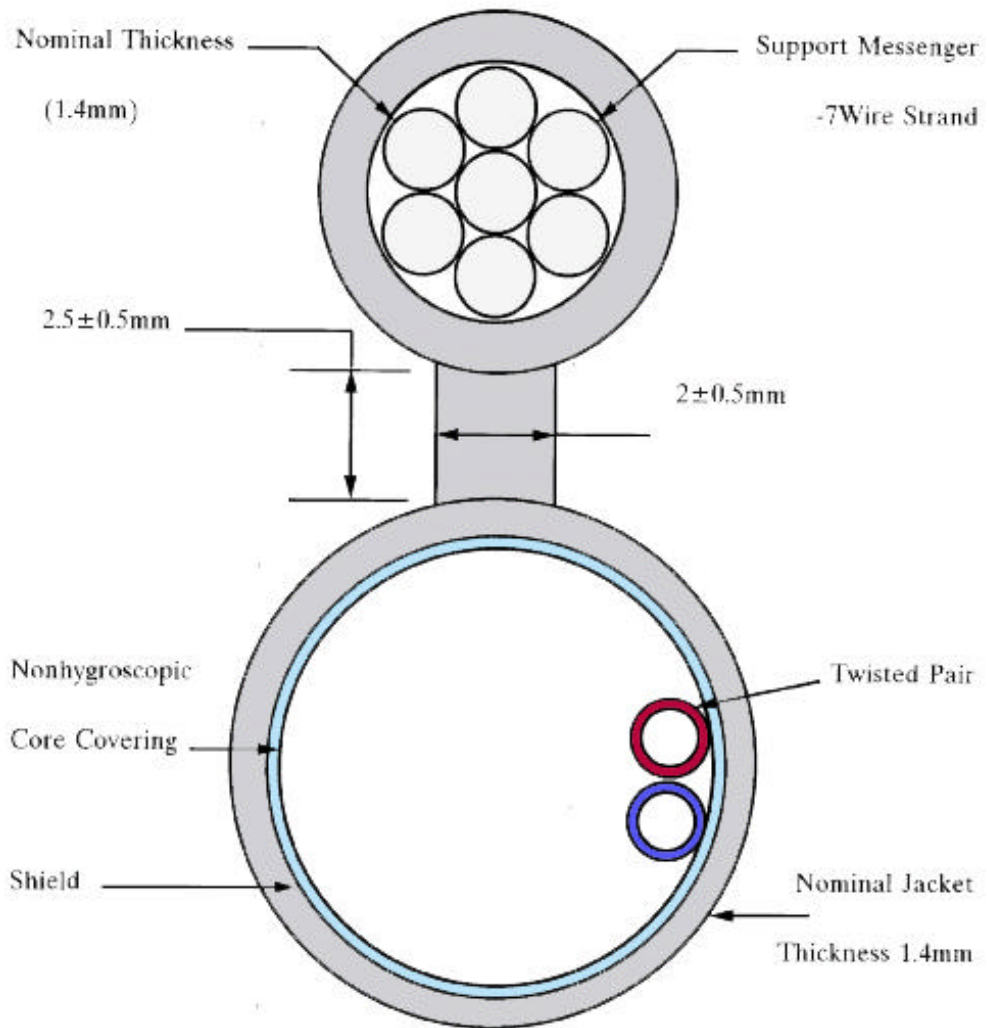
## **10. SUSPENSION STRAND (MESSENGER)**

Suspension strand consist of 7 galvanized steel wires with zinc coating at least 120 gr/m<sup>2</sup> and a minimum tensile strength of 1600 N/mn<sup>2</sup>. Depending on cable weight, diameter of each wire may be 0.9 mm, 1.2 mm or 1.6 mm.

## **11. OUTER JACKET**

A black polyethylene jacket in accordance with ASTM D-1248 type I class C. category 4 or 5 grade J-3. The nominal jacket thickness will be according the FIG1. The average thickness at any cross section shall not be less than 90% and minimum spot thickness shall not be less than 70% of the nominal thickness.

FIG1



## 12. ELECTRICAL PARAMETERS

The electrical parameters are accordance with the following table (6) :

TABLE (6)

PARAMETERS		UNIT	0.4 mm	0.5 mm	0.6 mm	0.65 mm	0.8 mm
Resistance	Max. Ind	W/km	147	93	65	57	36
	Max. Ave	W/km	139	88	62	54	35
Resistance Unbalance	Max. Ind	%	5	4.5	4.5	4.5	4.5
	Max. Ave	%	2	1.5	1.5	1.5	1.5
Dielectric Strength	Conductor to conductor	Kv/ 3 sec	2.4	3	3.5	3.5	5
	Conductor to ground	Kv/ 3 sec	10	10	10	10	10
	Shield to suspension	Kv/ 3 sec	5	5	5	5	5
Mutual Capacitance	* Max. Ind	Nf/km	57	57	57	57	57
	* Ave	Nf/km	52 ± 2	52 ± 2	52 ± 2	52 ± 2	52 ± 2
Capacitance Unbalance	**Pair to ground Max. Ind	Pk/km	2625	2625	2625	2625	2625
	**Pair to ground Max. Ave	Pk/km	574	574	574	574	574
	Pair to pair Max. Rms	Pk/km	45	45	45	45	45
Attenuation	Nom 1024 KHz	dB/Km	25.7	21.6	17.3	16.2	12.7
	Nom 1500 KHz	dB/Km	31.2	25.6	21	19.5	15.4
Crosstalk	Worst power-sum 1024	dB/Km	35	35	35	35	37
	Mean power-sum 1024	dB/Km	39	40	41	41	43
	Worst power-sum 3150	dB/Km	26	26	26	26	28
	Mean power-sum 3150	dB/Km	30	31	32	32	34

\* For cables less than 12 pairs the average  $52 \pm 4$  Nf/km and individual 58 Nf/km

\* Only for cables more than 12 pairs

## 13.CABLE SIZES

14-1. Cable sizes for 0.4 are in accordance with the following table (7-A) :

TABLE (7-A)

Size of Cable	Weight Approx (kg/km)	Diameter Approx (mm)	Reel Length (M)
10 × 2 × 0.4	136	9.5	1010 - 1020
20 × 2 × 0.4	171	10.5	1010 - 1020
30 × 2 × 0.4	207	12	1010 - 1020
40 × 2 × 0.4	241	13	1010 - 1020
50 × 2 × 0.4	305	13.5	1010 - 1020
70 × 2 × 0.4	370	15.5	1010 - 1020
100 × 2 × 0.4	469	17	505 - 510

14-2. Cable sizes for 0.5 are in accordance with the following table (7-B) :

TABLE (7-B)

Size of Cable	Weight Approx (kg/km)	Diameter Approx (mm)	Reel Length (M)
10 × 2 × 0.5	156	10	1010 - 1020
20 × 2 × 0.5	211	12	1010 - 1020
30 × 2 × 0.5	297	13.5	1010 - 1020
40 × 2 × 0.5	347	14.5	1010 - 1020
50 × 2 × 0.5	398	16	1010 - 1020
70 × 2 × 0.5	499	18	505 - 510
100 × 2 × 0.5	653	21	505 - 510
150 × 2 × 0.5	954	24	505 - 510
200 × 2 × 0.5	1197	27	505 - 510



14-3. Cable sizes for 0.6 are in accordance with the following table (7-C) :

TABLE (7-C)

Size of Cable	Weight Approx (kg/km)	Diameter Approx (mm)	Reel Length (M)
<b>10 × 2 × 0.6</b>	<b>178</b>	<b>11</b>	<b>1010 - 1020</b>
<b>20 × 2 × 0.6</b>	<b>287</b>	<b>13.5</b>	<b>1010 - 1020</b>
<b>30 × 2 × 0.6</b>	<b>361</b>	<b>15.5</b>	<b>1010 - 1020</b>
<b>40 × 2 × 0.6</b>	<b>431</b>	<b>16.5</b>	<b>1010 - 1020</b>
<b>50 × 2 × 0.6</b>	<b>499</b>	<b>17.5</b>	<b>1010 - 1020</b>
<b>70 × 2 × 0.6</b>	<b>639</b>	<b>20</b>	<b>505 - 510</b>
<b>100 × 2 × 0.6</b>	<b>904</b>	<b>23.5</b>	<b>505 - 510</b>

14-4. Cable sizes for 0.8 are in accordance with the following table (7-D) :

TABLE (7-D)

Size of Cable	Weight Approx (kg/km)	Diameter Approx (mm)	Reel Length (M)
<b>5 × 2 × 0.65</b>	<b>150</b>	<b>10</b>	<b>1010 - 1020</b>
<b>10 × 2 × 0.65</b>	<b>200</b>	<b>12</b>	<b>1010 - 1020</b>
<b>20 × 2 × 0.65</b>	<b>325</b>	<b>15</b>	<b>1010 - 1020</b>
<b>30 × 2 × 0.65</b>	<b>415</b>	<b>17</b>	<b>1010 - 1020</b>
<b>50 × 2 × 0.65</b>	<b>580</b>	<b>20</b>	<b>1010 - 1020</b>
<b>70 × 2 × 0.65</b>	<b>805</b>	<b>23</b>	<b>505 - 510</b>

14-5. Cable sizes for 0.8 are in accordance with the following table (7-E) :

TABLE (7-E)

Size of Cable	Weight Approx (kg/km)	Diameter Approx (mm)	Reel Length (M)
<b>10 × 2 × 0.8</b>	<b>245</b>	<b>13.5</b>	<b>1010 - 1020</b>
<b>20 × 2 × 0.8</b>	<b>409</b>	<b>16.5</b>	<b>1010 - 1020</b>
<b>30 × 2 × 0.8</b>	<b>537</b>	<b>19</b>	<b>1010 - 1020</b>
<b>40 × 2 × 0.8</b>	<b>660</b>	<b>21</b>	<b>1010 - 1020</b>
<b>50 × 2 × 0.8</b>	<b>834</b>	<b>22.5</b>	<b>1010 - 1020</b>
<b>70 × 2 × 0.8</b>	<b>1084</b>	<b>26</b>	<b>505 - 510</b>
<b>100 × 2 × 0.8</b>	<b>1456</b>	<b>30</b>	<b>505 - 510</b>