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**SINGLECORE  
MULTICORE  
FLEXIBLE  
CABLES**



An ISO- 9001- 2000  
Accredited Company



## TECHNICAL DATA FOR PVC INSULATED FLEXIBLE CABLES AS PER IS: 694 - 1990

SBEE CABLES INDIA LTD, BANGALORE, INDIA manufactures

"SBEE CABLES" under the supervision of qualified and experienced technocrats who are well versed with modern manufacturing techniques. PVC insulated SBEE CABLES conforming to IS: 694 – 1990, carry the prestigious ISI mark and are sheathed. Unsheathed Copper & Aluminium Cables have a wide range of applications in Industries, Agriculture, Machine Tools and Control Panel, Buildings and in all types of electrical power distribution. SBEE assures quality, thus ensuring that there will be no electric shock, no short circuit, and no electrical fire. This is because these cables are made of Bright Electrolytic Grade Copper with 100% conductivity which make them excellent conductors of electricity, thus saving energy. These cable are insulated with high grade PVC Compound that gives very higher insulation resistance and prevent current leakage. Each cable undergoes online high voltage spark test to ensure that there are no defects.

### CABLE CONSTRUCTION

**CONDUCTOR :** The conductor are drawn from Bright Electrolytic Grade 99.97% pure copper rod & H2 & H4 Grade Aluminium rod and multiple strand, these are of low resistance, consume less Power and give protection against voltage fluctuation.

**INSULATION :** Bunched conductors are insulated with specially formulated, developed PVC compound with high insulation resistance values. The insulation process is carried out on modern high-speed extrusion lines with high accuracy, ensuring consistency in performance. The flame-retardant properties of SBEE CABLES minimize the spread of fire, which provide safety.

**SHEATH :** In case of multicore cables, the insulated cores are laid up to form the core assemblies. The inner cores are coded for easy identification as per Indian / international coding practices. The sheathing is provided with specially formulated, developed PVC compound (Type ST1) to facilitate not only ease in stripping, but also to with stand mechanical abrasion while in use.

### CORE IDENTIFICATION

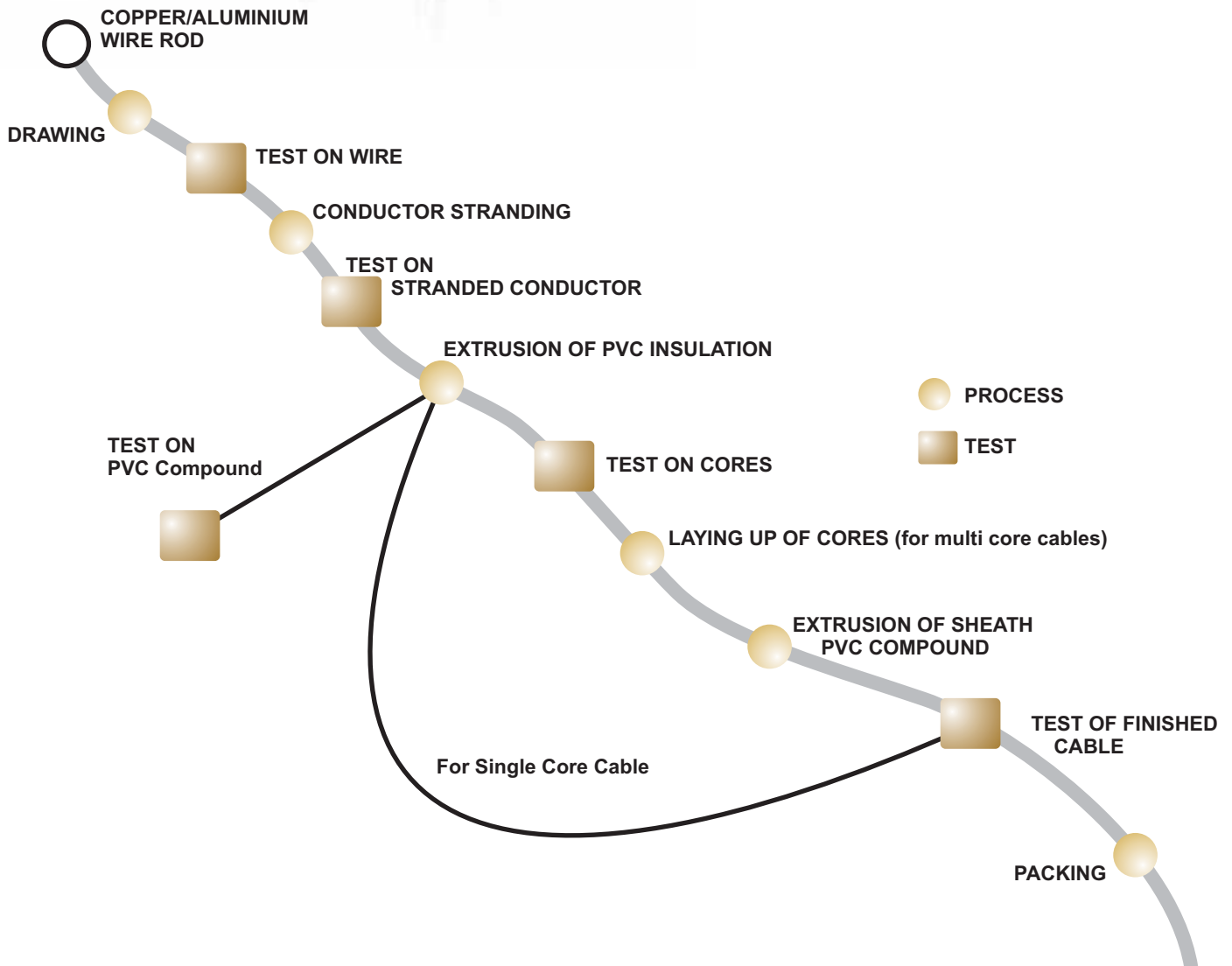
**COLOUR SCHEME:** Cores are identified by colour scheme of PVC insulation. The following colour scheme is normally adopted:

No of Cores	Cables For Fixed	Wiring Flexible Cables
1 Core	Red, Black, Yellow, Blue, White or Yellow	Red, Black, Yellow, Blue, White or Grey
2 Core	Red and Black	Red and Black
3 Core	Red, Yellow and Blue	Red, Black & Green or Yellow/Green (ECC)
4 Core	Red, Yellow, Blue & Black	Red, Yellow, Blue Black or Yellow/Green (ECC)
5 Core	Red, Yellow, Blue, Black & Green/Grey	Red, Yellow, Blue, Black & Green/Grey

### 6 CORE & ABOVE

Two adjacent core counting core direction & direction core in each layer are coloured Blue & yellow respectively and the remaining core are Grey. On specific request we can also provide core numbering for control cables.

# Cable Manufacturing Process



As per 

## PRIME MARKET SEGMENT

- Airports
- Automobile
- Building & Construction Industries
- Cement Industries
- Chemical & Process Industries
- Fertilizer Industries
- Hydro Power Generation
- Information Technology Industries
- Mining
- Nuclear Power Generation
- Ordinance Factories & Defence Installations
- Petrochemical Industries / LPG Plants
- Petroleum Refineries & Port Terminals
- Power Electricity Distribution Industries
- Railways
- Steel Plants & Industries
- Thermal Power Generation
- Turnkey Electrical Contractors
- Wind Power Generation

TABLE-I (IS : 694 - 1990) , CONDUCTOR DATA  
STRANDED COPPER & ALUMINIUM CONDUCTOR FOR SINGLE  
CORE & MULTICORE CABLES, AS PER IS : 8130 (1984)

Nominal Cross Sectional Area	Minimum Number of Wires in Stranded Conductor (class - 2)				Maximum DC Resistance At 20 deg C		
	Circular Conductor (non Compacted)		Circular Compacted Or Shaped Conductor		Plain Copper Conductor	Tinned Copper Conductor	Aluminium Conductor
	Copper	Aluminium	Copper	Aluminium	Ohm/km	Ohm/km	Ohm/km
Sq mm	Copper	Aluminium	Copper	Aluminium	Ohm/km	Ohm/km	Ohm/km
1.0	3	—	—	—	18.1	18.2	—
1.5	3	3	—	—	12.1	12.2	18.1
2.5	3	3	—	—	7.41	7.56	12.1
4	7	3	—	—	4.61	4.7	7.41
6	7	3	—	—	3.08	3.11	4.61
10	7	7	6	—	1.83	1.84	3.08
16	7	7	6	6	1.15	1.16	1.91
25	7	7	6	6	0.727	0.734	1.2
35	7	7	6	6	0.524	0.529	0.868
50	19	19	6	6	0.387	0.391	0.641
70	19	19	12	12	0.268	0.27	0.443
95	19	19	15	15	0.193	0.195	0.32
120	37	37	18	15	0.153	0.154	0.253
150	37	37	18	15	0.124	0.126	0.206
185	37	37	30	30	0.0991	0.100	0.164
240	61	37	34	30	0.0754	0.0762	0.125
300	61	61	34	30	0.0601	0.0607	0.100
400	61	61	53	53	0.047	0.0475	0.0778
500	61	61	53	53	0.0366	0.0369	0.0605
630	91	91	53	53	0.0283	0.0286	0.0469
800	91	91	53	53	0.0221	0.0224	0.0367
1000	91	91	53	53	0.0176	0.0177	0.0291

TABLE - 2 (IS : 694 - 1990) CONDUCTOR DATA

Flexible Copper Conductor for  
Single and multicore Cables As Per IS : 8130 (1984) - Class 5

Nominal Cross Sectional Area	Maximum Diameter of Wires in Conductor	Maximum Resistance of Conductor at 20 deg. C	
		Plain Wires	Tinned Wires
		Ohm/Km	Ohm/Km
sq.mm		Ohm/Km	Ohm/Km
0.5	0.21	39	40.1
0.75	0.21	26	26.7
1	0.21	19.5	20
1.5	0.26	13.3	13.7
2.5	0.26	7.98	8.21
4	0.31	4.95	5.09
6	0.31	3.3	3.39
10	0.41	1.91	1.95
16	0.41	1.21	1.24
25	0.41	0.78	0.795
35	0.41	0.554	0.565
50	0.41	0.386	0.393
70	0.51	0.272	0.277
95	0.51	0.206	0.21
120	0.51	0.161	0.164
150	0.51	0.129	0.132
185	0.51	0.106	0.108
240	0.51	0.0801	0.0817
300	0.51	0.0641	0.0654
400	0.51	0.0486	0.0495
500	0.61	0.0384	0.0391
630	0.61	0.0287	0.0292

TABLE - 3 (IS : 694 - 1990)

Single Core, FR / FR - LSH PVC insulated Copper Conductor  
(Unsheathed) Heavy Duty Electric Wire in Voltage Grade upto and  
including 1100V (Maximum Conductor Temperature 70 deg C & 85 deg C)

Nominal Cross Sectional Area	Number /Nom Diameter of Conductor Strand (*)	Thickness of Insulation (Nom)	Appx. Overall Diameter	Conductor Resistance (Max) at 20°C
sq.mm	mm	mm	mm	Ohm/km
0.5	16 / 0.2	0.6	2.3	39
0.75	24 / 0.2	0.6	2.4	26
1	14 / 0.3	0.7	2.7	19.5
1.5	22 / 0.3	0.7	3.2	13.3
2.5	36 / 0.3	0.8	3.8	7.98
4	56 / 0.3	0.8	4.2	4.95
6	84 / 0.3	0.8	4.8	3.3

**TABLE - 4 (IS : 694 -1990)**

Single Core FR / FR - LSH PVC Insulated (Unsheathed) Cable with Rigid Copper / Aluminium Conductor, Heavy Duty Electric Cable in Voltage Grade Upto and including 1100V (Class I & 2) Max.Con.Temp. 70 deg C & 85 deg C

Nominal Cross Sectional Area of Conductor	Number / Nominal Diameter of Each Strand	Thickness of Insulation (Nominal)	Overall Diameter ( Appx. )
Sq mm	mm	mm	mm
1.0 (Solid)	1 / 1.12	0.7	2.75
1.0 (Stranded)	7 / 0.43	0.7	2.9
1.5 (Solid)	1 / 1.38	0.7	3.0
1.5 (Stranded)	7 / 0.53	0.7	3.2
2.5 (Solid)	1 / 1.78	0.8	3.6
2.5 (Stranded)	7 / 0.67	0.8	3.8
4.0 (Solid)	1 / 2.24	0.8	4.0
4.0 (Stranded)	7 / 0.85	0.8	4.4
6.0 (Solid)	1 / 2.76	0.8	4.6
6.0 (Stranded)	7 / 1.04	0.8	5.0
10.0 (Solid) Aluminium	1 / 3.52	1.0	5.8
10.0 (Stranded)	7 / 1.35	1.0	6.2
16.0 Stranded Compacted	7 / 1.70	1.0	7.3
25.0 Stranded Compacted	7 / 2.14	1.2	9.0
35.0 Stranded Compacted	7 / 2.52	1.2	10.2
50.0 Stranded Compacted	7 / 2.92	1.4	12.0
70.0 Stranded Compacted	19 / 2.14	1.4	13.8
95.0 Stranded Compacted	19 / 2.52	1.6	16.0
120.0 Stranded Compacted	19 / 2.88	1.6	18.0
150.0 Stranded Compacted	19 / 3.20	1.8	20.0
185.0 Stranded Compacted	37 / 2.52	2.0	22.0
240.0 Stranded Compacted	37 / 2.88	2.2	25.0
300.0 Stranded Compacted	37 / 3.20	2.4	27.5
400.0 Stranded Compacted	61 / 2.92	2.6	32.0
500.0 Stranded Compacted	61 / 3.20	2.8	35.0
630.0 Stranded Compacted	61 / 3.65	2.8	39.5

**TABLE - 5 (IS : 694 -1990)**

Single Core FR / FR - LSH PVC Insulated (Unsheathed) Flexible Copper Conductor, (Class V) (Max.Con.Temp. 70 deg C & 85 deg C)

Nominal Cross Sectional Area of Conductor	Number / Nominal Diameter of Each Strand	Thickness of Insulation (Nominal)	Overall Diameter ( Appx. )
Sq mm	mm	mm	mm
0.5	16 / 0.2	0.6	2.3
0.75	24 / 0.2	0.6	2.4
1	32 / 0.2	0.6	2.75
1.5	30 / 0.25	0.7	3.3
2.5	50 / 0.25	0.8	3.9
4	56 / 0.3	0.8	4.3
6	84 / 0.3	0.8	4.9
10	80 / 0.4	1.0	6.4
16	126 / 0.4	1.0	7.4
25	196 / 0.4	1.2	9.4
35	276 / 0.4	1.2	10.4
50	396 / 0.4	1.4	12.7
70	360 / 0.5	1.4	15.0
95	475 / 0.5	1.6	16.8
120	608 / 0.5	1.6	18.0
150	750 / 0.5	1.8	20.0
185	925 / 0.5	2.0	21.2
240	1221 / 0.5	2.2	24.5
300	1525 / 0.5	2.4	26.8
400	2036 / 0.5	2.6	30.5

**TABLE - 6 (IS : 694 - 1990)**

Sheathed Single and Multicore Cable Voltage Grade upto and Including 1100V PVC Insulated Circular Sheathed Cords for Fixed Wiring (class V Conductor) Maximum Conductor Temp.70 deg C & 85 deg C

Area (sq.mm)	1	1.5	2.5	4	6	10	16	25	35	50	70	95	120
No & Size of each strand (mm)	32/0.2**	30/0.25 OR 48/0.2	50/0.25 OR 80/0.2	56/0.3	84/0.3	80/0.4 or 140/0.3	126/0.4	196/0.4	276/0.4	396/0.4	360/0.5	475/0.5	608/0.5
Max. Conductor Resistance at 20 degC (ohm / km)	19.5	13.3	7.98	4.95	3.3	1.91	1.21	0.78	0.554	0.386	0.272	0.206	0.161
Thickness of Insulation (mm)	0.6	0.6	0.8	0.8	0.8	1.0	1.0	1.2	1.2	1.4	1.4	1.6	1.6
Single Core (Unsheathed) Overall Diameter (mm)	2.7	3.2	3.8	4.2	4.8	6.4	7.4	9.4	10.4	12.7	15	16.8	18.0
Single Core Sheathed Sheath Thickness (mm)	0.8	0.8	0.8	0.9	0.9	0.9	1	1.1	1.1	1.2	1.2*	1.4*	1.4*
Overall Diameter (mm)	4.4	5.0	5.6	6.2	6.8	8.4	9.6	11.8	12.8	15.3	17.6	19.8	21.0
2 Core Sheathed Sheath Thickness (mm)	0.9	0.9	1.0	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7*	1.8*	1.9*
Overall Diameter (mm)	7.4	8.4	9.8	10.6	12.0	15.4	17.6	21.8	24.0	28.8	33.6	37.4	40.0
3 Core Sheathed Sheath Thickness (mm)	0.9	0.9	1.0	1.1	1.1	1.2	1.3	1.5	1.6	1.7	1.8*	1.9*	2.0*
Overall Diameter (mm)	7.9	9.0	10.6	11.6	12.8	16.5	18.8	23.6	25.9	31.1	36.2	40.3	43.1
4 Core Sheathed Sheath Thickness (mm)	0.9	0.9	1.0	1.1	1.2	1.3	1.4	1.6	1.7	1.8	1.9*	2.0*	2.1*
Overall Diameter (mm)	8.6	10.0	11.6	13.0	14.8	19.0	21.5	26.2	29.0	34.7	40.5	45.0	48.1
5 Core Sheathed Sheath Thickness (mm)	1.0	1.0	1.0	1.1	1.2	1.3	1.4	1.6	1.7	1.8	1.9*	2.0*	2.1*
Overall Diameter (mm)	9.6	11.0	12.7	14.0	15.8	20.2	23.1	28.9	32.0	38.2	44.7	49.8	53.0

\* Under Preparation as per IS : 694 -1990  
\*\* Copper Conductor Only

**TABLE - 7 (IS : 694 - 1990)**

Sheathed Single and Multicore Cable voltage grade upto and including 1100 V PVC insulated  
Circular Sheathed Cords for fixed wiring (Class 2) maximum conductor temperature 70 deg C & 85 deg C

Area (sq.mm)	1	1.5	2.5	4	6	10	16	25	35	50	70	95	120
No & Size of each strand (mm)	7/0.43	7/0.53	7/0.67	7/0.85	7/1.04	7/1.35	7/1.70	7/2.14	7/2.52	7/2.92	19/2.14	19/2.52	19/2.88
Max. Conductor Resistance at 20 degC (ohm / km)	18.1	12.1	7.41	4.61	3.08	1.83	1.15	0.727	0.524	0.387	0.268	0.193	0.153
Thickness of Insulation (mm)	0.7	0.7	0.8	0.8	0.8	1.0	1.0	1.2	1.2	1.4	1.4*	1.6*	1.6*
Single Core (Unsheathed) Overall Diameter (mm)	2.9	3.2	3.8	4.4	5.0	6.2	7.3	9.0	10.2	12.0	13.8	16.0	18.0
Single Core Sheathed Sheath Thickness (mm)	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.1	1.1	1.2	1.2*	1.4*	1.4*
Overall Diameter (mm)	4.7	5.0	5.8	6.5	7.2	8.4	9.8	11.5	13.1	15	17	19.7	21.2
2 Core Sheathed Sheath Thickness (mm)	0.9	0.9	1.0	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7*	1.8*	1.8*
Overall Diameter (mm)	7.9	8.5	10.0	11.0	12.6	15.2	17.6	21.2	23.8	27.6	31.5	36.0	40.0
3 Core Sheathed Sheath Thickness (mm)	0.9	0.9	1.0	1.1	1.1	1.2	1.3	1.5	1.6	1.7	1.7*	2.0*	2.0*
Overall Diameter (mm)	8.5	9.1	10.6	12.1	13.4	16.2	18.8	22.8	25.7	29.7	33.6	39.0	43.2
4 Core Sheathed Sheath Thickness (mm)	0.9	0.9	1.0	1.1	1.2	1.3	1.4	1.6	1.7	1.8	1.8*	2.0*	2.0*
Overall Diameter (mm)	9.2	10.0	11.6	13.2	14.8	18.1	21.0	25.5	28.5	33.0	37.5	43.2	48.0

\* Under Preparation as per IS : 694 - 1990

**TABLE - 8 (IS : 694 - 1990)**

Multi Core Flexible PVC Insulated And Sheathed Cables (circular) (Max. Conductor Temperature 70 deg C & 85 deg C)

Nominal Cross Sectional Area of Conductor	Thickness of Insulation (Nominal) (t1)	Nominal Thickness of Sheath (ts)										Overall Diameter (mm) Approx										Core Diameter (mm)			
		5	6	7	8	10	12	14	16	19	25	5	6	7	8	10	12	14	16	19	25				
		core	core	core	core	core	core	core	core	core	core	core	core	core	core	core	core	core	core	core	core				
0.5	0.6	0.9	0.9	0.9	1.0	1.0	1.0	1.1	1.1	1.1	1.2	1.2	1.3	1.4	9.5	10.4	10.5	11.3	13.0	13.6	14.0	15.2	16.5	19.0	2.7
0.75	0.6	0.9	1.0	1.0	1.0	1.1	1.1	1.1	1.2	1.2	1.3	1.3	1.4	11.0	12.0	12.5	13.0	15.2	16.0	17.0	18.0	19.0	22.5	3.2	
1.0	0.6	1.0	1.0	1.0	1.1	1.1	1.1	1.2	1.2	1.3	1.4	1.4	1.5	12.8	13.8	14.2	15.5	18.0	18.5	19.5	21.1	22.5	26.0	3.8	

**TABLE - 9 (IS : 694 - 1990)**

Parallel Twin / Twisted Twin Flexible PVC Insulated Unsheathed Cords

Nominal Cross Sectional Area	Thickness of Insulation (Nominal) (t1)	Appx. Overall Diameter	
		Parallel Twin	Twisted Twin
Sq.mm	mm	mm	mm
0.5	0.6	2.3 X 4.6	4.6
0.75	0.6	2.4 X 4.8	4.8
1.0	0.6	2.7 X 5.4	5.4
1.5	0.6	3.2 X 6.4	6.4
2.5	0.7	3.8 X 7.6	7.6
4.0	0.8	4.2 X 8.4	8.4

**TABLE - 10 (IS : 694 - 1990)**

Two and Three Core Flat Cables with PVC Insulation and Sheathed Cable

Nominal Cross Sectional Area	Thickness of Insulation (Nominal) (T1)	Nominal Thickness of Sheath	Overall Dimensions	
			2 core	3 core
Sq mm	mm	mm	mm	mm
0.5	0.6	0.9	4.3 x 6.8	4.3x8.9
0.75	0.6	0.9	4.5 x 7.0	4.5x9.2
1.0	0.6	0.9	4.9 x 7.4	4.9x10.0
1.5	0.6	0.9	5.2 x 8.4	5.2x11.6
2.5	0.7	1.0	6.0 x 9.8	6.0x13.8
4.0	0.8	1.1	6.4 x 10.8	6.4x15.0
6.0	0.8	1.1	-	7.2x17.2
10	1.0	1.2	-	9.2x22.0
16	1.0	1.3	-	10.2x25.0
25	1.2	1.5	-	12.4x30.8
35	1.2	1.6	-	13.8x35.0
50	1.4	1.7	-	16.5x42.0
70	1.4	2.0	-	19.2x48.6
95	1.6	2.4	-	22x56.0

TABLE - II (IS : 694 -1990)

Current Carrying Capacity and Associated Voltage Drops for Single Core Copper Conductor PVC Insulated Cables with or Without Sheath (main Application For Fixed Installation In Building And Industrial Under Takings)

Nominal Cross Sectional Area of Conductor sq.mm	INSTALLATION METHOD - ENCLOSED				INSTALLATION METHOD - CLIPPED DIRECT				Trefoil /	
	2 cables, single phase AC/DC		3 or 4 cables, 3 phase AC		2 cables, single phase AC/DC		3 or 4 cables, 3 phase AC		3 cables / 3 phase	
	Current Carrying Capacity (A)	Voltage Drop / Meter (mv)	Current Carrying Capacity (A)	Voltage Drop / Meter (mv)	Current Carrying Capacity (A)	Voltage Drop / Meter (mv)	Current Carrying Capacity (A)	Voltage Drop / Meter (mv)	Current Carrying Capacity (A)	Voltage Drop / Meter (mv)
1	13	40	12	35	16	40	16	35	-	-
1.5	16	27	17	23	20	27	17	23	-	-
2.5	22	16	24	14	28	16	24	14	-	-
4	30	10	30	8.8	37	10	30	8.8	-	-
6	38	6.8	38	5.9	47	6.8	39	5.9	-	-
10	52	4.0	50	3.5	63	4.0	57	3.5	-	-
16	70	2.6	64	2.2	85	2.6	66	2.2	-	-
25	91	1.6	81	1.4	110	1.6	90	1.4	-	-
35	112	1.2	99	1.0	136	1.2	110	1.0	-	-
50	136	0.97	125	0.84	164	0.93	135	0.82	125	0.8
70	173	0.70	150	0.62	207	0.65	165	0.59	153	0.59
95	216	0.59	175	0.48	253	0.48	200	0.45	189	0.42
120	244	0.48	195	0.42	291	0.40	230	0.38	220	0.34
150	-	-	-	-	333	0.34	265	0.34	253	0.29
185	-	-	-	-	381	0.29	305	0.3	290	0.25
240	-	-	-	-	452	0.24	355	0.27	342	0.22
300	-	-	-	-	526	0.22	400	0.25	405	0.19
400	-	-	-	-	639	0.2	455	0.24	483	0.17
500	-	-	-	-	752	0.18	513	0.23	561	0.16
630	-	-	-	-	855	0.17	591	0.22	631	0.15

TABLE - II (IS : 694 -1990)

NOTE : 1) All the rating are based on ambient temperature of 30 deg C and are in accordance with IEEE regulations.  
2) Rating Factors for Higher Ambient Temperature.

Ambient temp deg C	20	30	35	40	45	50	55	60	65
Rating Factor	1.06	1	0.94	0.87	0.79	0.71	0.61	0.5	0.35

3) The term enclosed is explained below.

**Type : DESCRIPTION**

- A) Single Core and Multi Core Cables enclosed in a Conduit.
- B) Single Core and Multi Core Cables enclosed in Cable Trunking.
- C) Single Core and Multi Core Cables enclosed I Underground Conduit ducts and cable ducting
- D) The term clipped direct is explained below.

**Type : DESCRIPTION**

- A) Sheathed Single Core and MultiCore Cables clipped direct to or lying on a non metallic surface.
- B) Sheathed Single Core and MultiCore Cables on a Cable Tray, bunched and unenclosed.
- C) Sheathed Single Core and MultiCore Cables suspended from incorporating a catenary Wire.

TABLE - 12 (IS : 694 -1990)

Current Carrying Capacity And Associated Voltage Drops for Multi Core Copper Conductor PVC Insulated Cables Unarmoured with or without Sheath (Main Application for Fixed Installation in Building and Industrial Under Takings)

Nominal Cross Sectional Area of Conductor	INSTALLATION METHOD - CLIPPED DIRECT				INSTALLATION METHOD - DEFINED CONDITIONS			
	One twin cable single phase AC/DC		One 3 or 4 core cable 3 phase		One twin cable single phase AC/DC		One 3 or 4 core cable 3 phase	
	Current Carrying Capacity	Voltage Drop / Meter	Current Carrying Capacity	Voltage Drop / Meter	Current Carrying Capacity	Voltage Drop / Meter	Current Carrying Capacity	Voltage Drop / Meter
Sq mm	(A)	(mv)	(A)	(mv)	(A)	(mv)	(A)	(mv)
1.5	20	27	17	23	-	-	-	-
2.5	27	16	24	14	-	-	-	-
4	35	10	30	8.8	-	-	-	-
6	44	6.8	39	5.9	46	6.8	40	5.9
10	60	4.0	52	3.5	63	4.0	54	3.5
16	82	2.6	66	2.2	86	2.6	70	2.2
25	110	1.6	90	1.4	116	1.6	95	1.4
35	130	1.2	110	1.0	137	1.2	116	1.0
50	165	0.93	135	0.82	177	0.93	143	0.82
70	205	0.65	165	0.59	216	0.65	175	0.59
95	245	0.48	200	0.45	258	0.48	211	0.45
120	280	0.4	230	0.38	295	0.4	243	0.38
150	320	0.34	265	0.34	338	0.34	280	0.34
185	370	0.29	305	0.3	390	0.29	318	0.3
240	425	0.24	355	0.27	449	0.24	376	0.27
300	475	0.22	400	0.25	502	0.22	424	0.25
400	550	0.2	455	0.24	581	0.2	482	0.24

TABLE - 13 (IS : 694 -1990)

Current Carrying Capacities And Associated Voltage Drops for Single Core Aluminium Conductor PVC Insulated Cables, with or Without Sheath (Main Applications For Fixed Installation In Buildings And Industrial Under Takings)

Nominal Cross Sectional Area of Conductor	INSTALLATION METHOD - CLIPPED DIRECT				INSTALLATION METHOD - DEFINED CONDITIONS				Trefoil	
	2 Cables, Single Phase AC/DC		3 or 4 cables 3 phase AC		2 Cables, Single Phase AC/DC		3 or 4 cables 3 phase AC		3 cables / 3 phase	
	Current Carrying Capacity	Voltage Drop / Meter	Current Carrying Capacity	Voltage Drop / Meter	Current Carrying Capacity	Voltage Drop / Meter	Current Carrying Capacity	Voltage Drop / Meter	Current Carrying Capacity	Voltage Drop / Meter
sq.mm	(A)	(mv)	(A)	(mv)	(A)	(mv)	(A)	(mv)	(A)	(mv)
16	60	4.5	51	3.9	72	4.5	64	3.9	-	-
25	76	2.8	70	2.5	92	2.8	84	2.5	-	-
35	92	2	86	1.8	111	2.1	105	1.8	-	-
50	110	1.6	105	1.4	133	1.5	130	1.3	140	1.3
70	135	1.2	130	1	166	1.1	155	0.93	170	0.9
95	165	0.85	155	0.8	213	0.76	190	0.7	205	0.67
120	185	0.7	180	0.7	241	0.62	220	0.56	235	0.54
150	210	0.64	205	0.64	273	0.5	250	0.48	270	0.48
185	-	-	-	-	317	0.4	290	0.4	310	0.37
240	-	-	-	-	383	0.32	335	0.34	370	0.3
300	-	-	-	-	448	0.28	380	0.3	435	0.25
400	-	-	-	-	542	0.2	435	0.26	530	0.2
500	-	-	-	-	672	0.16	480	0.24	600	0.2

TABLE - 14 (IS : 694 -1990)

Current Carrying Capacities and Associated Voltage Drops for Twin and Multi Core PVC Insulated. Aluminium Conductor. Cables with or Without Sheath (Main Applications for Fixed Installation In Buildings and Industrial Under Takings)

Nominal Cross Sectional Area of Conductor	INSTALLATION METHOD - CLIPPED DIRECT				INSTALLATION METHOD - DEFINED CONDITIONS			
	One twin cable single phase AC/DC		One 3 or 4 core cable 3 phase		One twin cable single phase AC/DC		One 3 or 4 core cable 3 phase	
	Current Carrying Capacity	Voltage Drop / Amp/ Meter	Current Carrying Capacity	Voltage Drop / Amp/ Meter	Current Carrying Capacity	Voltage Drop / Amp/ Meter	Current Carrying Capacity	Voltage Drop / Amp/ Meter
Sq mm	(A)	(mv)	(A)	(mv)	(A)	(mv)	(A)	(mv)
16	62	4.5	52	3.9	65	4.5	54	3.9
25	80	2.9	73	2.5	84	2.8	77	2.5
35	98	2.1	89	1.8	102	2.1	94	1.8
50	110	1.7	111	1.4	115	1.5	116	1.3
70	135	0.95	138	1.0	143	1.1	143	0.93
95	175	0.79	168	0.8	185	0.76	177	0.7
120	-	-	195	0.7	-	-	200	0.56
150	-	-	222	0.64	-	-	232	0.48
185	-	-	252	0.37	-	-	265	0.4
240	-	-	301	0.29	-	-	316	0.34
300	-	-	345	0.25	-	-	363	0.3

**NOTE :** 1) All the above rating are based on ambient Temperature of 30 deg C and are in accordance with IEEE regulation.  
2) Rating Factor for higher ambient temperature.

AMBIENT TEMP.	25	30	35	40	45	50	55	60	65
RATING FACTOR	1.08	1	0.94	0.87	0.79	0.61	0.5	0.35	0.25

## ZERO HALOGEN FLAME RETARDANT

SBEE manufacturers wide range of ZERO HALOGEN FLAME RETARDANT (ZHFR) wires, these wires are superior & safer alternative to conventional wires which are made of PVC. ZHFR insulated wires are filled with hydrated fillers which release water during fire, which is deterrent for fire & will not propogate. These wires are well suited for environment where smoke mitigation is of particular concern. Such as those with in closed spaces where means of escape is a constraint/restricted (ie specially in hotels, large offices, apartment blocks, off shore installations, trains, metros & ships). SBEE with its strength in quality, process control & knowledge of cable designing are capable of supplying these cables meeting any specification, tailor made to specific customer requirement .

### Construction

SINGLE CORE, ZHFR INSULATED COPPER CONDUCTOR (UNSHEATHED) HOUSE WIRES IN VOLTAGE GRADE UPTO INCLUDING 1100 V, CONDUCTOR AS PER IS 694-1990, INSULATION AS PER IS 3961 (PART V)-1968

Nominal Cross Sectional Area	Number / Nom Diameter of conductor strand	Thickness of insulation	Appr. Over all Diameter	Current carrying capacity in conduit/ Trunking	Conductor Resistance (Max ) at 20°C
Sq mm	mm	mm	mm	Amps	Ohms/km
0.5	16/0.2	0.6	2.3	6	39.0
0.75	24/0.2	0.6	2.4	8	26.0
1.0	14/0.3	0.7	2.7	13	19.5
1.5	22/0.3	0.7	3.2	16	13.3
2.5	36/0.3	0.8	3.8	20	7.98
4.0	56/0.3	0.8	4.2	26	4.95
6.0	84/0.3	0.8	4.8	36	3.30

Standard specification: is -694-1990

**Characteristics:** Does not burn, melt & drip to spread fire. Smoke negligible & transparent. Smoke is nontoxic & non corrosive.

### SBEE BRAND WINDING WIRES & 3 CORE FLAT CABLES FOR SUBMERSIBLE PUMP MOTORS

We have been manufacturing SBEE brand of PVC and other general purpose and specialised cables for almost a decade. After gaining experience in above field, SBEE brand ventured into the specialised field of wrapped winding wire and “3CORE FLAT CALBES” for Submersible Pumps during 1998. We have now introduced HR PVC insulated SUBMERSIBLE WINDING WIRES.

In Submersible Pumps Motors liquid is used surrounding the stator winding and are therefore known as wet Rotor Motors. To preserve the life and efficiency of the motor, the quality of winding wires could be very good. The insulating material should also be impervious to liquids. SBEE windings wires are specially designed and manufactured for these purposes.

#### SUBMERSIBLE 3 CORE FLAT CABLE

It has been observed in practice and through laboratory tests that submersible 3 core flat cables are as important as winding wires for trouble free working of the submersible pumps. SBEE 3 core flat cables are manufactured by keeping in mind the severe and adverse conditions in which they are required to perform. The conductors are drawn from bright electrolytic grade of 99.97% pure copper. The wires are drawn, annealed & bunched together properly to ensure flexibility & uniform resistance. Each of the three bunched conductors are insulated with high grade PVC compound which gives very high insulation resistance values. The insulated cores are laid up in flat parallel position. The outer sheathing is provided with specially formulated PVC compound (Type ST-1), which has high resistance to soil & chemical. Thus the cable remains flexible even after years in soil. SBEE submersible 3 core flat cables are now available with sequential marking, brand name, size and voltage printed on them.

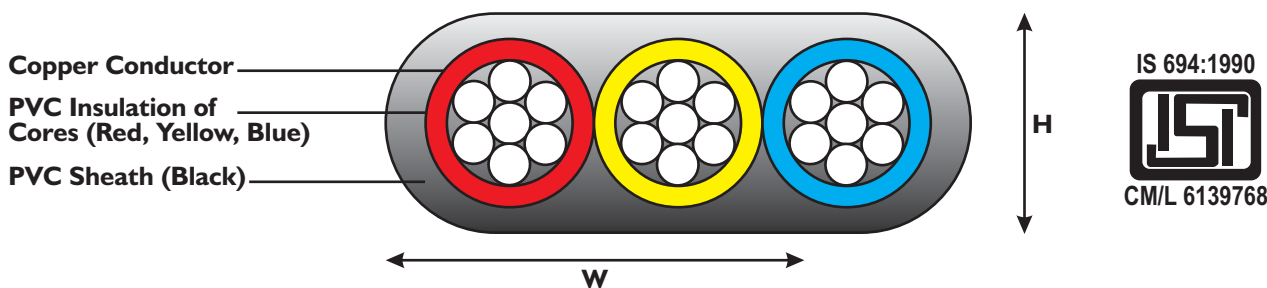


Table for 3 core flat cables use for submersible pump motors conforming to IS-694-1990. Technical specification

Conductor		Insulation Thickness (Nom)	Sheath Thickness (max) mm	Width 'W' mm	Height 'T' mm	Conductor Max. Resistance @ 20°C mm	Current Capacity @ 40°C Amps
Area in Sq. mm	Number/size of wire No/mm						
1.0	14/0.3	0.6	0.9	10.5	5.0	19.5	11
1.5	22/0.3	0.6	0.9	11.5	5.4	13.3	14
2.5	36/0.3	0.7	1.0	14.0	6.4	7.98	18
4.0	56/0.3	0.8	1.1	16.5	7.2	4.95	26
6.0	84/0.3	0.8	1.1	18.0	8.0	3.30	31
10.0	140/0.3	1.0	1.2	22.5	9.6	1.91	42
16.0	226/0.3	1.0	1.3	26.5	11.0	1.21	57
25.0	354/0.3	1.2	1.5	32.5	13.5	0.78	75
35.0	495/0.3	1.2	1.6	36.0	15.0	0.554	110
50.0	703/0.3	1.4	1.7	41.5	17.0	0.386	135
70.0	360/0.5	1.4	2.0	51.0	20.0	0.272	195
95.0	475/0.5	1.6	2.4	58.0	23.0	0.206	225

#### SELECTION GUIDE FOR 3 CORE FLAT CABLES

**HP VS CURRENT:** The full load current for submersible pump motors, 3 phase, 50 cycles, 415-425Volts

HP	5.0	7.5	10.0	12.5	15.0	17.5	20.0	25.0	30.0	35.0	40.0	45.0	50.0	55.0	60.0	65.0	70.0	75.0	80.0
AMP	7.5	11.0	14.9	18.9	22.5	25.2	28.4	37.5	45.0	52.4	60.0	67.5	75.0	82.5	90.0	97.5	105.0	112.5	120.0

**Derating factors:** Multiply the current carrying capacity of the cable by factors given below for various ambient temperatures

Ambient Temperature °C	30	35	40	45	50
Derating Factor	1.09	1.04	1.00	0.95	0.9

### POLYSTER & POLYPROPYLENE WRAPPED-SUBMERSIBLE WINDING WIRES OF COPPER

SBEE brand poly wrapped winding wires of CC copper (99.97% pure EC grade) for submersible pump motors are insulated with high quality polyester and Biaxially Oriented polypropylene film. The required size of the conductor is wrapped uniformly by these films in with latest and modern technology. Our winding wires have excellent properties to withstand water abrasion and friction losses. Rigid quality control of SBEE is ensured in our well-equipped modern laboratories. Specially trained technicians and latest imported equipment ensure consistency of product quality.

### HR PVC INSULATED SUBMERSIBLE WINDING WIRES

SBEE HR PVC insulated winding wires are insulated with a very superior grade of HR (HEAT RESISTANT) PVC compound to give it necessary electrical strength and resistance to abrasion. The automatic online controls in our extrusion process consistently give high quality to winding wires.

### SBEE BRAND POLYESTER AND POLYPROPYLENE WINDING WIRES AS PER IS-8783 (PART-4/SEC-3) 1995 & HR PVC INSULATED WINDING WIRES AS PER IS - 8783 (PART-4/SEC-1-1995 (SOLID COPPER CONDUCTOR) RANGE OF WINDING WIRES

Non Conductor Diameter mm	Non-Cross sectional Area mm <sup>2</sup>	Minimum Insulation Thickness mm		Approximate Overall Diameter mm MAX		Maximum Conductor Resistance @ 20°C Ohms/Km	Conductor Elongation Maximum %	Range of Motors for which Normally Suited HP
		Polyester & Polypropylene	HR PVC	Polyester & Polypropylene	HR PVC			
0.40	0.125	0.20	0.25	0.80	1.05	140	24	1 To 1.5
0.45	0.159	0.20	0.25	0.85	1.1	112	25	1 to 1.5
0.50	0.196	0.20	0.25	0.90	1.15	89.6	25	1.5 to 2
0.55	0.238	0.20	0.25	0.95	1.2	74.7	26	1.5 to 2
0.60	0.283	0.20	0.25	1.00	1.25	62.2	26	2 to 3.5
0.65	0.332	0.20	0.30	1.05	1.35	53.5	28	2 to 3.5
0.70	0.385	0.20	0.30	1.10	1.45	45.7	28	2 to 3.5
0.75	0.442	0.20	0.30	1.15	1.5	40.2	28	2 to 3.5
0.80	0.502	0.20	0.30	1.20	1.55	35.0	28	4 to 5
0.90	0.638	0.20	0.30	1.30	1.65	27.6	29	4 to 5
0.95	0.709	0.20	0.30	1.35	1.70	25.1	30	4 to 5
1.00	0.785	0.20	0.30	1.40	1.75	22.4	30	5 to 10
1.10	0.850	0.20	0.30	1.50	1.85	18.5	30	5 to 10
1.20	1.130	0.20	0.30	1.60	1.95	15.5	31	10 to 20
1.30	1.330	0.20	0.30	1.70	2.05	13.2	32	10 to 20
1.40	1.540	0.25	0.35	1.90	2.25	11.4	32	10 to 20
1.50	1.770	0.25	0.35	2.00	2.35	9.95	32	10 to 20
1.60	2.010	0.25	0.35	2.10	2.45	8.75	32	20 to 30
1.70	2.270	0.25	0.35	2.20	2.55	7.75	32	20 to 30
1.80	2.540	0.25	0.35	2.30	2.70	6.91	32	20 to 30
1.90	2.840	0.25	0.35	2.40	2.80	6.20	32	20 to 35
2.00	3.140	0.25	0.45	2.50	3.10	5.60	33	20 to 35
2.10	3.460	0.25	0.45	2.60	3.20	5.08	33	20 to 35
2.20	3.800	0.25	0.45	2.70	3.30	4.63	33	35 to 75
2.30	4.150	0.30	0.45	2.90	3.40	4.23	33	35 to 75
2.40	4.520	0.30	0.50	3.00	3.60	3.89	33	35 to 75
2.50	4.910	0.30	0.50	3.10	3.70	3.58	33	35 to 75
2.60	5.310	0.30	0.50	3.20	3.80	3.31	34	35 to 75
2.70	5.730	0.30	0.50	3.30	3.90	3.07	34	Above 75
2.80	6.154	0.30	0.55	3.40	4.10	2.86	34	Above 75
2.90	6.610	0.30	0.55	3.50	4.20	2.66	34	Above 75
3.00	7.07	0.30	0.55	3.60	4.30	2.49	34	Above 75

**NOTE: All data given in this catalogue is approximate and are subject to manufacturing tolerance**  
**Delivery length tolerance ± 5% length more than normal as per customer request.**  
**All figures given in various tables are indicative only.**



Dealer

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