

RajnigandhaTM WIRES & CABLES



HOUSE WIRES

FLEXIBLE CABLES

LT 1100V ALUMINIUM CABLES

LT 1100V COPPER CABLES

COAXIAL CABLES

TELEPHONE CABLES

SUBMERSIBLE CABLES

ZERO HALOGEN CABLES

ALUMINIUM SERVICE CABLES

ISO 9001 • CPRI • TAC • RTH • FIA

Rajnigandha Cables, a reputed manufacturer and reliable supplier of quality PVC Wires & Cables is equipped with most modern plant, machinery & testing equipment, to meet the ever increasing demand for the quality cables by various sectors like Power Plants, Telecommunication, Railways and Industrial users.

OUR PRODUCT RANGE

PVC insulated unsheathed single core multistrand (flexible) copper conductor house/industrial/panel/wiring cables.

Upto 300 sq. mm.

PVC insulated & sheathed single/multicore copper flexible cables.

Upto 4 core x 50 sq. mm.

Current Rating

Standard Condition of Installations and Basic assumptions for Current Rating

The Current ratings in the tables are based on the following assumptions :

(i) Maximum conductor temperature	70° C
(ii) Thermal resistivity of soil	150° cm/w
(iii) Thermal resistivity of PVC	650° cm/w
(iv) Ground Temperature	30° C
(v) Ambient air Temperature	40° C
(vi) Depth of laying (for 1.1 KV cables) cables laid in ground	75 cm

Rating Factors

(1) Rating factors for variation in ground temperature								
Ground Temperature (°C)	15	20	25	30	35	40	45	50
Rating factor	1.17	1.12	1.06	1.00	0.94	0.87	0.79	0.71
(2) Rating factors for variation in ambient air temperature								
Air Temperature (°C)	20	25	30	25	40	45	50	
Rating factor	1.32	1.25	1.16	1.09	1.00	0.90	0.81	
(3) Rating factors for variation in depth of laying in ground								
Depth of laying (mm)	750	900	1-5-	1200	1500	1800 & above		
Upto 25 sq. mm.	1.00	0.99	0.98	0.97	0.96	0.95		
above 25 sq. mm.	1.00	0.98	0.97	0.96	0.94	0.93		
and upto 300 sq. mm.								
Above 300 sq. mm.	1.00	0.97	0.97	0.95	0.92	0.91		

Short Circuit Rating

With increase in KVA capacity of the power distribution system, the cables are expected to carry short circuit currents of high magnitude. Normally rated at 70° C PVC insulating materials permit a short circuit temperature of 160° C.

Short circuit rating of a cable can be calculated as under :

$$\text{Where } I_{sh} = K \times A \sqrt{t}$$

I_{sh}	:	Short circuit current in Amps.
t	:	Duration of short circuit in seconds
A	:	Area of conductor in sq. mm.
K	:	Constant i.e. 76 for Aluminium and 115 for Copper

SINGLE CORE/MULTICORE FLEXIBLE CABLES AS PER IS 694/1990 VOLTAGE GRADE UPTO 1100 VOLTS

Area	Sq. mm	0.50	0.75	1	1.5	2.5	4	6	10	16	25	35	50	
Conductor	No & Size of Wire (Nom)	No/mm	16/2	24/2	32/2	30/2.5	50/2.5	56/3	84/3	80/4	126/4	196/4	276/4	396/4
		mm				or 48/2	or 80/2		or 140/3					
	Max Resistance at 20°C	Ohm/Km	39.0	26.0	19.5	13.30	7.98	4.95	3.30	1.91	1.21	0.78	0.554	0.386
	Current Rating													
	DC or AC	Amp	4	7	12	15	20	27	35	46	62	80	102	138
Insulation	Thickness (Nom)	mm	0.60	0.60	0.60	0.60	0.70	0.80	0.80	1.00	1.00	1.20	1.20	1.40
Single Core	Overall Diameter (AApprox)	mm	2.30	2.50	2.75	2.95	3.65	4.30	5.30	6.80	8.20	10.00	11.20	13.50
Single Core	Sheath Thickness (Nom)	mm	0.90	0.90	0.90	0.90	1.00	1.00						
Sheathed	Overall Diameter (Approx)	mm	4.10	4.35	4.50	4.75	5.65	6.40						
Twin Flat	Overall Height (Approx)	mm	4.20	4.45	-	-	-	-						
	Overall Width (Approx)	mm	6.50	7.00	-	-	-	-						
2 Core	Sheath Thickness (Nom)	mm	0.90	0.90	0.90	0.90	1.00	1.00						
Sheathed	Overall Diameter (Approx)	mm	6.60	7.00	7.50	8.00	9.50	11.00						
3 Core	Sheath Thickness (Nom)	mm	0.90	0.90	0.90	0.90	1.00	1.00						
Sheathed	Overall Diameter (Approx)	mm	7.00	7.60	7.90	8.50	10.20	11.70						
4 Core	Sheath Thickness (Nom)	mm	0.90	0.90	0.90	1.00	1.00	1.00						
Sheathed	Overall Diameter (Approx)	mm	7.60	8.25	8.60	9.50	11.05	12.80						
5 Core	Sheath Thickness (Nom)	mm	0.90	0.90	1.00	1.00	1.00	1.00						
Sheathed	Overall Diameter (Approx)	mm	8.30	9.10	9.60	10.30	11.70	13.95						

Note : Sheath Thickness given are nominal and overall diameters given are approximate.
The Conductor strand diameters are in line with IS : 8130/1984.
The no. of wires indicated are approximate and diameters of strands are nominal and shall be such that it satisfies the requirements as per IS : 694/1990.
The conductor strand size and conductor resistance requirements as per IS : 8130 will be satisfied.

THREE & FOUR HEAVY DUTY FLEXIBLE CABLES FOR VOLTAGE GRADE UPTO 1100 VOLTS

Area	Sq. Mm	6	10	16	25	35	50	70	95	120	
	No. & Size	84/3	140/3	126/4	196/4	276/4	396/4	360/5	475/5	608/5	
Conductor	Max Res	Ohm/km	3.3	1.91	1.21	0.78	0.554	0.386	0.272	0.206	0.161
	Current Rating	Amps	31	42	57	72	91	120	165	200	225
Insulation	Thickness	mm	0.8	1.0	1.0	1.2	1.2	1.4	1.4	1.6	1.6
Sheath	3 Core Sheath Thickness	mm	1.20	1.30	1.30	1.50	1.60	1.60	1.80	1.80	2.00
	Overall Dia	mm	14.05	18.00	20.60	25.12	28.40	32.87	37.78	43.55	47.95
	4 Core Sheath Thickness	mm	1.50	1.50	1.50	1.60	1.80	1.80	2.00	2.00	2.00
	Overall Dia	mm	15.80	19.00	23.00	28.00	31.44	36.87	41.93	48.81	53.30

FLEXIBLE MULTICORE CABLES (6 CORES TO 19 CORES) GENERALLY CONFORMING TO IS 694/1990 VOLTAGE GRADE UPTO 1100 VOLTS

Core	Area	Sq.mm	0.50	0.75	1.00	1.50	2.50	4.00
6	Sheath thickness	mm	0.90	1.00	1.00	1.00	1.10	1.20
	O.D.	mm	8.85	9.80	10.25	11.00	13.30	15.70
7	Sheath thickness	mm	0.90	1.00	1.00	1.00	1.10	1.20
	O.D.	mm	8.85	9.80	10.25	11.00	13.30	15.70
8	Sheath thickness	mm	1.00	1.00	1.00	1.10	1.20	1.30
	O.D.	mm	9.55	10.40	10.85	11.90	14.35	16.90
10	Sheath thickness	mm	1.00	1.10	1.10	1.10	1.30	1.40
	O.D.	mm	11.35	12.55	13.15	14.14	17.35	20.40
12	Sheath thickness	mm	1.00	1.10	1.10	1.10	1.30	1.40
	O.D.	mm	11.70	13.00	13.55	14.60	17.90	21.10
14	Sheath thickness	mm	1.10	1.10	1.10	1.20	1.30	1.40
	O.D.	mm	12.55	13.65	14.30	15.50	18.90	22.20
16	Sheath thickness	mm	1.10	1.20	1.20	1.20	1.40	1.50
	O.D.	mm	13.30	14.70	15.40	16.55	20.25	23.70
19	Sheath thickness	mm	1.10	1.20	1.30	1.30	1.40	1.50
	O.D.	mm	14.10	15.55	16.50	17.75	21.45	25.00

SINGLE CORE HEAVY DUTY FLEXIBLE CABLE GENERALLY CONFORMING TO IS 694/ 1990 VOLTAGE GRADE UPTO 1100 VOLTS

	Area	Sq.mm	70.00	95.00	120.00	150.00	185.00	240.00
	No. & Size of Wire	No./mm	360/.50	475/.50	608/.50	750/.50	925/.50	1221/.50
Conductor	Max. Res @ 20°C	Ohm/Km	0.272	0.206	0.161	0.129	0.106	0.0801
	Current DC/AC	Amps	214	254	300	340	390	460
	Thickness Insulation	mm	1.80	1.90	2.10	2.10	2.50	2.50
	Overall dia	mm	14.50	16.15	18.75	21.25	22.25	25.50

COLOUR CODING FOR IS 694/1990 CABLES (Flexible)

TYPE	COLOUR
	CORE
Single Core Unsheathed (SCUSH)	Red, Yellow, Blue, Black
Single Core Sheathed (SC SH)	Black
Twin Twisted	Red & Black
Twin Parallel	White or Grey
Twin Flat Sheathed (TFSE)	Red & Black
2 Core Round Sheathed (2 Cr Rd)	Red & Black
3 Core Round Sheathed (3 Cr Rd)	Red, Black & Yellow/Green for earth
4 Core Round Sheathed (4 Cr Rd)	Red, Blue, Yellow & Yellow/Green for earth
5 Core Round Sheathed (5 Cr Rd)	Red, Yellow, Blue, Black & Grey
	SHEATH
Single Core Unsheathed (SCUSH)	Black or Grey
Single Core Sheathed (SC SH)	White
Twin Twisted	Black or Grey
Twin Parallel	Black or Grey
Twin Flat Sheathed (TFSE)	Black or Grey
2 Core Round Sheathed (2 Cr Rd)	Black or Grey
3 Core Round Sheathed (3 Cr Rd)	Black or Grey
4 Core Round Sheathed (4 Cr Rd)	Black or Grey
5 Core Round Sheathed (5 Cr Rd)	Black or Grey

RAJNIGANDHA SINGLE CORE PVC INSULATED UN-SHEATHED CABLES 1100 VOLTAGE GRADE TO IS : 694/1990

Construction : Plain Annealed Copper Conductor / Aluminium Conductor as per IS : 8130-1984
PVC Insulation Colour Code : Type A- of IS : 5831/1984
: Red, Blue, Yellow, Black
: White or Grey

Conductor Nominal Cross Sectional Area (mm) ²	Maximum Resistance of Conductor at 20°C		Number & Nominal Dia of Wire (mm)	Nominal Thickness of Insulation (mm)	Overall dia Max (mm)	Current Rating Amps. ***	
	Copper Ohms/km	Aluminium Conductor Ohms/km				Aluminium	Copper
**1.0	18.1	-	1/1.13	0.70	3.20		12
1.5	12.1	18.1	1.1.38 or 3/0.80	0.70	3.40	16	16
2.5	7.41	12.1	1/1.78 or 7/0.67 or 3/1.04	0.8	4.20	21	22
4.0	4.61	7.41	1/2.25 or 7/0.85	0.80	4.80	27	29
6.0	3.08	4.61	1/2.76 or 7/1.04	0.80	5.60	35	37
**10.0		3.08	**1/3.57 or	1.00	7.00	48	-
10.0	1.83	3.08	7/1.35	1.00	7.00	48	51
16.0	1.15	1.91	7/1.70	1.00	8.20	65	68
25.0	0.727	1.20	7/2.14	1.20	10.00	84	86
35.0	0.524	0.868	7/2.52	1.20	11.50	105	110
50.0	0.387	0.641	19/1.78	1.40	13.0	125	145
70.0	0.268	0.443	19/2.14	1.40	15.0	150	200
95.0	0.193	0.320	19.2.52	1.60	17.5	185	235
120.0	0.153	0.253	37/2.03	1.60	19.0	210	270
150.0	0.124	0.206	37/2.25	1.80	21.0	240	310
185.0	0.0991	0.164	37/2.52	2.00	23.5	280	360
240.0	0.0754	0.125	61/2.25	2.20	26.6	325	425
300.0	0.0601	0.100	61.2.52	2.40	29.5	380	490
400.0	0.0470	0.0778	61/2.85	2.60	33.5	460	590
500.0	0.0366	0.0605	61/3.20	2.80	37.5	535	650
630.0	0.0283	0.0469	91/2.98	2.80	42.0	630	730

* Copper conductor only.

** Aluminium Conductor only.

*** 2 Cables single phase A.C. or D.C.

SOLID/STRANDED CONDUCTOR FOR INSULATED CABLES CONFORMING TO IS : 8130 : 1984

Nominal cross-sectional area of conductor	SOLID CONDUCTOR Class - 1		STANDARD CONDUCTOR Class - 2					
	Maximum Resistance of Conductor at 20°C		Minimum number of wires in Conductors				Maximum Resistance of Conductor at 20°C	
	Ohm/km	Ohm/km	Circular Conductor (non-Compact)		Circular Compact or Shaped Conds.		Ohm/km	Ohm/km
Sq.mm	Copper	Aluminium	Copper	Aluminium	Copper	Aluminium	Copper	Aluminium
1.5	12.10	18.10	3	3	-	-	12.1	18.1
2.5	7.41	12.10	3	3	-	-	7.41	12.1
4	4.61	7.41	7	3	-	-	4.61	7.41
6	3.08	4.61	7	3	-	-	3.08	4.61
10	1.83	3.08	7	7	6	6	1.83	3.08
16	1.15	1.91	7	7	6	6	1.15	1.91
25	-	-	7	7	6	6	0.727	1.20
35	-	-	7	7	6	6	0.524	0.868
50	-	-	19	19	6	6	0.387	0.641
70	-	-	19	19	12	12	0.268	0.443
95	-	-	19	19	15	15	0.193	0.320
120	-	-	37	37	18	15	0.153	0.253
150	-	-	37	37	18	15	0.124	0.206
185	-	-	37	37	30	30	0.0991	0.164
240	-	-	61	37	34	30	0.0754	0.125
300	-	-	61	61	34	30	0.0601	0.100
400	-	-	61	61	53	53	0.0470	0.0778
500	-	-	61	61	53	53	0.0366	0.0605
630	-	-	91	91	53	53	0.0283	0.0469
800	-	-	91	91	53	53	0.0221	0.0367
1000	-	-	91	91	53	53	0.0176	0.0291

CHARACTERISTICS OF INSULATING MATERIALS

PARTICULARS	Insulating Materials		
	Cross linked Polyethylene	Polyethylene	PVC
Specific Gravity	0.92	0.92	1.3-1.6
Dielectric Strength (KV/mm)	35	35	15
Volume Resistivity (Ohm-cm)	10 ¹²	10 ¹²	10 ¹² to 10 ¹⁴
Dielectric Constant	2.3	2.3	5-8
Power Factor	0.0003	0.0003	0.08
Tensile Strength (N/mm ²)	13 to 16	13 to 16	14 to 20
Elongation (%)	250 to 400	250 to 500	200 to 300
Maximum Operating Temperature (°C)	90	70	70-105
Maximum Conductor Temperature (°C)			
Short Circuit (°C)	250	130	160
Minimum Operating Temperature (°C)	-40	-40	-20

CHARACTERISTICS OF FRLS PVC COMPOUND

Oxygen Index as per ASTM D-2863
 Temp. Index as per ASTM D-2863
 Smoke Density Rating as per ASTM D-2843
 Acid Gas Generation as per IEC-754(I) by weight
Flammability Tests
 Swedish Chimney Test as per SS-424-14-75(Class F3)
 Vertical Tray Flame Propagation Test as per IEEE-383-1974
 Single vertical cable fire resistance test as per IEC-332(I)
 Bundled Vertical Cable fire test as per IEC-332(III)

29 Min^m
 250 Min^m
 60 Max^m
 20 Max^m
 Unaffected length from top 425 mm
 Unaffected length of the cable 125 mm from top of the ladder
 325 mm cable unaffected from bottom edge of the top clamp
 Affected length of the cable 1.5 metre from bottom edge of burner

TESTS

The tests on cables have been classified broadly in four categories as follows :

ROUTINE TESTS

Tests carried out by manufacturer on all finished cable lengths to demonstrate the integrity of the cable.

TYPE TESTS :

Tests carried out to prove conformity with the specification. These are intended to prove the general qualities and design of a given type of cable.

TYPE TESTS :

Tests carried out on samples taken from a lot for the purpose of acceptance of the lot.

OPTIONAL TESTS :

Special tests to be carried out when required by agreement between the purchaser and the manufacturer.

Special tests required for FRLS / ZHLS cables can also be carried out at our works i.e. Halogen gas generation test to IEC-754 Part-I, Smoke generation test to ASTM D 2843, Oxygen index test and Temperature index test to ASTM D-2863, Flammability test to (i) IEC-332(I), (ii) Swedish Chimney test to SS-4241475 Class F3 & (iii) Flame resistance test to IEC-383 & IEC - 332 (III). Together with the most advanced equipment available, we are able to offer to our valued customers assurances of highest quality and strict adherence to the required specification. As a third party guarantee, our cables have passed rigorous tests at various Government recognized test laboratories such as CPRI, Shri Ram Test House, NTH and RTC.

Routine Test, Type Test, Acceptance Tests and Optional Tests as per the Indian Standard Specification for Power and Control Cables with PVC insulation, and Special Tests are as given as below.

1. ROUTINE TESTS :

- a) Conductor Resistance Tests
- b) High Voltage Test
- c) Armour Resistance Test for mining type Cables.

2. TYPE TESTS :

- a) Tensile Test (For Aluminium Conductor)
- b) Wrapping Test (For Aluminium Conductor)
- c) Annealing Test (For Copper Conductor)
- d) Conductor Resistance Test
- e) Test for Armour Wires/Strips
- f) Test for Thickness of insulation & Sheath
- g) Physical Test for insulation & Outer Sheath
- h) Insulation Resistance Test
- i) High Voltage Test
- j) Flammability Test

3. ACCEPTANCE TESTS :

- a) Tensile Test (For Aluminium Conductor)
- b) Wrapping Test (For Aluminium Conductor)
- c) Annealing Test (For Copper Conductor)
- d) Conductor Resistance Test
- e) Test for Thickness of insulation & Sheath
- f) High Voltage Test
- g) Insulation Resistance Test
- h) Tensile Strength & Elongation at break test for insulation and Sheath.

4. OPTIONAL TESTS :

- a) Cold Bend Test
- b) Cold impact Test
- c) Armour Resistance Test (for other than Mining Type Cables)

5. SPECIAL TESTS :

(Applicable for FRLS & ZHLS Cable)

- a) Oxygen Index Test as per ASTM D-2863
- b) Temp. Index Test as per ASTM D-2863
- c) Smoke Generation Test as per ASTM D - 2843
- d) Acid Gas Generation Test as per IEC - 754-1
- e) Flammability Test as per IEC - 332 - 1, IEC-383, SS - 4241475 Class F3 and IEC - 332-3.
- g) Halogen Acid Test as per IEC 60755 (Part - 1)

RajnigandhaTM

WIRES & CABLES

Regd. Office:

Rajnigandha Cables Pvt. Ltd.

3, Woodburn Road, Ground Floor, Kolkata - 700 020

rajnigandhacables@gmail.com

Works:

Rajnigandha Cables Pvt. Ltd.

Plot no. 48, Gall No. 6, Friends Colony Industrial Area, G.T Road, Shahdara, Delhi -110 095

rajnigandhacab@gmail.com

Rajnigandha Cables Pvt. Ltd.

Plot No. 74 & 75 , EPIP, Phase II, Village Thana, Baddi, District-Solan, Himachal Pradesh - 173 205

rajnigandhabaddi@gmail.com

For more information and to place orders, Please contact:

Eastern India: +91-93318 20683

Western India: +91-93226 95098

Northern India: +91-98103 07643

Southern India: +91-93412 29955

