RR✓KĀBEL
wires without worries

INDUSTRIAL WIRE & CABLES

RAM RATNA
GROUP

ENRICHING LIVES THROUGH INNOVATION

Innovation, Trust and Transparency are the key drivers to growth and excellence in RAM RATNA GROUP. In fact it is the way of life. Brilliant, yet simple ideas for better living have been the hallmark of Ram Ratna Group. Present in over 73 countries across the globe, the group endeavors to set standards that redefine quality, delivery and customer care. The Group's success is attributed to promptness in identifying and responding to emerging market needs. Top-of-the-line technologies driven by skilled team of technocrats give the group an edge in both domestic and global markets. The Group is engaged in a diverse range of activities spanning from electricals, magnet wires, infrastructure, dyes & chemicals, to exports.

RR Kabel presents a wide range of Electrical wires for diverse spectrum of applications like Control switchboards, Building management systems, Construction, Appliances, Marine, Welding and Telecommunications.

FIREX – The only cable with HFFR Insulation and Unilay conductor. FLAMEX – FR-LSH – Low smoke flame retardant PVC insulated wire with reduced Halogen evolution. RR Unilay – FR – Flame Retardant PVC insulated wire with Unilay conductor.

With Unilay conductor technology, optimum current and temperature rating is achieved. It facilitates a perfect electrical contact preventing overheating & conductive losses.

RR Kabel, an ISO 9001:2008 company is the only Indian cable company to have obtained multiple international product certifications like BASEC (U.K), VDE (Germany), NF-USE (France), PSB (Singapore), SABS (South Africa), CE and many more, for its range of cables.

RR Kabel is also the first Indian cable manufacturing company to have obtained **ISO 14001: 2004 and OHSAS 18001:2007** certification.

RoHS COMPLIANT

UK · UL Certified · Germany · NF-USE FRANCE · Saudi Arabia · PSB Certification Singapore · SABS South Africa · CE

ISO 9001:2008 · ISO 14001:2004 · OHSAS 18001:2007 · IS 1554 · IS 694

RATNAFLEX

Single-core flexible cables for Electrical Panel Switch Boards
Upto 1100 V

Insulation	Applications	Specifications
70°C/105°C Heat Resistant PVC.	Wiring of panels for use in high ambient temperatures.	IS-694, BS 6004, IEC 60227, DIN VDE-0281-3, AWM-UL 1015, UL 758, VW-1, FT-1, BS 6231
70°C/105°C Heat Resistant PVC.	Internal wiring of appliances.	AWM-UL 1007, 1569, UL 758, VW-1, FT-1, UL 1015, UL 1275
Flame Retardant (FR)	Wiring in high density & critical installations.	IEC 694, IEC 60332-1, BS 4006-1, IEC 60754-1, ASTM D 2863
Flame Retardant Low Smoke Halogen (FR-LSH)	Wiring in public places & fire prone areas.	IEC 694, IEC 60332-1, BS 4006-1, IEC 60754-1, ASTM D 2863 and 2463
Halogen Free Flame Retardant (HFFR)	Wiring for critical installations in public places and in vicinity of electronic systems.	BS 7211, DIN VDE 0281-15, IEC 60754-1 & 2, ASTM D 2843 and 2863

Conductor: Compactly bunched, electrolytic grade, annealed copper with high flexibility according to class 5 conductor as per IS 8130. Available in various sizes from 0.5 sq. mm to 300 sq. mm.

Colours: Red, Yellow, Blue, Green, Green/Yellow, Grey & Black.

Packing: 100 mtrs. Coils. Longer lengths can be made available on request.

Physical and Electrical Properties

Cross section area sq. mm	Approx. AWG	Overall Dia., mm., Max.	Insulation Thickness, mm, Nom	Conductor Config. No. of wires/ Nom. Dia.	Conductor Resist. Ohm/km at 20° C Max	Max. current rating, Amp	Approx. voltage drop per amp per meter, mV
0.5	-	2.6	0.6	16/0.2	39	6	46.0
0.75	19	2.8	0.6	24/0.2	26	9	31.0
1.0	18	3.0	0.6	32/0.2	19.5	14	22.0
1.5	16	3.80	0.6	30/0.25	13.3	18	15.0
2.5	14	4.0	0.7	50/0.25	7.98	24	9.1
4.0	12	4.8	0.8	56/0.3	4.95	32	5.7
6.0	10	6.4	0.8	84/0.3	3.30	42	3.8
10.0	8	8.0	1.0	140/0.3	1.91	55	2.2
16.0	6	9.6	1.0	126/0.4 or 226/0.3	1.21	75	1.4
25.0	4	11.5	1.2	196/0.4	0.780	100	0.89
35.0	3	13.0	1.2	276/0.4	0.554	125	0.64
50.0	1	15.0	1.4	396/0.4	0.386	165	0.45
70.0	-	15.0	1.4	360/0.5	0.272	240	0.32
95.0	3/0	17.5	1.6	480/0.5	0.206	300	0.24
120	4/0	19.0	1.6	608/0.5	0.161	325	0.19
150	-	21.0	1.80	750/0.5	0.129	352	0.15
185	-	23.5	2.0	931/0.5	0.106	400	0.12
240	400	26.5	2.20	1200/0.5	0.0801	475	0.10
300	500	29.5	2.40	1500/0.5	0.0641	500	0.08

* The above data is indicative and may be revised without prior intimation. The above dimensions are not applicable for UL 1007 & 1569. Conductor as per IS 8130 : 84, Class 5

RATNAFLEX-*M*

Multicore Flexible Cables for Appliances & Machine Tools
Upto and including 1100V

• Compact construction • Rugged yet flexible for industrial use • High temperature insulation

Type of Insulation	Type of Sheathing	Typical Applications	Specifications
80° C PVC	80° C PVC	Power cords for appliances, temporary power supplies.	IS-694, BS 6500, IEC 60227, DIN VDE-0281-5, UL - 2464, 2576, 2598, 2587.
Heat Resistant PVC upto 105° C	HR PVC	Hi-power appliances, ovens, temporary power supply in higher temperature areas.	IS 694, BS 6500, IEC 60227, DIN VDE-0281-5
80° C FR / FR-LSH PVC	FR / FR-LSH	Power cords for appliance used in fire prone areas, flame proof equipments, machine tools used in critical locations and heat zones.	IEC 60092-353, DIN VDE-0281-5, IEC 60754-1, IEC 60332-1/3, BS 4066-1, ASTMD 2843, ASTMD 2863.

* Note: HFFR Sheath applicable.

Conductor: Compactly bunched, electrolytic grade, annealed copper with high flexibility according to class 5 conductor as per IS 8130 sizes from 0.5 sq. mm to 50.0 sq. mm.

Colours: Black & Grey. White available on request.

Packing: 100 mtr. coils. Longer lengths can be made available on request.

Physical and Electrical Properties of IS 694 Cables

No. of cores	Properties	0.5	0.75	1.0	1.5	2.5	4.0
Circularly Laid Up Cores	No. & Nominal Dia. of Strands	16/0.2	24/0.2	32/0.2	30/0.25	50/0.25	56/0.3
	Ins. thickness, (nom), mm	0.6	0.6	0.6	0.6	0.7	0.8
	Single core OD (max.), mm	2.60	2.80	3.0	3.8	4.0	4.8
	Cond. resist. (max.), Ohm/km	39.0	26.0	19.5	13.3	7.98	4.95
2 Cores Red, Black	Sheath thickness, (nom), mm	0.9	0.9	0.9	0.9	1.0	1.0
	Overall dia. (max.), mm	7.20	7.80	8.0	8.60	10.50	12.0
	Current rating DC or single phase AC, amp.	6	9	14	18	24	32
	Voltage drop DC or single phase AC, mV/A/m	93	62	46	32	19	12
3 Cores Red, Black And Green	Sheath thickness, (nom), mm	0.9	0.9	0.9	0.9	1.0	1.0
	Overall dia. (max.), mm	7.60	8.20	8.60	9.20	11.0	12.50
	Current rating DC or single phase AC, amp.	6	9	14	18	24	32
	Voltage drop DC or single phase AC, mV/A/m	102	62	46	32	19	12
4 Cores Red, Yellow, Blue And Green	Sheath thickness, (nom), mm	0.9	0.9	0.9	1.0	1.0	1.0
	Overall dia. (max.), mm	8.20	8.80	9.40	10.50	12.0	14.0
	Current rating, three phase AC	6	9	14	18	20	25
	Voltage drop, three phase AC	88	54	40	27	16	10

* The above data is indicative and may be revised without prior intimation. The data of UL cables can be submitted on request. Conductor as per IS 8130 : 1984, Class 5

BRAIDED CABLES

Data Transmission Cables

• Braiding Min. 65% Coverage.

Applications: Is suitable for interconnection of electrical measuring devices to Instrument panel or instrument. Measuring, monitoring and control in machine tool manufacturing, in plant engineering, in all places where electrical interference fields can distort a signal transmission or where Interference pulses arising in the mains must be confined.

Technical Data: Special PVC data cables, adapted to DIN VDE 0245,

The material used in manufacture is cadmium free and contains no silicone and free of substances harmful to the wetting properties of Lacquers.

Temperature Range: Flexing -5° C to +80° C
Fixed Installation -20° C to +80° C

Nominal Voltage: Uo / 500 V

Test Voltage: 3000 V.

Insulation Resistance: Min. 20 Mohm x km

Mutual Capacitance: According to different cross sections
Core / Core approx, 150 nF / km. Core / Screen approx, 270 nF / km

Minimum Bending Radius: Approx. 10 x cable

Coupling Resistance: < 250 ohm

Cable Structure: Bare copper, fine wire conductors, bunch stranded to IS 8130 class 5 and IEC 60228 class 5. Core insulation of special PVC Type A IS 5831, TI 1 DIN VDE 0207 Part 4. Coloured cores upto 4 cores only. Continuous numbering in white and one green / yellow core from 5 core onwards. Cores stranded in layers with optimal lay-length. Core Wrapping with copper mylartape. Tinned copper braided screen, Approx. 85% coverage. Special PVC outer sheath TYPE ST1 of IS 5831, TM2 DIN VDE 0281 Part 1 and HD 21.1, sheath colour grey. Extensively Oil Resistant, Chemical Resistant. PVC self-extinguishing and flame retardant, test according to IS 694, DIN VDE 0472 Part 804 and IEC 60332-1

No. of cores per conductor	No. of sq.mm² per conductor	Approx cable diameter in mm	Copper weight kg/km	Approx weight kg/km
2	0.5	5.3	21	57
3	0.5	5.6	25	64
4	0.5	6.2	35	84
5	0.5	6.7	33	89
6	0.5	7.4	39	107
7	0.5	7.9	43	121
8	0.5	8.5	49	138
10	0.5	9.3	60	167
12	0.5	9.6	67	180
14	0.5	10.0	78	201
16	0.5	10.7	88	228
18	0.5	11.2	96	249
2	0.75	5.7	25	66
3	0.75	6.2	31	79
4	0.75	6.7	38	93
5	0.75	7.2	45	109
6	0.75	8.0	53	132
7	0.75	8.6	59	150
8	0.75	9.4	68	177
10	0.75	10.2	83	211
12	0.75	10.4	93	224
14	0.75	11.1	106	255
16	0.75	11.6	121	284
18	0.75	12.4	134	319

No. of cores per conductor	No. of sq.mm² per conductor	Approx cable diameter in mm	Copper weight kg/km	Approx weight kg/km
2	1.0	6	29	74
3	1.0	6.5	37	90
4	1.0	7.1	46	108
5	1.0	7.6	56	127
6	1.0	8.5	66	154
7	1.0	9.1	74	175
8	1.0	9.9	84	203
10	1.0	10.8	104	246
12	1.0	11.2	119	270
14	1.0	11.8	137	305
16	1.0	12.3	154	335
18	1.0	13.2	172	380
2	1.5	8.5	37	128
3	1.5	7.6	50	121
4	1.5	8.2	62	145
5	1.5	9.1	76	177
7	1.5	10.8	100	242
8	1.5	11.6	115	279
2	2.5	8.6	55	146
3	2.5	9.4	76	183
4	2.5	10.2	96	221
5	2.5	11.3	117	270
7	2.5	13.5	157	375
12	2.5	16.7	261	591

* The above data is indicative and may be revised without prior intimation. Conductor as per IS 8130 : 1984, Class 5

SHIELDED CABLES

Instrumentation Cables

Cables to BS 5308 Part 1/2

Construction Type 1 (unarmoured)

1. Plain anealed copper wire conductors to BS 6360

2. Insulation Type A of IS 5831, Type TI 1 PVC to BS 7655, Polyethylene

3. Individual Pair Screened(optional):-

a) Aluminium / polyester tape, metallic side down, in contact with 0.5 mm^2 tinned copper drain wire.

b) Polyester isolating tape(s) numbered for identification (optional).

4. Polyester binder tape

5. Collective screen (optional) - Aluminium / polyester tape, metallic side down, in contact with 0.5 mm^2 tinned copper drain wire.

6. ST1 of IS 5831, Type TM1 or Type 6 PVC sheath to BS 7655

Type 1 - Unarmoured
Multi-core collectively Screened

Multipair, collectively Screened

Multipair, individual & collectively Screened

Construction Type 2 (armoured)

1. Plain anealed copper wire conductors to IS 8130, BS 6360

2. Type A IS 5831, Type TI 1 PVC to BS 7655

3. Individual pair screen (optional)
a) Aluminium / polyester tape, metallic side down, in contact with min. 0.5mm^2 tinned copper drain wire.
b) Polyester isolating tape(s) numbered for identification.(optional)

4. Polyester binder tape

5. Collective screen (optional) -Aluminium / polyester tape, metallic side down, in contact with minimum 0.5mm^2 tinned copper drain wire.

6. ST 1 of IS 5831, Type TM1 PVC bedding to BS 7655

7. IS 3975, Single layer galvanised steel wire armour to IS 3975, BS EN 10257-1

8. ST1 of IS 5831, Type TM1 PVC sheath to BS 7655

Type 2 - Armoured
Multi-core collectively Screened

Multipair, collectively Screened

Multipair, individual & collectively Screened

Technical Data

Maximum working voltage: 300/500V r.m.s.

Test Voltage: 1000V r.m.s. between conductors and screen / armour

Minimum ambient temperature: -15° C after installation and only when cable is in a fixed position.

Conductor size - Multicore, Multipair and Maximum conductor d.c. resistance: 52/km at 20° C

16 / 0.20 mm (0.5 mm^2)	39.0 Ω / Km
24 / 0.20 mm (0.75 mm^2)	26.0 Ω / Km
7 / 0.53 mm (1.5 mm^2)	12.10 Ω / Km

Maximum capacitance unbalance: 450 pF/metre 1 kHz

Maximum mutual capacitance at 1kHz: Pair of adjacent cores - 250 pF/m at kHz

Spread of Flame: Type 1 & 2 comply with IEC 332-1, BSEN 60332-1, HD 405-1

Minimum insulation resistance: Individual conductors - 25MΩ Km at 20° C, between individual screens - 1 MΩ km

Minimum bending radius: Type 1 - 5 x overall diameter
Type 2 - 6 x overall diameter

BS 5308 P-2 MULTICORE OVERALL SHIELDED CABLES TYPE 2

Nominal cross section x No. of pairs	Nominal no and Nominal diameter of strands x mm	Nominal overall diameter mm	Nominal weight kg / km
0.50 x 2C	16/0.20	10.5	140
0.50 x 3C	16/0.20	10.8	153
0.50 x 4C	16/0.20	11.4	173
0.50 x 6C	16/0.20	13.0	232
0.50 x 10C	16/0.20	15.7	349
0.50 x 20C	16/0.20	18.9	536
0.75 x 2C	24/0.20	10.9	154
0.75 x 3C	24/0.20	11.2	170
0.75 x 4C	24/0.20	11.8	194
0.75 x 6C	24/0.20	13.4	256
0.75 x 10C	24/0.20	16.5	399
0.75 x 20C	24/0.20	19.9	625
1.0 x 2C	32/0.20	11.2	166
1.0 x 3C	32/0.20	11.6	186
1.0 x 4C	32/0.20	12.2	216
1.0 x 6C	32/0.20	13.8	284
1.0 x 10C	32/0.20	17.1	447
1.0 x 20C	32/0.20	20.8	710
1.5 x 2C	7/0.53	11.8	192
1.5 x 3C	7/0.53	12.4	225
1.5 x 4C	7/0.53	13.1	261
1.5 x 6C	7/0.53	14.9	351
1.5 x 10C	7/0.53	18.5	554
1.5 x 20C	7/0.53	22.5	899

Note : * All configurations mentioned will be conforming to IS 8130:84 and BS 6360. The above data is indicative and may be revised without prior intimation.

Armoured & Unarmoured Cables

PVC Insulated Heavy Duty Power + Control Cable as per IS 1554 (P-1)

• Heavy Duty Performance • Offers the best combination safety, efficiency & economy

Applications: Heavy Duty Power and Control Cables are used for Underground power supply by utility provider for Street Lights, Industrial Automation with mechanical strength for protection on insulated cores and other industrial applications.

Specifications: IS 1554 (P-1)

Construction		**IS Specifications**
Conductor	: ETP Grade Copper	8130
Insulation	: PVC Type A or C	5831
Inner Sheath	: PVC Type ST1 or ST2	5831
Armour	: Galvanised Steel Wire Strip	3975
Outer Sheath	: PVC Type ST1 or ST2	5831

The sheath is also provided in with FR and FRLSH PVC

Core Identification: For power cable and control cable upto 4 cores, the cores are identified by different colours as per IS 1554: (Part1)

Single Core : Red, Yellow, Blue, Black, etc. (only unarmoured).
2 Core : Red and Black.
3 core : Red, Yellow and Blue.
4 Core : Red, Yellow, Blue and Black.
5 Core : Red, Yellow, Blue, Black and Grey.

Duration of short ckt. in sec.	**1 cycle = 0.02 s**	**2 Cycles**	**5 Cycles**	**10 cycles**	**25 Cycles**	**50 Cycles**	**2 sec.**	**3 sec.**	**4 sec.**	**5 sec.**
Short ckt. Constant per unit area	**536**	**378**	**239**	**169**	**107**	**75.5**	**53**	**43.6**	**37.8**	**34.0**

Note:*The entire range of Power and control cables can be supplied with Flame Retardant (FR), Flame Retardant Cables with reduced Halogen evolution and smoke (FR-LSH) or Halogen Free Flame Retardant (HFFR) sheathing on request.

Tables I to III: Copper Conductor, PVC Insulated, PVC Sheathed Cables.

Table I: 1.5 sqmm., Solid Copper Conductor, PVC insulated, PVC Sheathed, Unarmoured (YY) / Armoured (YWY & YFY) Multicore Control Cables - 650/1100 Volts

			Unarmoured		Armoured			Max.DC	In Air		In Ground	
Size	Nom. Thickness of PVC Insulation mm.	Cores	Approx Overall cable Dia mm.	Approx Weight Kg. / km.	Nom. Steel Armour Size mm.	Approx. Overall cable Dia. mm.	Approx Weight Kg. / km.	Conductor Resistance At 20° C Ohm / km	PVC insulation Amps.	HRPVC Insulation Amps.	PVC insulation Amps.	HRPVC Insulation Amps.
1.5	0.8	2	10.65	154	1.4	12.60	370	12.1	20	24	23	27
	0.8	3	11.15	180	1.4	13.10	418	12.1	17	21	21	24
	0.8	4	11.9	212	1.4	13.85	475	12.1	17	21	21	24
	0.8	5	12.75	249	1.4	14.70	537	12.1	14	17	17	19
	0.8	7	13.75	305	1.4	15.70	630	12.1	13	16	15	18
	0.8	8	14.00	326	1.4	15.95	655	12.1	12	15	14	17
	0.8	12	17.35	497	4 x 0.8	18.40	797	12.1	12	15	14	16
	0.8	14	18.15	555	4 x 0.8	19.20	875	12.1	12	14	14	16
	0.8	16	19.40	634	4 x 0.8	20.00	953	12.1	11	13	13	15
	0.8	18	20.35	703	4 x 0.8	20.90	1033	12.1	10	12	12	14
	0.8	20	20.40	731	4 x 0.8	21.00	1090	12.1	10	12	11	13
	0.8	24	23.50	937	4 x 0.8	24.10	1304	12.1	9	11	11	12
	0.8	27	24.00	1003	4 x 0.8	24.60	1399	12.1	9	11	11	12
	0.8	30	24.80	1086	4 x 0.8	25.40	1502	12.1	9	11	11	12
	0.8	37	26.50	1276	4 x 0.8	27.10	1774	12.1	8	8	9	11
	0.8	44	29.90	1584	4 x 0.8	30.60	2056	12.1	8	10	9	11
	0.8	52	31.15	1774	4 x 0.8	31.85	2302	12.1	8	9	9	10
	0.8	61	32.90	2018	4 x 0.8	33.60	2594	12.1	7	9	9	10

Table II: 2.5 sqmm., Solid Copper Conductor, PVC insulated, PVC Sheathed, Unarmoured (YY) / Armoured (YWY & YFY) Multicore Control Cables - 650/1100 Volts

			Unarmoured		Armoured			Max.DC	In Air		In Ground	
Size	Nom. Thickness of PVC Insulation mm.	Cores	Approx Overall cable Dia mm.	Approx Weight Kg. / km.	Nom. Steel Armour Size mm.	Approx. Overall cable Dia. mm.	Approx Weight Kg. / km.	Conductor Resistance At 20° C Ohm / km	PVC insulation Amps.	HRPVC Insulation Amps.	PVC insulation Amps.	HRPVC Insulation Amps.
2.5	0.9	2	11.85	202	1.4	13.80	449	7.41	27	32	32	37
	0.9	3	12.40	238	1.4	14.4	503	7.41	24	29	27	31
	0.9	4	13.35	287	1.4	15.30	577	7.41	24	29	27	31
	0.9	5	14.50	345	1.4	16.45	668	7.41	19	23	23	27
	0.9	7	15.55	423	1.4	17.50	776	7.41	18	21	21	25
	0.9	8	15.75	451	1.4	17.70	811	7.41	17	20	20	23
	0.9	12	20.25	720	4 x 0.8	20.85	1046	7.41	17	20	20	23
	0.9	14	21.45	819	4 x 0.8	22.05	1171	7.41	16	19	19	22
	0.9	16	22.40	909	4 x 0.8	23.1	1284	7.41	15	18	18	20
	0.9	18	23.50	1009	4 x 0.8	24.2	1406	7.41	14	17	17	19
	0.9	20	23.60	1057	4 x 0.8	24.4	1462	7.41	13	16	16	18
	0.9	24	27.10	1343	4 x 0.8	28.00	1826	7.41	12	15	15	17
	0.9	27	27.70	1444	4 x 0.8	29.10	1973	7.41	12	15	15	17
	0.9	30	28.60	1565	4 x 0.8	30.15	2123	7.41	11	13	13	15
	0.9	37	31.10	1884	4 x 0.8	32.20	2457	7.41	11	13	13	15
	0.9	44	34.70	2301	4 x 0.8	35.40	2918	7.41	10	12	12	14
	0.9	52	36.20	2592	4 x 0.8	36.90	3239	7.41	10	12	12	13
	0.9	61	38.30	2961	4 x 0.8	39.20	3669	7.41	9	11	11	12

Table III: 2 core, 3 core & 4 core copper conductor, PVC Sheathed, Unarmoured (YY) / Armored (YWY & YFY)* cables - 650 / 1100 Volts.

			Unarmoured			Armored				In Air		In Ground	
No. of Cores	Nom. Cross Sectional Area Sq. mm.	Class of conductor	Nom. Thickness of PVC Insulation mm.	Approx Overall Db. mm.	Approx Overall Weight Kg. / km.	Nom. Steel Armour Size mm.	Approx. Overall Dia. mm.	Approx Weight Kg. / km.	Conductor Resistance At 20° C Ohm / km	PVC insulation Amps.	HRPVC Insulation Amps.	PVC insulation Amps.	HRPVC Insulation Amps.
2	4	1	1.0	13.25	264	1.4	15.2	585	4.61	35	43	41	48
2	4	2	1.0	13.95	292	1.4	15.9	632	4.61	35	43	41	48
2	6	1	1.0	14.25	327	1.4	16.2	682	3.08	45	55	50	58
2	6	2	1.0	15.05	368	1.4	17.0	751	3.08	45	55	50	58
2	10	2	1.0	16.95	524	4 x 0.8	17.7	867	1.83	60	73	70	81
2	16	2	1.0	19.60	747	4 x 0.8	20.2	1102	1.15	78	95	90	105
2	25	2	1.2	23.20	1092	4 x 0.8	23.8	1874	0.727	105	123	115	122
2	35	2	1.2	25.60	1394	4 x 0.8	26.2	1891	0.524	125	147	140	145
3	4	1	1.0	14.05	317	1.4	16.00	659	4.61	30	37	36	42
3	4	2	1.0	14.70	351	1.4	16.65	713	4.61	30	37	36	42
3	6	1	1.0	15.05	401	1.4	17.00	770	3.08	39	48	45	53
3	6	2	1.0	15.90	451	1.4	18.15	860	3.08	39	48	45	53
3	10	2	1.0	17.95	657	4 x 0.8	19.00	1000	1.83	52	63	60	69
3	16	2	1.0	20.75	939	4 x 0.8	21.35	1323	1.15	66	81	77	90
3	25	2	1.2	24.70	1405	4 x 0.8	25.30	1874	0.727	90	106	99	105
3	35	2	1.2	27.20	1810	4 x 0.8	27.80	2336	0.524	110	129	120	125
4	4	1	1.0	15.15	385	1.4	17.10	762	4.61	30	37	39	42
4	4	2	1.0	15.90	430	1.4	18.15	828	4.61	30	37	39	42
4	6	1	1.0	16.70	506	1.4	17.40	878	3.08	39	48	45	53
4	6	2	1.0	17.20	559	4 x 0.8	18.25	901	3.08	39	48	45	53
4	10	2	1.0	20.00	837	4 x 0.8	20.60	1220	1.83	52	63	60	69
4	16	2	1.0	22.70	1180	4 x 0.8	23.35	1621	1.15	66	81	77	90
4	25	2	1.2	27.05	1767	4 x 0.8	27.65	2293	0.727	90	106	99	105
4	35	2	1.2	30.20	2328	4 x 0.8	30.90	2912	0.524	110	129	120	125

* Y = PVC Insulation, W = Steel round wire armour, F = Steel strip armour

Cables with stranded conductors also made on request. * The above data is indicative and may be revised without prior intimation.

*The size up to 50.0 sqmm core available on request.

Table - B

Current ratings

The current rating given in tables are based on normal conditions of installation described below:

1. Maximum Conductor temperature 70°C for PVC insulation & 80°C for HRPVC insulation.

2. Thermal Resistivity of soil 150°C cm/w

3. Thermal Resistivity of PVC 650°C cm/w

4. Ground temperature 40°C

5. Depth of laying 75cms

(To the highest point of cable laid direct in the ground)

Formula for calculating the Short Circuit for other durations

$$I_t = \frac{I_1}{\sqrt{t}}$$

Where.....

I_1= Short Circuit Current for one second.

I_t= Short Circuit Current for t second.

t= Duration in seconds.

Note : For cables in air , no reduction in current rating is necessary provided that

1. The horizontal clearance between circuits is (a) not less than six times the overall diameter of an individual cable, and (b) not less than the overall width of an individual circuit, except that the horizontal clearance may need not in any case exceed 150mm.

2. If the number of circuits exceeds 4, they are installed in a horizontal plane. However, for installation conditions other above, current rating factors incorporated in IS 3961 Part II please be applied.

The following points should be taken in to consideration before selecting any particular size and type of cable:

1. The system of power & voltage source where the cables are being used.

2. Conditions of installation at site.

3. Current carrying capacity of cable.

4. Voltage drop of cable.

5. Short circuit capacity of cable.

6. Availability of the selected size of cable.

CONTROL CABLES

PVC Insulated and Sheathed Flexible Control Cables

Applications: These cables are used for flexible use for medium mechanical stresses with Free Movement without tensile stress in dry & moist condition for measuring and control cables in tool machines, conveyor belts, production lines in machinery production and in steel production.

Conductor: Annealed Bare Copper as per IS 8130, Class 5

Insulation PVC: Type A conforming to IS 5831

PVC Sheath: Type ST-1 conforming to IS 5831.HR, FR and FRLS sheathing can be provided as per requirement.

Sheath Colour: Black / Grey

Core Colours: Black with white numbering + Green / Yellow (earth core)

Rated Voltage: 300/500 V

Test Voltage: 2000 V A.C.

Min. Bending Radius: Flexing 7.5 x the overall dia.of cable

Fixed Installation: 4 x the overall dia. of cable

Max Working Temperature: 70° C, also available for 85° C and as per requirement.

105° C

Max Short Circuit Temperature: 160° C

Minimum Laying Temperature: Upto -15° C

These cables comply with the requirements of DIN VDE 0245, 0281, 0293, 295

No. of Cores and mm² per conductor	Finished Cable Dia in mm	Approx Wt of cable Kg/Km
0.50 x 2C	4.8	34
0.50 x 3C	5.1	41
0.50 x 4C	5.7	52
0.50 x 5C	6.2	62
0.50 x 7C	7.9	88
0.50 x 12C	9.1	138
0.50 x 18C	10.70	196
0.50 x 19C	10.80	198
0.50 x 25C	13.0	284
0.75 x 2C	5.2	42
0.75 x 3C	5.5	51
0.75 x 4C	6.2	66
0.75 x 5C	6.8	80
0.75 x 7C	8.1	113
0.75 x 10C	9.6	160
0.75 x 12C	9.9	177
0.75 x 18C	11.9	260
0.75 x 19C	12.3	276
0.75 x 25C	14.5	377
1.0 x 2C	5.5	49
1.0 x 3C	6.0	63
1.0 x 4C	6.6	79
1.0 x 5C	7.2	96
1.0 x 7C	8.6	135
1.0 x 8C	9.4	159
1.0 x 12C	10.0	218
1.0 x 14C	11.3	247
1.0 x 16C	12.0	280
1.0 x 18C	12.7	315
1.0 x 19C	13.0	331
1.0 x 25C	15.6	459

No. of Cores and mm² per conductor	Finished Cable Dia in mm	Approx Wt of cable Kg/Km
1.5 x 2C	6.3	66
1.5 x 3C	6.7	83
1.5 x 4C	7.3	102
1.5 x 5C	8.2	129
1.5 x 7C	9.8	183
1.5 x 8C	10.6	212
1.5 x 12C	12.1	292
1.5 x 18C	14.5	427
1.5 x 19C	15.2	461
1.5 x 25C	17.8	622
2.5 x 2C	7.6	101
2.5 x 3C	8.3	131
2.5 x 4C	9.10	164
2.5 x 5C	10.2	205
2.5 x 7C	12.1	288
2.5 x 12C	15.2	471
2.5 x 18C	18.1	685
2.5 x 19C	18.2	711
2.5 x 21C	20.7	839
2.5 x 25C	22.2	1011

Conductor config. No. of wires/max.dia	Conductor Resist ohm/km at 20° C max
0.5mm² (16/0.20mm)	39.0
0.75mm² (24/0.20mm)	26.0
1.0mm² (32/0.20mm)	19.5
1.5mm² (30/0.25mm)	13.3
2.5mm² (50/0.25mm)	7.98

* The above data is indicative and may be revised without prior intimation.

RR✓COPPER

In its Endeavour to add more Copper based products to its armory, Ram Ratna Group is now producing Rectangular Copper Bus Bars, Tapes (Strips), Fabricated Bus Bars & Tin plated Copper Bus Bars. Ram Ratna Group is a leading fabricator of Copper, all these products are manufactured using OXYGEN FREE COPPER, on modern upcast machines as per the international as well as Indian standards. These products are available in a wide range of sizes / dimensions. The hardness of the product can be altered to meet specific customer needs.

Copper Bus Bars

Rectangular Copper tapes, Strips & Bus Bars are used :-

- For Power Distribution in control panels
- As connectors in big windings
- As base conductors in different insulating materials
- As Earthing connectors in High rise building & power sub stations

Different shaped and profiled tapes are used in MCCB, ACB as moving contacts. Trapezoidal shaped tapes are used in Rotor windings. Special shaped bars are used for power switches in transmission and distribution lines.

Fabricated Copper Bus Bars

Fabricated Copper Bus Bars provide a quick, convenient, and economical solution for switchboard and switchgear makers.

High Quality and Easy Installation

Oxygen Free Copper as raw material & high tech machines ensure production of reliable & accurate bus bars. Bus bars to suit customer designs & specification can also be produced.

Customer Benefits

- Reduce internal scrap
- Save processing time
- Ease of installation
- Enrich profit margins
- Reduce maintenance cost for equipment quick delivery

Tin Plating

- High quality tin-plated copper bus bar as per International Standards.
- Tin Plating process using 99.5% up Tin anode.
- Coating thickness 3 to 10 microns and as per customer specification.

Copper Tapes

Copper tapes (supplied in coils), are also available made from oxygen free high conductivity copper of approximately 101% IACS.

- Width : 1.0 to 7.5 mm
- Thickness : 2.0 to 5.0 mm
- Standard I.D. of Coil : 3 mm
- Min. O.D. of Coil : 1000 mm
- Temper : Annealed / Soft grade
- Application : Earthing

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Convenience Empowered

- Architecturally versatile, sleek design and Unique modular concept.
- Ultra safe world patented GSS Technology.
- Provides flexible solution.
- Quick and Easy Installation.

RR✓CONNECT

- Worlds first Design it yourself wiring accessories range.
- Entire Spectrum of modular switches for Domestic, Commercial, Industrial and Hospitality applictions.

RR✓SWITCHGEAR

- Comprehensive range of LV Switchgear products encompassing switching, automation, control & measurement, cable management and accessories.
- Total Solution for LV Panel Builders & Switchboard manufacturers.
- Products conform to International Standards.

RR✓EARTH

- Oxygen free copper is used as raw material.
- Manufacturers of Earthing Rods, Earthing Tapes and Earthing Accessories.

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Winding Wire

- Leading manufacturers of Super Enamelled Copper Wires and Strips, Submersible Winding wires, Paper covered Magnet wires and Strips.
- The only ISO 9001:2000, ISO 14001:2004, OHSAS 18001:2007 certified Copper wire producer in India.

RR✓COPPER

- Oxygen free copper is used in its complete range.
- Manufacturers of wide range of Copper Strips, Bus Bars, Fabricated Bus Bars and Tin plated Bus Bars.

RR✓PARKON
Automated Multi-level Car Parking Systems

- Pioneer in Multi Level Car Parking Solutions in India.
- Computerized control system with low power consumption.
- Technically sound, reliable, operationally quick and smooth.
- Successfully completed over 200 projects.

Charging Lives Globally

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