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) / Armoured (YWY & YFY)* cables - 650 / 1100 Volts.

			Unarmoured			Armoured				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.