HPL
Speciality Cables

a smart way to power your projects

Highlights

- Superior Flexibility, Runs straight from a distribution point
- Superior longevity
- No corrosion and Environment friendly
- Provides more enhanced crosstalk and attenuation protection
- Circuit integrity upto 95°C for 3 hrs
- Inhouse fire testing facility

For more information scan the QR code.

Corporate Information

HPL Group is currently the leading player in the low voltage Electrical Industry in India with commitment to state of art technology, manufacturing world class products. HPL Group has been serving Indian Industry since last 58 Years with time tested, reliable and well proven products in the field of Switchgears, Protection Devices, Electrical Energy Meters, Energy Management Systems, CFL Lamps, Luminaries, Wires & Cable and Modular Switches.

HPL Group possess nine most modern manufacturing Units, ISO 9001: 2000 certified located Gurgaon, Kundli, Sonipat, Karnal and Himachal Pradesh having 80,0000 sq. mtr. covered area to manufacture products confirming to International and Indian Standard. HPL has an R&D center with over 100 Design Engineers, who are consistently working to upgrade the product technology.

HPL Group has manpower of over 1200+ Workforce, 90 Branch Offices & Representative offices spread throughout the country with 900+ Authorized Dealers and 27000 Retailers across country. Who has committed to provide solutions and services to customer's delight.

Introduction

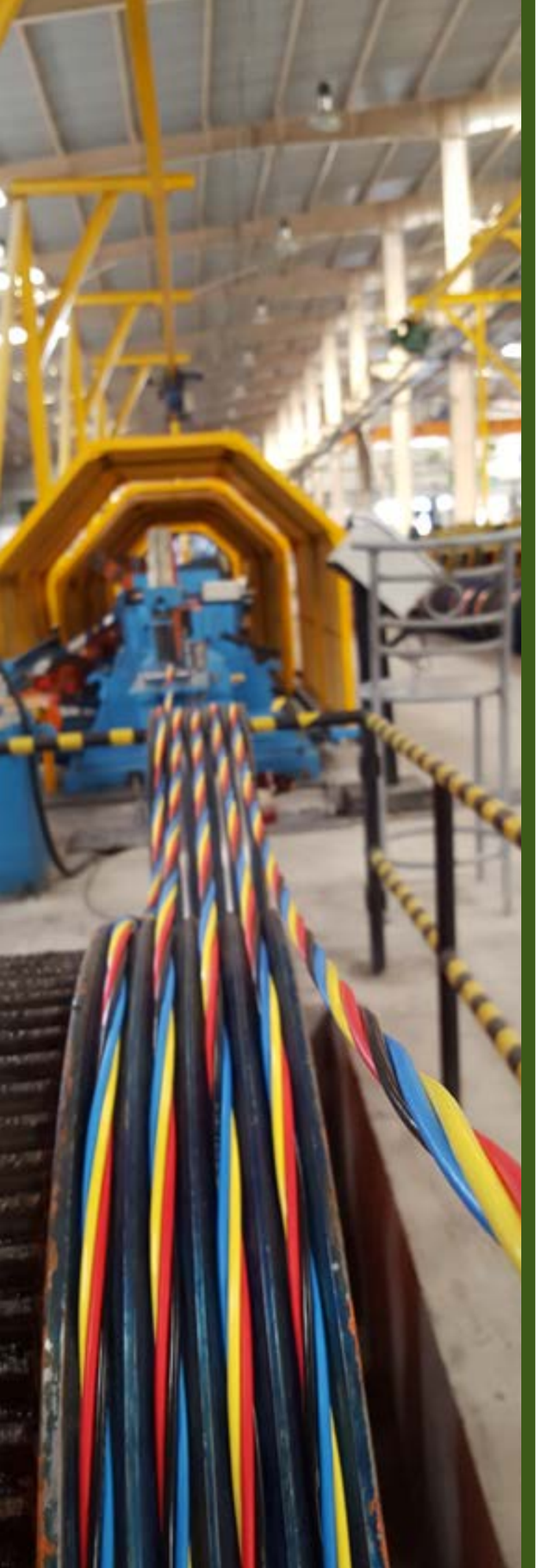
HPL Cables possess ISO 9001, ISO 14001, ISO 45001 ROHS Compliant cable manufacturing facility in India at Karnal, Haryana. Committed to the environment public health and safety HPL's out class in ensuring Ecofriendly range with CE mark.

The plant also append Industry's preeminent R&D laboratory with test facilities as per IS, JIS, IEC, BS & various other international standards.

With a strong technical setup the company started manufacturing specialized cables with features like weather, gas, oil and water resistance along with providing solutions for distortion free signalling, special bending radius and cables that perform at temperatures ranging from minus 40^{0}C to plus 70^{0}C.

CE · ELECTROLYTIC COPPER · SUPERIOR FLEXIBILITY · ANTI RODENT ANTI TERMITE · IS : 7098 (P-1) CM/L-9768313 · IS : 1554 (Pt-1) CM/L-9768414 · IS : 694 CM/L No. 9977726 · ISO 14001 · OHSAS 45001 · TUV SUD ISO 9001 · MEMBER

Certifications



Reliability

HPL constantly monitors its manufacturing processes and operates stringent quality assurance procedures to give long term reliability. This is of vital significance where cables are to be installed in locations where future access would be difficult and this is where HPL reputation and resources give peace of mind.

Performance

Optimum cable performance can be provided only by a company such as HPL, with access to the latest developments in materials technology. In addition, HPL knowledge of application requirements throughout is an assurance of high performance.

Our experienced Technical Staff can provide guidance on cable selection and installation and can ensure that you get the right cable for the job.

Health & Safety Management System Certified to OHSAS 45001

HPL ensure that its products are designed and constructed to be hazard-free under the prescribed conditions of use.

HPL uses only tried and tested materials and processes in full compliance with all relevant Indian, British and International Standards. Our cables are therefore manufactured for safe use without risk to health on the understanding that users will exercise the same degree of care in their selection and application. Safety is an important issue for HPL, and the strict standards are adhered to throughout the company. HPL is proud of its safety record.

Certification to OHSAS 45001 provides a recognizable Occupational Health and Safety Management standard against which an organization management system can be assessed and certified. Based on the structure of OHSAS 45001, the standard requires continual improvement in health and safety related activities.

Quality Management System Certified to ISO 9001

HPL Quality Management System conforms to the ISO 9001 Quality System Standard. Certification to the ISO 9001 standard demonstrates that HPL has drawn up written procedures to ensure full compliance with all requirements of the standard and that these procedures are followed by every department in the company, thus ensuring that goods leaving HPL factory are of the highest quality and meet each customer's requirements in every respect.

Environmental Management System Certified to ISO 14001

HPL Environmental Management System conforms to the ISO 14001 Environmental Management Standard.

Certification to the ISO 14001 standard shows that HPL has a well defined Structure and established working practices aimed at limiting its impact on the environment. Measurement and monitoring of effects, issuing work instructions, training of personnel and taking corrective actions are all essential elements to limiting the impact on the environment. HPL has set improvement targets to reduce the significant environmental impacts associated with its activities.

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HPL is committed to supplying its customers with the highest quality of product and of service. HPL cables have been type approved by recognized certifying bodies such as BIS Laboratory, TUV Certified, ROHS Complied and CE Certified. They fully conform to BS, IEC other international and national specifications. In addition, HPL is one of the best Wire & Cable company in India.

Control Cables

Application :

HPL Control Cable is suitable for main power distribution and lighting circuits in residential and commercial buildings. UV resistant outer sheath for outdoor application and anti-rodent properties is provided if required.

Design

- Conductor : annealed bare copper Class I / II - in accordance to **IS: 8130.**
- Standard : **IS: 1554 (Part-I)** & **IS: 7098 (Part-I).**
- Insulation : PVC type-A as per IS: 5831 & cross linked polyethylene in accordance to IS: 7098-I.
- Inner Sheath : PVC – Type ST-1 & PVC – Type ST2 as per IS: 5831.
- Outer Sheath : PVC – Type ST-1 & PVC – Type ST2 as per IS: 5831.
- Armouring : GI wire armour (W). GI strip armour (F).

Electrical properties

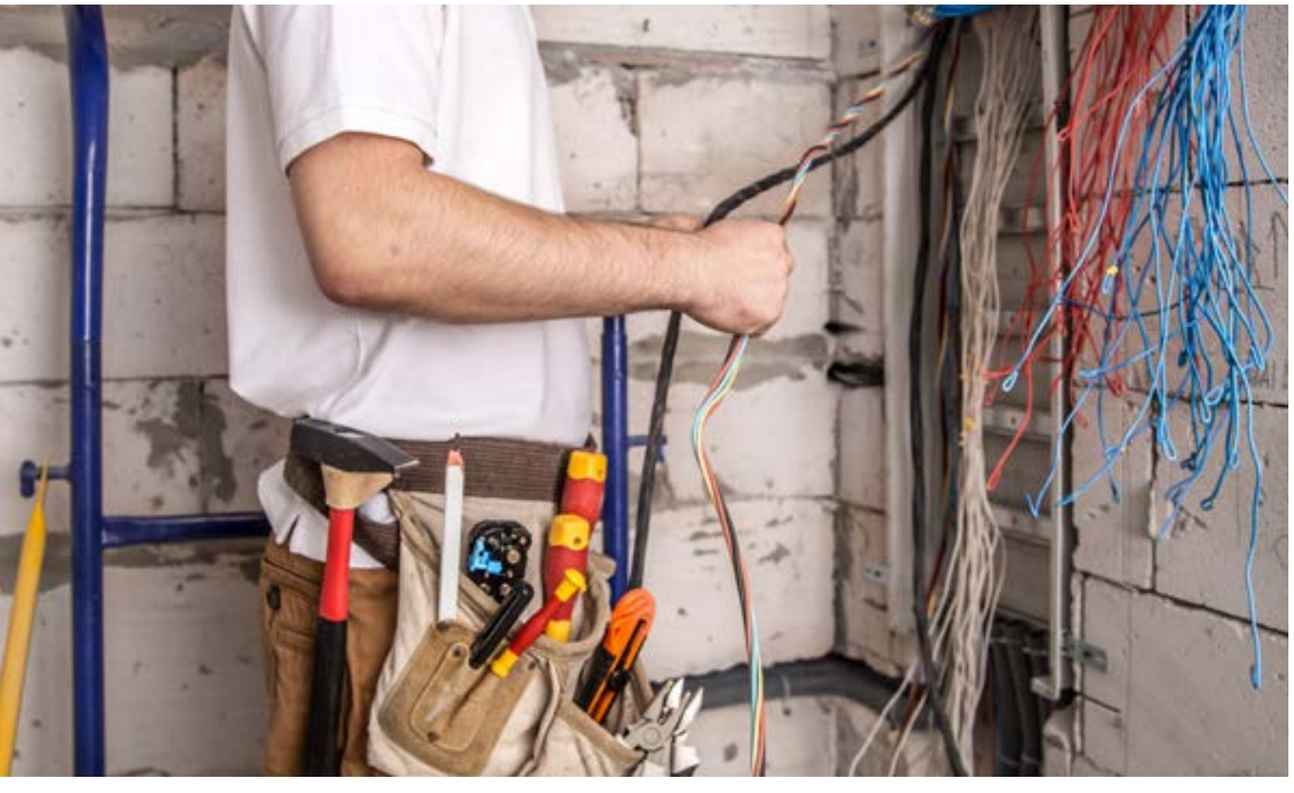
- Nominal voltage : 1100 V.
- Test voltage : 3 KV for 5 minutes.

Mechanical properties

- Min. bending : 10 x cable OD radius fixed installation.
- Temperature range : (i) fixed installation : -5°C up to +70°C max. conductor temperature IS:1554 (Part-I). (ii) fixed installation : -5°C up to +90°C max. conductor temperature IS:7098 (Part-I).

Flame and other tests

- Flammability Test : in acc. with IS: 10810-53 / IEC 60332-1 acc. to **IS: 10810.**



Technical Details for HPL 1.1 KV 1.5 sqmm

Copper conductor, pvc insulated, armoured / unarmoured control cables
Ref specifcation : IS: 1554 Part-1

Physical Parameters

No. of Cores	Minimum Inner-Sheath Thickness	Unarmoured (YY)					Flat Strip Armoured (YFY)I						Round Wire Armoured (YWY)					
		Nominal Outer-heath Thickness	Approx. Overall Dia of Cable		Approx. Weight of Cable		Dimension of Armour Strip	Minimum Outer Sheath Thickness	Approx. Overall Dia of Cable		Approx. Weight of Cable		Nominal Dia of Armour Wire	Minimum Outer Sheath Thickness	Approx. Overall Dia of Cable		Approx. Weight of Cable	
			Solid Cond.	Std. cond.	Solid Cond.	Std. cond.			Solid Cond.	Std. cond.	Solid Cond.	Std. cond.			Solid Cond.	Std. cond.	Solid Cond.	Std. cond.
No's	mm	mm	mm	mm	Kg/Km	Kg/Km	mm	mm	Cond.	Std.	Kg/Km	Kg/Km	mm	mm	mm	mm	Kg/Km	Kg/Km
2	0.30	1.80	11	12	160	170	N/A	N/A	cond.	Soild	N/A	N/A	1.40	1.24	13	13	350	370
3	0.30	1.80	12	12	190	200	N/A	N/A	Cond	Std.	N/A	N/A	1.40	1.24	13	14	360	380
4	0.30	1.80	12	13	220	230	N/A	N/A	cond.	N/A	N/A	N/A	1.40	1.24	14	15	410	430
5	0.30	1.80	13	14	240	230	N/A	N/A	N/A	N/A	N/A	N/A	1.40	1.24	15	16	470	490
6	0.30	1.80	14	15	270	280	N/A	N/A	N/A	N/A	N/A	N/A	1.40	1.24	16	17	530	550
7	0.30	1.80	14	15	290	300	N/A	N/A	N/A	N/A	N/A	N/A	1.40	1.24	16	17	540	560
10	0.30	1.80	17	18	410	430	N/A	N/A	N/A	N/A	N/A	N/A	1.40	1.40	19	20	720	760
12	0.30	1.80	18	19	450	470	4 x 0.80	1.40	18	19	620	640	1.60	1.40	20	21	830	860
14	0.30	1.80	19	19	500	520	4 x 0.80	1.40	20	20	700	740	1.60	1.40	21	22	900	950
16	0.30	1.80	19	20	570	570	4 x 0.80	1.40	20	21	780	800	1.60	1.40	22	23	1010	1030
19	0.30	2.00	21	22	670	700	4 x 0.80	1.40	21	22	850	900	1.60	1.40	23	24	1070	1130
24	0.30	2.00	24	25	820	870	4 x 0.80	1.40	24	26	1050	1110	1.60	1.40	26	27	1310	1370
27	0.30	2.00	24	25	880	950	4 x 0.80	1.40	25	26	1130	1190	1.60	1.40	26	28	1380	1450
30	0.30	2.00	25	26	950	1000	4 x 0.80	1.40	26	27	1200	1270	1.60	1.40	27	28	1470	1540
37	0.30	2.00	27	28	1150	1200	4 x 0.80	1.40	27	29	1400	1470	1.60	1.40	29	30	1690	1770
40	0.30	2.00	28	29	1220	1270	4 x 0.80	1.40	29	30	1500	1570	1.60	1.56	31	32	1830	1910
44	0.30	2.00	30	31	1350	1400	4 x 0.80	1.56	31	32	1670	1760	1.60	1.56	33	34	2000	2100
52	0.40	2.00	31	33	1600	1650	4 x 0.80	1.56	32	34	1890	1980	2.00	1.56	35	36	2440	2550
61	0.40	2.20	34	35	1800	1900	4 x 0.80	1.56	34	36	2130	2250	2.00	1.56	37	38	2700	2830

Conductor : Solid / Stranded Annealed Bare Copper as per Class-2 of IS: 8130.
Option : Tinned.
Insulation Material : PVC Type-A OR HR PVC Type-C as per IS: 5831.
Nominal Insulation Thickness : 0.80 mm.
Inner Sheath : PVC Type ST-1 as per IS: 5831.
Option : PVC Type ST-2/FR Type/FR-LSH Type.
Armouring : Single Layer of Aluminium Round Wire / Flat Strip.
Outer Sheath : PVC Type ST-1 as per IS: 5831.
Option : PVC Type ST-2/FR Type/FR-LSH Type.
Outer Sheath : Black or any other Colour as per requirement.

Electrical Parameters

No. of Cores	Max. Conductor D.C. Resistance at 20°C	Approx. Conductor A.C.Resistance		Reactance of Cable at 50 Hz (Approx.)	Capacitance of Cable (Approx.)	Normal Current Rating						Short Circuit Current Rating for 1 Second Duration	
						For General Purpose Insulation			For Heat Resisting Insulation				
		at 70°C	at 85°C			Ground	Duct	Air	Ground	Duct	Air	For General Purpose Insulation	For Heat Resisting Insulation
No's	Ohm/Km	Ohm/Km	Ohm/Km	Ohm/Km	µF/Km	Amps	Amps	Amps	Amps	Amps	Amps	K.amps	K.amps
2	12.10	14.52	15.20	0.112	0.20	23	20	20	26	24	24	0.173	0.156
3	12.10	14.52	15.20	0.112	0.20	21	17	17	24	21	21	0.173	0.156
4	12.10	14.52	15.20	0.112	0.20	21	17	17	24	21	21	0.173	0.156
5	12.10	14.52	15.20	0.112	0.20	21	17	17	24	21	21	0.173	0.156
6	12.10	14.52	15.20	0.112	0.20	15	13	13	17	16	16	0.173	0.156
7	12.10	14.52	15.20	0.112	0.20	14	13	13	16	15	15	0.173	0.156
10	12.10	14.52	15.20	0.112	0.20	13	11	11	15	13	13	0.173	0.156
12	12.10	14.52	15.20	0.112	0.20	12	10	10	14	12	12	0.173	0.156
14	12.10	14.52	15.20	0.112	0.20	11	10	10	13	12	12	0.173	0.156
16	12.10	14.52	15.20	0.112	0.20	11	9	9	13	11	11	0.173	0.156
19	12.10	14.52	15.20	0.112	0.20	10	9	9	11	11	11	0.173	0.156
24	12.10	14.52	15.20	0.112	0.20	9	8	8	10	10	10	0.173	0.156
27	12.10	14.52	15.20	0.112	0.20	9	8	8	10	10	10	0.173	0.156
30	12.10	14.52	15.20	0.112	0.20	9	7	7	10	8	8	0.173	0.156
37	12.10	14.52	15.20	0.112	0.20	8	7	7	9	8	8	0.173	0.156
40	12.10	14.52	15.20	0.112	0.20	8	7	7	9	8	8	0.173	0.156
44	12.10	14.52	15.20	0.112	0.20	7	7	7	8	7	7	0.173	0.156
52	12.10	14.52	15.20	0.112	0.20	6	6	6	7	7	7	0.173	0.156
61	12.10	14.52	15.20	0.112	0.20	6	6	6	7	7	7	0.173	0.156

Further sizes and specifications shall be provided on request.

Instrumentation Cables

Standard

Adapted to EN 50288-7./ BS 5308 -2.

Cable Construction

Conductor : Annealed copper wires according to BS EN 60228.

Insulation : Polyvinyl chloride PVC.

Pairs : Twisted.

Identification Pairs : Blue & white, continuously numbered on white core (1, 2, 3…) for multi-element.

Wrapping : 1 layer of PETP tape.

Collective Screen : Aluminium / PETP tape over tinned copper drain wire.

Cable Sheath : Polyvinyl Chloride PVC.

Technical Data

Flame Propagation : EN 60332-1-2.

Operating Temperature Range : -5°C to +70°C.

Bending Radius : 12 x cable diameter (Min).

Operating Voltage : 500V.

*Also available in 300V variant on request.

n - No. of pairs

m - Pairs

a - Cross sectional area

Electrical Properties

Conductor Cross Section (Sq.mm)	Class of Conductor	No. of Strands/ Max. Strand Diameter (mm)	Max. DC Conductor Resis-tance* at 20°C (Ω/ km)	Max. L/R Ratio (µH/Ω)	Min. Insulation Resistance (MΩ x Km)	Max. Mutual Ca-pacitance (nF/km)	Max. Inductance (mH/km)	Test Volt-age Vrms (Core-Core)	Test Voltage Vrms (Core-Screen)
0.5	2	7/0.3	36.0	25	20	250	1	2000	2000
0.5	5	16/0.2	39.0	25	20	250	1	2000	2000
0.75	2	7/0.37	24.5	25	20	250	1	2000	2000
0.75	5	24/0.2	26.0	25	20	250	1	2000	2000
1	2	7/0.43	18.1	25	20	250	1	2000	2000
1	5	32/0.2	19.5	25	20	250	1	2000	2000
1.5	2	7/0.53	12.1	40	20	250	1	2000	2000
2.5	2	7/0.67	7.41	60	20	250	1	2000	2000

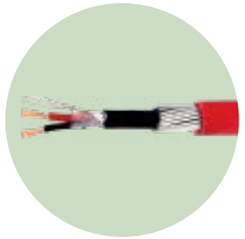
Class	No. of Pairs & Nom. Cross Sectional Area (Sq. mm)	Min. Insulation Thickness (mm)	Nominal Sheath Thickness (mm)	Approx. Cable Diameter (mm)	Approx. Cable Weight (kg/km)
Class 5	1 x 2 x 0.5	0.44	1.0	6.4	48.2
	2 x 2 x 0.5	0.44	1.0	7.7	74.2
	3 x 2 x 0.5	0.44	1.1	9.0	100.8
	4 x 2 x 0.5	0.44	1.1	10.1	126.5
	5 x 2 x 0.5	0.44	1.2	11.1	151.8
	8 x 2 x 0.5	0.44	1.3	13.6	225.5
	10 x 2 x 0.5	0.44	1.3	15.0	274.0
	12 x 2 x 0.5	0.44	1.4	16.2	321.9
	16 x 2 x 0.5	0.44	1.4	18.4	416.1
	20 x 2 x 0.5	0.44	1.5	20.4	510.0
	24 x 2 x 0.5	0.44	1.6	22.2	603.1
	1 x 2 x 0.75	0.44	1.0	6.8	56.7
	2 x 2 x 0.75	0.44	1.1	8.3	89.5
	3 x 2 x 0.75	0.44	1.1	9.7	122.9
	4 x 2 x 0.75	0.44	1.2	10.9	155.8
	5 x 2 x 0.75	0.44	1.2	12.0	188.0
	8 x 2 x 0.75	0.44	1.3	14.7	282.2
	10 x 2 x 0.75	0.44	1.4	16.2	345.0
	12 x 2 x 0.75	0.44	1.4	17.6	406.3
	16 x 2 x 0.75	0.44	1.5	20.0	527.7
	20 x 2 x 0.75	0.44	1.6	22.2	649.5
	24 x 2 x 0.75	0.44	1.6	24.1	769.0
	1 x 2 x 1	0.44	1.0	7.1	64.1
	2 x 2 x 1	0.44	1.1	8.7	103.4
	3 x 2 x 1	0.44	1.1	10.2	143.1
	4 x 2 x 1	0.44	1.2	11.5	182.2
	5 x 2 x 1	0.44	1.2	12.6	220.5
	8 x 2 x 1	0.44	1.3	15.5	333.8
	10 x 2 x 1	0.44	1.4	17.1	408.9
	12 x 2 x 1	0.44	1.4	18.6	482.3
	16 x 2 x 1	0.44	1.5	21.2	629.0
	20 x 2 x 1	0.44	1.6	23.5	776.5
	24 x 2 x 1	0.44	1.7	25.5	920.3
Class 2	1 x 2 x 0.5	0.44	1.0	6.4	48.0
	2 x 2 x 0.5	0.44	1.0	7.7	73.9
	3 x 2 x 0.5	0.44	1.1	9.0	100.4
	4 x 2 x 0.5	0.44	1.1	10.1	125.9
	5 x 2 x 0.5	0.44	1.2	11.1	151.2
	8 x 2 x 0.5	0.44	1.3	13.6	224.5
	10 x 2 x 0.5	0.44	1.3	15.0	272.7
	12 x 2 x 0.5	0.44	1.4	16.2	320.4
	16 x 2 x 0.5	0.44	1.4	18.4	414.1
	20 x 2 x 0.5	0.44	1.5	20.4	507.5
	24 x 2 x 0.5	0.44	1.6	22.2	600.1
	1 x 2 x 0.75	0.44	1.0	6.8	56.7
	2 x 2 x 0.75	0.44	1.1	8.3	89.5
	3 x 2 x 0.75	0.44	1.1	9.7	123.4
	4 x 2 x 0.75	0.44	1.2	10.9	155.9
	5 x 2 x 0.75	0.44	1.2	12.0	188.0
	8 x 2 x 0.75	0.44	1.3	14.7	282.4
	10 x 2 x 0.75	0.44	1.4	16.3	345.1
	12 x 2 x 0.75	0.44	1.4	17.6	406.4
	16 x 2 x 0.75	0.44	1.5	20.1	527.9
	20 x 2 x 0.75	0.44	1.6	22.2	649.7
	24 x 2 x 0.75	0.44	1.6	24.2	769.4
	1 x 2 x 1	0.44	1.0	7.2	65.2
	2 x 2 x 1	0.44	1.1	8.8	105.6
	3 x 2 x 1	0.44	1.1	10.4	146.7
	4 x 2 x 1	0.44	1.2	11.7	186.8
	5 x 2 x 1	0.44	1.2	12.9	226.1
	8 x 2 x 1	0.44	1.3	15.8	342.3
	10 x 2 x 1	0.44	1.4	17.4	419.3
	12 x 2 x 1	0.44	1.5	19.0	495.5
	16 x 2 x 1	0.44	1.6	21.6	646.0
	20 x 2 x 1	0.44	1.6	23.9	796.2
	24 x 2 x 1	0.44	1.7	26.0	945.0
	1 x 2 x 1.5	0.44	1.0	7.9	81.9
	2 x 2 x 1.5	0.44	1.1	9.7	136.4
	3 x 2 x 1.5	0.44	1.2	11.5	191.5
	4 x 2 x 1.5	0.44	1.2	13.0	246.0
	5 x 2 x 1.5	0.44	1.3	14.3	299.7
	8 x 2 x 1.5	0.44	1.4	17.7	457.6
		0.44	1.5	19.5	563.2
	12 x 2 x 1.5	0.44	1.5	21.2	666.6
	16 x 2 x 1.5	0.44	1.6	24.2	872.3
	20 x 2 x 1.5	0.44	1.7	26.8	1079.7
	24 x 2 x 1.5	0.44	1.8	29.2	1283.9
	1 x 2 x 2.5	0.53	1.1	9.3	113.8
	2 x 2 x 2.5	0.53	1.2	11.5	195.3
	3 x 2 x 2.5	0.53	1.3	13.6	278.3
	4 x 2 x 2.5	0.53	1.3	15.5	360.2
	5 x 2 x 2.5	0.53	1.4	17.1	441.1
	8 x 2 x 2.5	0.53	1.5	21.1	680.6
	10 x 2 x 2.5	0.53	1.6	23.4	840.3
	12 x 2 x 2.5	0.53	1.7	25.5	998.3
	16 x 2 x 2.5	0.53	1.8	29.1	1310.9
	20 x 2 x 2.5	0.53	1.9	32.3	1627.1
	24 x 2 x 2.5	0.53	2.1	35.2	1938.7

*For multi-pair maximum resistance shall be increased by 2%

Cable Design Parameters

Fire Survival Cables As per BS : 7846

HPL Fire Survival Cable are installed in areas whereby there is a need to maintain circuit integrity for prolonged period of time in a fire situation, these cables provides vital additional time to accomplish the evacuation of personnel, to contain and minimize the damage to equipment, plant and buildings, and to mount an effective fire fighting operation. These cables are specially used in wiring applications in critical life safety systems (e.g. Building management systems, emergency lightings, standby power supplies, lifts & elevators) in public such as airports, hotels, hospitals, subways, train stations, etc. Plant engineering and construction, industrial machinery and power stations.



Design		
Standard	BS 7846	
Conductor	annealed bare copper conductor – IS 8130 / IEC 60228	
Flame barrier tape	suitable flame barrier tape (mica tape) to sustain fire test.	
Insulation	cross linked polyethylene insulated – BS 7655 / IS 7098	
Inner Sheath	low smoke zero halogen with flame retardant properties	
Armouring	GI round wire/ GI strip	
Outer Sheath	low smoke zero halogen with flame retardant properties	
Electrical Properties		
Nominal voltage	600 / 1000 V	
Test voltage	3500 V AC for 5 minutes core to core.	
Mechanical Properties		
Min. bending radius	fixed installation	12 x cable OD
Temperature range	fixed installation	-5°C up to +90°C max. Conductor temperature
Flame and Other Tests		
Flammability	in acc. with IEC 60332-1-2 & IEC 60332-3-24 (BS EN 50266-2-4)	
Flame test	as per BS 6387	
Oxygen index	>30 % in acc. to ASTM-D 2863	
Temperature index	>250°C in acc. to ASTM-D 2863	
Smoke density	70% Light Transmittance in acc. to EN 61034-2 or max. 20% in acc. to ASTM D 2843	
Acid gas generation	max 0.5% in acc. to BS EN 50267-2-1 or IEC 60754-1	
Special Properties		
This product conforms to RoHS directive (Restriction of the use of certain hazardous substances)		

No. of cores & (mm) per conductor	Nominal outer diameter (mm)	Copper Weight (kg/km) Approx.	Weight (kg/km) Approx.
2x1.5	14.2	26.75	360.59
2x1.5	14.2	26.75	360.59
2x2.5	15.6	43.43	436.09
2x2.5	15.6	43.43	436.09
3x1.5	14.8	40.13	394.86
3x1.5	14.8	40.13	394.86
3x2.5	16.3	65.15	481.30
3x2.5	16.3	65.15	481.30
4x1.5	15.7	53.51	444.80
4x1.5	15.7	53.51	444.80
4x2.5	17.4	86.86	552.43
4x2.5	17.4	86.86	552.43
5x1.5	16.9	66.88	508.43
5x1.5	16.9	66.88	508.43
5x2.5	18.6	108.58	630.49
5x2.5	18.6	108.58	630.49
6x1.5	18.0	80.26	575.70
6x1.5	18.0	80.26	575.70
6x2.5	19.8	130.30	717.14
6x2.5	19.8	130.30	717.14
7x1.5	18.0	93.64	581.92
7x1.5	18.0	93.64	581.92
7x2.5	19.8	152.01	728.84
7x2.5	19.8	152.01	728.84
8x1.5	20.5	107.01	792.74
8x1.5	20.5	107.01	792.74
8x2.5	22.8	173.73	991.81
8x2.5	22.8	173.73	991.81
9x1.5	21.8	120.39	885.99
9x1.5	21.8	120.39	885.99
9x2.5	24.3	195.44	1118.00
9x2.5	24.3	195.44	1118.00
10x1.5	22.5	133.77	944.56
10x1.5	22.5	133.77	944.56
10x2.5	25.1	217.16	1191.70
10x2.5	25.1	217.16	1191.70
11x1.5	22.5	147.14	950.78
11x1.5	22.5	147.14	950.78
11x2.5	25.1	238.88	1203.40
11x2.5	25.1	238.88	1203.40
12x1.5	23.1	160.52	1005.61
12x1.5	23.1	160.52	1005.61
12x2.5	25.8	260.59	1273.09
12x2.5	25.8	260.59	1273.09
13x1.5	24.2	173.90	1088.38
13x1.5	24.2	173.90	1088.38
13x2.5	28.1	282.31	1556.90
13x2.5	28.1	282.31	1556.90
14x1.5	24.2	187.27	1094.60
14x1.5	24.2	187.27	1094.60
14x2.5	28.1	304.02	1568.60
14x2.5	28.1	304.02	1568.60
15x1.5	25.2	200.65	1183.22
15x1.5	25.2	200.65	1183.22
15x2.5	29.4	325.74	1707.99
15x2.5	29.4	325.74	1707.99
16x1.5	25.2	214.03	1189.44
16x1.5	25.2	214.03	1189.44
16x2.5	29.4	347.46	1719.70
16x2.5	29.4	347.46	1719.70

No. of cores & (mm) per conductor	Nominal outer diameter (mm)	Copper Weight (kg/km) Approx.	Weight (kg/km) Approx.
17x1.5	26.3	227.40	1276.39
17x1.5	26.3	227.40	1276.39
17x2.5	30.6	369.17	1840.58
17x2.5	30.6	369.17	1840.58
18x1.5	26.3	240.78	1282.61
18x1.5	26.3	240.78	1282.61
18x2.5	30.6	390.89	1852.28
2x4	16.6	70.02	504.90
2x4	16.6	70.02	504.90
2x6	17.8	105.37	599.34
2x6	17.8	105.37	599.34
2x10	19.8	176.37	764.89
2x10	19.8	176.37	764.89
2x16	22.7	281.41	1101.62
2x16	22.7	281.41	1101.62
2x25	23.5	443.90	1184.45
2x25	23.5	443.90	1184.45
2x35	26.7	615.71	1631.98
2x35	26.7	615.71	1631.98
2x50	29.0	832.75	1974.73
2x50	29.0	832.75	1974.73
2x70	31.9	1204.87	2512.19
2x70	31.9	1204.87	2512.19
2x95	35.7	1677.93	3395.57
2x95	35.7	1677.93	3395.57
3x4	17.4	105.03	570.50
3x4	17.4	105.03	570.50
3x6	18.7	158.05	683.96
3x6	18.7	158.05	683.96
3x10	21.5	264.55	999.22
3x10	21.5	264.55	999.22
3x16	24.1	422.11	1302.19
3x16	24.1	422.11	1302.19
3x25	27.7	665.85	1736.53
3x25	27.7	665.85	1736.53
3x35	29.9	923.56	2118.72
3x35	29.9	923.56	2118.72
3x50	32.1	1249.13	2582.99
3x50	32.1	1249.13	2582.99
3x70	36.2	1807.31	3373.25
3x70	36.2	1807.31	3373.25
3x95	42.9	2516.90	4722.65
3x95	42.9	2516.90	4722.65
4x4	18.6	140.04	658.48
4x4	18.6	140.04	658.48
4x6	20.9	210.74	907.26
4x6	20.9	210.74	907.26
4x10	23.1	352.74	1174.82
4x10	23.1	352.74	1174.82
4x16	26.0	562.82	1553.47
4x16	26.0	562.82	1553.47
4x25	29.7	887.80	2086.70
4x25	29.7	887.80	2086.70
4x35	31.5	1231.41	2555.42
4x35	31.5	1231.41	2555.42
4x50	34.4	1665.51	3160.97
4x50	34.4	1665.51	3160.97
4x70	39.8	2409.75	4472.35
4x70	39.8	2409.75	4472.35
4x95	43.3	3355.87	5659.42

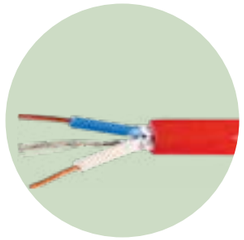
Fire Alarm Cables

Application

These cables are used in high rise buildings, commercial complexes, schools and educational institutions, hospitals, etc. for the connection with security systems like smoke detectors, emergency lightings, exit signboards and fire command center. These cables are used where the fire safety is utmost important.

Standard

BS 7629-1, BS EN 50200.



Technical Data

Voltage Rating : 300/500V

Temperature Range : -30°C to + 70°C
(The cable should not be flexed when either the ambient or cable temperature is below 0°C)

Minimum Bending Radius : 6D

Cable Construction

- Plain annealed copper conductor to BS EN 60288, class 2.
- Primary insulation of glass mica fire resistant tape.
- Secondary insulation to BS EN 50363-5, Type EI 5, Low smoke zero halogen (LSZH) cross-linkable flame retardant insulation.

Core colours:

- 2 Core : blue, brown.
- 3 Core : blue, brown, black.
- 4 Core : blue, brown, black, grey.
- Glass fibre tape.
- Earth/Drain wire of annealed tinned copper to BS EN 60228.
- Electrostatic screen of aluminium fire barrier.
- Sheath Type LTS3 to BS 7655 section 6.1.

Properties

*Low smoke zero halogen (LSOH), flame retardant.

Fire Performance Tests

BS 7629 -1, 300 / 500V fire resistant electric cables with non corrosive gases and low emission of smoke when affected by fire.
Category STANDARD 60 when tested in accordance with BS EN 50200-Method of test for resistance to fire of unprotected small cables for use in emergency circuits.
In addition, it shall meet the 30 min survival time when tested in accordance with BS EN 502000,Annex E.
Meets requirement for the fire resistant cables as described in clause 262d of BS 5839-1

Cable Design Parameters

No. of Cores & Nominal Cross Section Area (Sq. mm)	No. of Strands / Strand Diameter (mm)	Nominal Overall Diameter (mm)
2 x 1.5	7/0.53	10.0
2 x 2.5	7/0.67	11.5
3 x 1.5	7/0.53	10.8
3 x 2.5	7/0.67	12.3
4 x 1.5	7/0.53	12.0
4 x 2.5	7/0.67	13.5

Electrical Properties

No. of Cores & Nominal Cross Section Area (Sq. mm)	Max. Conductor Resistance at 20°C (Ω/km)	Current Rating (A)		Voltage Drop DC or Single Phase AC (mV/A/m)
		DC or Single Phase AC enclosed	DC or Single Phase AC Clipped	
2 x 1.5	12.1	17.5	20.0	29
2 x 2.5	7.41	24.0	27.0	18
3 x 1.5	12.1	17.5	20.0	29
3 x 2.5	7.41	24.0	27.0	18
4 x 1.5	12.1	17.5	20.0	29
4 x 2.5	7.41	24.0	27.0	18

CAT 6 Cables

Description

HPL LAN Cable Cat.6 is an installation cable for structured horizontal cabling. These cables are ideal for LAN data transmission in all Ethernet (IEEE 802.3) applications up to 1000 Base-T. IEC 61156-5/ISO/IEC11801, EN 50173-1, EIA/TIA 568C.2

General characteristics

Conductor	Solid bare copper wire, AWG 24/1
Insulation	solid polyethylene
Core identification code	Pair 1: white/blue – blue Pair 2: white/orange – orange Pair 3: white/green – green Pair 4: white/brown - brown
Stranding	two cores stranded to pairs, pairs are separated by a central cross element
Outer sheath	PVC compound outer Ø: approx. 6.0 mm color: grey, similar to RAL 7035

Mechanical characteristics

Minimum bending radius	at installation : 4 x cable Ø fixed installation : 8 x cable Ø
Permissible temperature range	at installation : 0˚C up to +50˚C fixed installation: -20˚C up to +60˚C
Flame propagation	**flame retardant acc. to IEC 60332-1-2**
Classification of fire behaviour acc. to EU Regulation 305/2011 (CPR)	Eca (acc. to EN13501-6 and EN50575)

Electrical characteristics

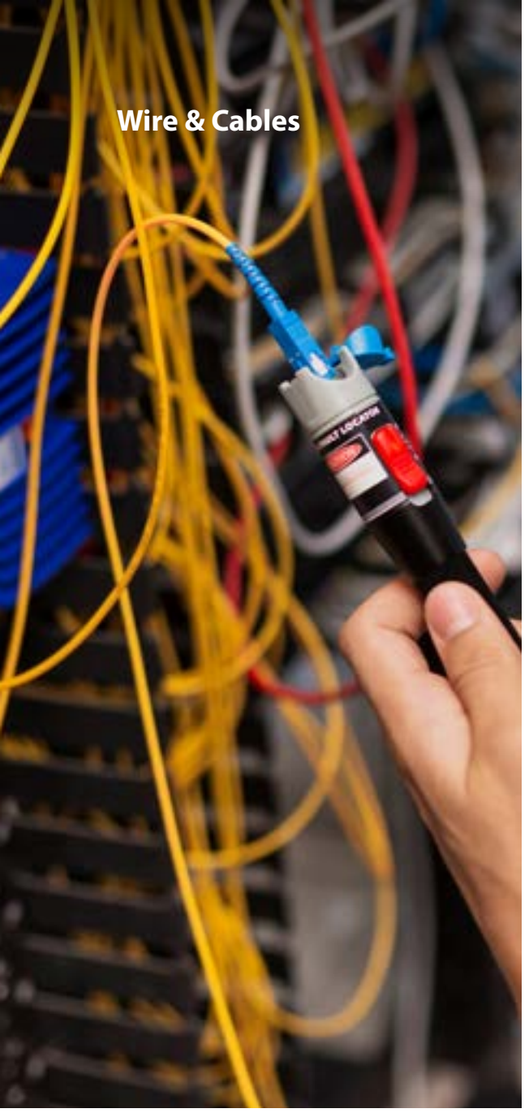
DC-Resistance (loop)	max. 172.0 Ω/km
Insulation resistance	min. 5 GΩ x km
Mutual capacitance	nom. 50 nF/km at 1 kHz
Characteristic impedance	nom. 100 Ω acc. to IEC 61156-5
Operating peak voltage	100 V (not for power purposes)
velocity of propagation	approx. 0.68 c
Test voltage	core/core : 1000V

Transmission properties

Transmission properties acc. to IEC 61156-5 for Category Cat.6 :

f [MHz]	Attenuation [dB/100m]		PS NEXT [dB]		EL FEXT [dB]		Return Loss [dB]	
	Standard	Typical	Standard	Typical	Standard	Typical	Standard	Typical
1*	2.1	1.8	75	90	68	82	20.0	25
4	3.8	3.5	66	80	56	75	23.0	30
10	6.0	5.6	60	75	48	67	25.0	34
16	7.6	7.2	57	70	44	65	25.0	35
31,25	10.7	10.1	53	68	38	60	23.6	35
62,5	15.5	14.4	48	62	32	53	21.5	33
100	19.9	18.4	45	60	28	50	20.1	30
250	33.0	29.1	39	57	20	44	17.3	25
300	-	34.8	-	53	-	41	-	23
350	-	38.5	-	48	-	39	-	22

* Extract of normative minimum requirements



CAT 6A Cables

HPL 10 GB/s Ethernet In A Smaller, More Rugged Cable for Military And Aerospace Environments

Achieve 10 Gb/s speeds while saving space and helping to meet the demands of harsh military and aerospace environments.

HPL Cat 6a cables are fully shielded four-pair cables meeting the electrical requirements of ANSI/TIA-568-C.2 for Category 6a cable.

The cable's FEP insulation and jacket allow a reduced- diameter cable, when compared to standard commercial

Cat 6a cables, while stranded conductors provide high flexibility in routing.

Engineered to Perform

The HPL cable is highly engineered to provide excellent 10G signal integrity and performance stability over a temperature range as wide as -55°C to +200°C.

The cable comes in two wire gauges: the industry-standard 24 AWG and a smaller 26 AWG as required in certain military and aerospace applications.

High Speed, High Compatibility

Compared to commonly used tape-wrapped cables, HPL Cat 6a cables are easier to terminate. Plus the cable is compatible with common high-speed aerospace and military connectors. This compatibility includes TE's high-performance 10 Gb/s CeeLok FAS-T and CeeLok FAS-X connectors.

HIGH PERFORMANCE

- Excellent signal integrity at 10 Gb/s
- Stable performance in extreme conditions
- Support full 100 m links

COMPACT AND RUGGED

- Ruggedized to survive in harsh environments
- Reduced size and weight

EASY TO USE

- Easier to terminate compared to tape-wrapped designs
- Flexible with tight bend radius for easier routing

COMPATIBLE

- Fit most high-speed aerospace connectors, including TE's CeeLok FAS-T and CeeLok FAS-X connectors

APPLICATIONS

- Military and Commercial Aerospace
- In-Flight Entertainment Systems
- Flight Control
- Avionics
- Cabin Management Systems
- Military Ground Vehicles
- Formula 1 Motorsport

Specifications:

MATERIALS

- **Conductors :**
  24 AWG: Stranded silver-coated copper alloy
  26 AWG: Stranded silver-coated high-strength copper alloy
- **Dielectric : FEP**
  Core Wrap: PTFE (26 AWG cables only)
- **Shielding :**
  200°C Rated Cables: Silver-coated copper braid an aluminum/ polyimide foil wrap 150°C Rated Cables: Tin-coated copper braid an aluminum/polyester foil wrap
- **Jacket :** FEP, in colors per MIL-STD-681
  or laser-markable white

ENVIRONMENTAL/MECHANICAL

- Temperature Range: -55°C to 150°C or 200°C
- Bend Radius (Min.):
- 24 AWG: 1.0 in.
- 26 AWG: 0.75 in.

ELECTRICAL

- Standard Impedance (Nom): 100 ohms
- Attenuation (Max.) at 500 MHz:
  24 AWG: 54.4 ohms/100m
  26 AWG: 67.9 ohms/100m
- Mutual Capacitance (Max.) at 1 kHz: 5.6 nF/100 m
- DC Resistance (Nom.) at 20°C: 43.9 ohms/1000 ft.
- Velocity of Propagation (Nom.): 70%

STANDARDS/SPECIFICATIONS

- Ethernet Cable: ANSI/TIA-568-C.2 and IEEE 801.3
- Environmental Testing: WC 27500/AS6070
- Smoke and toxicity: Boeing and Airbus ABD0031 standards FAR Part 25, Appendix F, Part 1
- TE Product Specification: 1200/1400

DC Solar Cables

DC SOLAR CABLES for ON-GRID / OFF -GRID APPLICATION - SPECIFICATION.

General Description

Flexible Single core cable with flexible electroplated tinned copper conductor insulated with special Halogen free cross linked Polyofin (XLPO)

As per EN - 50618 (XLPO), low smoke zero halogen sheathed,

UV and Ozone resistant. The cable is able to satisfy the latest requirement for PV systems as per EN 50618, IEC-60227/60502, IS-694.

Applications

Flexible cables suitable for:

- Mobile & fixed installations.
- Connection between photovoltaic
- panels to junction Box/Inverter.
- Indoor & outdoor use in dry,
- damp and wet situations.
- On trays and in ducts open and closed.

Construction

Conductor :- Electrolytic annealed electroplated tinned copper conductor, Class - 5 IEC 60228/ IS 8130.

Insulation & Outer Sheath :-

Halogen free cross linked Polyofin (XLPO) As per EN – 50618 (XLPO).

$1x10^{14}$ Ohm cm @ 20°C & $1x10^{12}$ Ohm cm @ 90°C.

(Specific volume resistance to IEC: 50395-8.2)

Technical Data Sheet For Solar Cable

Photovoltaic Cable (Solar Cable)

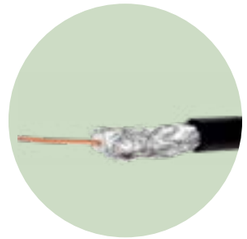
TYPE-1									
Dimensions of Solar D.C. Cables From PV Module to Array Junction Box & MIB to Inverter as per EN - 50618 : 2014									
Single Core Size (sqmm)	Maximum Wire size	No of wire	XL-LSOH Insulation Thickness Nominal (mm)	XL-LSOH Sheath Thickness Nominal (mm)	Overall Diameter Nominal (mm)	Maximum Conductor Resistance at 20°C ohm/km (Tinned Copper)	Current Carrying capacity of DC solar cable with XL-LSOH insulation & XL-LSOH sheathing at 60°C		
							Single cable in Air (Amp.)	Single cable on surface (Amp.)	Two adjacent cable on surface (Amp.)
1.50	0.26	30	0.70	0.80	5.40	13.70	30	29	24
2.50	0.26	50	0.70	0.80	5.90	8.21	41	39	33
4.00	0.31	56	0.70	0.80	6.60	5.09	55	52	44
6.00	0.31	84	0.70	0.80	7.40	3.39	70	67	57
10.00	0.41	80	0.70	0.80	8.80	1.95	98	93	79
16.00	0.41	126	0.70	0.90	10.10	1.24	132	125	107
25.00	0.41	196	0.90	1.00	12.50	0.795	176	167	142
35.00	0.41	276	0.90	1.10	14.00	0.565	218	207	176
50.00	0.41	396	1.00	1.20	16.30	0.393	274	260	219
70.00	0.41	556	1.00	1.20	18.70	0.277	406	386	325
95.00	0.41	756	1.10	1.30	20.80	0.210	491	467	393

TYPE-2									
Dimensions of Solar D.C. Cables From PV Module to Array Junction Box (As per IS : 694 & IS:1554 Part-1 Guideline)									
Single Core Size (sqmm)	Maximum Wire size	No of wire	HR 105°C Insulation Thickness Nominal (mm)	UV-HR 105°C Sheath Thickness Nominal (mm)	Overall Diameter Nominal (mm)	Maximum Conductor Resistance at 20°C ohm/ km (Bare Copper)	Current Carrying capacity of DC solar cable with HR 105°C Insulation & UV stabilised HR 105°C sheathing at 40°C		
							Single cable in Air (Amp.)	Single cable on surface (Amp.)	Two adjacent cable on surface (Amp.)
1.50	0.26	30	0.70	0.80	5.40	13.70	28	26	22
2.50	0.26	50	0.70	0.80	5.90	8.21	39	37	31
4.00	0.31	56	0.70	0.80	6.60	5.09	50	48	40
6.00	0.31	84	0.70	0.80	7.40	3.39	64	61	51
10.00	0.41	80	0.70	0.80	8.80	1.95	89	84	71
16.00	0.41	126	0.70	0.90	10.10	1.24	119	113	95
25.00	0.41	196	0.90	1.00	12.50	0.795	150	143	120
35.00	0.41	276	0.90	1.10	14.00	0.565	191	182	153
50.00	0.41	396	1.00	1.20	16.30	0.393	253	240	202
70.00	0.41	556	1.00	1.20	18.70	0.277	374	350	299
95.00	0.41	756	1.10	1.30	20.80	0.210	451	429	361

TYPE-3									
Dimensions of Solar D.C. Cables From PV Module to Array Junction Box (As per IS : 7098 Part-1 Guideline)									
Single Core Size (sqmm)	Maximum Wire size	No of wire	XLPE Insulation Thickness Nominal (mm)	UV ST-2 Sheath Thickness Nominal (mm)	Overall Diameter Nominal (mm)	Maximum Conductor Resistance at 20°C ohm/km (Bare Copper)	Current Carrying capacity of DC solar cable with XLPE Insulation & UV stabilised PVC ST-2 sheathing at 40°C		
							Single cable in Air (Amp.)	Single cable on surface (Amp.)	Two adjacent cable on surface (Amp.)
1.50	0.26	30	0.70	0.80	5.40	13.70	25	24	20
2.50	0.26	50	0.70	0.80	5.90	8.21	35	33	28
4.00	0.31	56	0.70	0.80	6.60	5.09	45	43	36
6.00	0.31	84	0.70	0.80	7.40	3.39	58	55	46
10.00	0.41	80	0.70	0.80	8.80	1.95	80	76	64
16.00	0.41	126	0.70	0.90	10.10	1.24	106	101	85
25.00	0.41	196	0.90	1.00	12.50	0.795	135	128	108
35.00	0.41	276	0.90	1.10	14.00	0.565	173	164	138
50.00	0.41	396	1.00	1.20	16.30	0.393	226	215	181
70.00	0.41	556	1.00	1.20	18.70	0.277	336	319	269
95.00	0.41	756	1.10	1.30	20.80	0.210	406	386	325

Coaxial Cables (RG6)

HPL Coaxial Cables are designed to be used at homes for television sets and also in security agencies for advanced data transmission.



Salient Features

- Protects signals from external electromagnetic interference
- Very low Attenuation or signal losses
- For both analog and di gital transmission
- Special jacketing offers increased life even in rugged conditions
- Jelly flooded

Technical Details

- **Conductor:** The central conductor is made of solid electrolytic grade annealed bare copper (BC) conductor or copper clad steel (CCS) conductor.
- **Insulation:** The insulation provided over the conductor is of foam PE dielectric insulator with gas injucted in it to reduce signal loss .
- **Screen:** Aluminium mylar tape is provided over the insulated conductor to shield the conductor and ensure disturbance-free transmission of signals
- **Braiding:** The braiding is generally provided with 60% coverage of Aluminium-Magnesium alloy
- **Packing:** Available in 100 meter packed in carton and 305 meter packed in easy pull box. Higher lengths available on special request

Cable Cross Section View

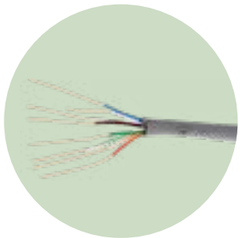
TECHNICAL SPECIFICATION OF RG6 COAXIAL CABLE (JELLY FLOODED)		
Properties	**Unit**	**Specification**
Construction Parameters		
Conductor Material	---	Solid bare copper / CCS
Nominal Diameter	mm	1.02 ± 0.01
Insulation Material	---	Foam P.E
Nominal Diameter of Foam	mm	4.57 ± 0.1
Centricity	%	≥ 85
Shield Material	---	Bonded Aluminium Foil
Braiding Material	---	Aluminium - Magnesium Alloy
Braiding Coverage	---	16*6*0.12mm (63%)
Jacket Material	---	PVC
Nominal Diameter of PVC Jacket	mm	7.0 ± 0.1
Colour	---	Black
Bending Radius	mm	60
Electrical Parameters		
Nominal Impedance	Ω	75±3
Nominal Velocity of Propagation	%	85
Nominal Capacitance	pf/mtr	50
Insulation Resistance	MΩ/km	≥100000
Structural Return Loss (5 to 300 MHz)	dB	20
Structural Return Loss (300 to 1000 MHz)	dB	18
Performance		
Frequency MHz		**Attenuation @ 68°F (20°C)**
55	dB/100 m (Max)	5.2
200	dB/100 m (Max)	9.9
400	dB/100 m (Max)	13.3
750	dB/100 m (Max)	18.3
865	dB/100 m (Max)	19.9
1000	dB/100 m (Max)	21.4

Telephone Cables

HPL twisted paired cables are best suited for telephone and switchboard cabling applications. The cables can be used for switchboard and internal telephone wiring in apartments, high-rise buildings, offices, factories, hotels, residential complexes, etc. The most common sizes are 2 Pair, 3 Pair, 4 Pair and 5 Pair in conductor of 0.4 mm or 0.5 mm.

Salient Features

- Low Power Loss
- Low Crosstalk
- Fire Retardant Sheath
- Low attenuation



Range of Product

- 1 Pair to 20 Pair (0.4 mm / 0.5 mm)

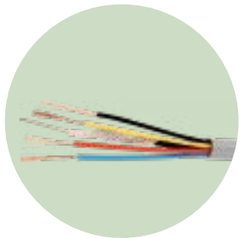
Technical Details:

- Conductor: The central conductor is made of bare annealed solid electrolytic grade of copper.
- Insulation: Premium quality HDPE is used. This serves for low attenuation and minimized cross talk.
- Twisted Pairs: The cores are carefully twisted with suitable lays and bunched together.
- Packing: Available in 90 meter packed in carton and 500 meter packed in easy pull box. Higher lengths available on special request.

Si. No.	Technical Parameters	Requirements				
A	**Physical Parameter**					
1	Construction	1 Pair	2 Pair	3 Pair	5 Pair	5 Pair
2	Conductor Material: 0.4 mm diameter (nom.) & 0.5 mm diameter (nom.)	Solid Annealed Bare Copper of Conductivity 102% IACS & Purity 99.97%				
3	Insulation Material (0.4 & 0.5 mm dia.)	High Density Polyethylene				
4a	Insulation Thickness (Average) for 0.4 mm dia.	0.17 mm	0.17 mm	0.17 mm	0.17 mm	0.17 mm
4b	Insulation Thickness (Average) for 0.5 mm dia.	0.20 mm	0.20 mm	0.20 mm	0.20 mm	0.20 mm
5a	Diameter of Insulated Conductor for 0.4 mm dia.	0.74 mm	0.74 mm	0.74 mm	0.74 mm	0.74 mm
5b	Diameter of Insulated Conductor for 0.5 mm	0.92 mm	0.92 mm	0.92 mm	0.92 mm	0.92 mm
6	Rip cord (0.4 & 0.5 mm dia.)	Nylon				
7	Colour Combination	White-Blue	White-Blue	White-Blue	White-Blue	White-Blue
		-	White-Orange	White-Orange	White-Orange	White-Orange
		-	-	White-Green	White-Green	White-Green
		-	-	-	White-Brown	White-Brown
		-	-	-	-	White-Grey
8a	PVC Jacket (0.4mm & 0.5mm diameter)	FR-PVC compound with high oxygen index (LOI = 29%)*				
8b	PVC Thickness Minimum (in mm)	1.1	1.1	1.1	1.2	1.2
9	Approx. Outer Diameter (for 0.4 mm)	2.4	3.1	3.5	3.9	4.3
10	Approx. Outer Diameter (for 0.5 mm)	3.1	3.9	4.2	5.1	5.6
11	Packing Length (meters)	90	90	90	90	90
B	**Electrical Parameters**					
1	Conductor Resistance (max.) ohms/km at 20°C	143 Ω / km for 0.4 mm diameter & 92.2 Ω / km for 0.5 mm diameter				
2	Mutual Capacitance (max.) Nano Farads/km	50	50	50	50	50
3	Insulation Resistance in Air (min.) Meg-ohms/km	10000	10000	10000	10000	10000
4	Capacitance Unbalance Pair to Pair (max.)	250	250	250	250	250

CCTV Cables

HPL CCTV Cables are offered in two types normally 4+1 CCTV Cables & 3+1 CCTV Cables. Co-axial Cables form the carrier for video signal and the other '4cores' or 3 cores' form the carriers for power. Co-axial cables are designed to transmit the complete video frequency range with minimum distortion or attenuation, making them an excellent choice for CCTV. HPL CCTV cables are designed to optimize the quality of video signal, which are transmitted through the Coaxial cable in the CCTV cable. The Coaxial cable consists of solid annealed bare copper conductor of electrolytic grade which is insulated with special grade HDPE dielectric, braided with aluminium Alloy or copper braiding and then jacketed with FR PVC.



Topmost quality of construction of co-axial cable in HPL CCTV cables ensures distortion free video signals and thus a clear picture over complete low frequency bandwidth of transmission in such applications. The impedance of coaxial cable is 75, which matches the CCTV equiment. This matching ensures adequate signal strength, no reflection and best picture quality. In CCTV the coaxial Cable is of type RG-59 which has highest attenuation compared to RG-6 and RG-11. Hence, it is recommended for us only electrical properties such as low capacitance and high velocity of propagation. This results in low-loss characteristice and reduced attenuation of the video signal.

Aluminium foil and Aluminium Alloy braiding of 60% coverage ensures complete elimination of EMI/RFI from the video signals and also provides a reduced DC resistance ground path. Jacketing with FR PVC is ideal for all indoor and outdoor applications.

Technical Data

PARAMETERS			CCTV (3 + 1)	CCTV (4 + 1)
Name of Manufacturer		Unit	HPL ELECTRIC & POWER LTD.	HPL ELECTRIC & POWER LTD.
A. CONDUCTOR				
(i)	Conductor for 3 & 4 core (Electric Wire)			
	(a) Type	-	ABC Flexible Conductor	ABC Flexible Conductor
	(b) No of wire	Nos.	14	14
	(c) Nominal Strand Diameter	mm	0.120	0.120
(ii)	Conductor for Coxial Cable			
	(a) Type	-	Solid Annealed Bare Copper Conductor	Solid Annealed Bare Copper Conductor
	(b) No of wire	Nos.	1	1
	(c) Nominal Strand Diameter	mm	0.500	0.500
B. Braiding for Coaxial Cable				
	(a) Type	-	Aluminium Alloy Braiding	Aluminium Alloy Braiding
	(b) Total no of wire	Nos.	64	64
	(c.)No. of wires in each spindle	Nos.	4	4
	(d) Total no of spindle	Nos.	12	12
	(e) Nominal Diameter of Braiding wire	mm	0.112	0.112
	(f) Minimum Coverage	%	60	60
C. Polyster Tape over laid up				
	(a) Dimension	mm	16.00 x 0.050	16.00 x 0.050
	(b) Minimum Overlap	%	25	25
D. Insulation				
1	Dimension for 3 Core			
	(a) Type of Insulation	-	HDPE	HDPE
	(b) Core Colour	Visual	Red, Yellow & Blue	Red, Yellow, Blue & Black
	(c) Maximaum Diameter of Core	mm	1.40	1.40
	(d) Nominal Thickness of Insulation	mm	0.45	0.45
2	Dimension for Coaxial Cable			
(i)	(a) Type of Insulation	-	HDPE	HDPE
	(b) Core Colour	Visual	Natural	Natural
	(c) Maximaum Diameter of Core	mm	1.50	1.50
	(d) Nominal Thickness of Insulation	mm	0.50	0.50
(ii)	(a) Type of Jacket	-	PVC	PVC
	(b) Core Colour	Visual	Black	Black
	(c) Maximaum Diameter of Jacket	mm	2.70	2.70
	(d) Nominal Thickness of Jacket	mm	0.45	0.45
E. Outer Sheath				
	(a) Type of Outer Sheath	-	ST-1	ST-1
	(b) Sheath Colour	Visual	White	Grey
	(c) Maximaum Diameter of Core	mm	6.00	6.70
	(d) Nominal Thickness of Insulation	mm	0.80	0.80
	(e) Bending Radius	mm	65	65
F. Rib Cord		-	Applicable	Applicable
G. Electrial Parameters				
	(a) Maximum Resistance at 20^{0}C	ohm/km	110 .00	110 .00
	(b) Nominal Capacitance	pf/mtr	53.0	53.0
	(c) Impeadence	ohm	75.0	75.0
	(e) Nominal Velocity Ratio	%	85.0	85.0
H. Printing :- HPL 3+1 (COPPER) CCTV DIGITAL PERFORMANCE 1 GHz 100 % SIGNAL TRANSMISSION ……..MTRS				

Speaker Cables:

Insulated with specially formulated FR (Fire Retardant) grade PVC compound. HPL twin parallel type speaker cables are manufactured with multi wire, bright annealed flexible bare electrolytic grade conductor, insulated with specially formulated and manufactured in FR (Fire retardant) grade PVC compound. Each core is uniquely designed for easy identification. The distance between the two conductors is maintained consistently for uniform capacitance throughout the length. This highest safety against the fire is offered by the use of FR grade crystal PVC compound with high value of Oxygen and temperature Index. These cables are uniquely available in natural color. These are highly recommended for use in connecting Speakers, used in Public Address systems installed in large residential complexes, (as per new building code) for clear and distortion free voice with very low db loss.

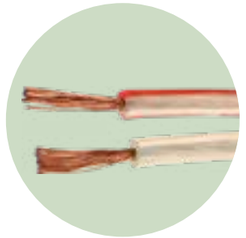


Illustration:

To use this table for the selection of the cable is for example we can use maximum length of 14 AWG cable in 8 ohm speaker system with power loss of 21% (3.2db)

Sr. No.	Size in Sqmm	Radial Thickness in mm	Core Diameter in mm	Maximum Conductor Resistance at 20^{0}C (ohm/km)	Nominal Overall Diameter in mm
		Nom.	Avg.		Width X Hight
1	2C x 0.75	0.90	2.90	26.00	6.10 x 2.90
2	2C x 1.00	1.00	3.30	19.5	6.90 x 3.30
3	2C x 1.50	1.10	3.70	13.3	7.80 x 3.70
4	2C x 2.50	1.10	4.15	7.98	8.70 x 4.12

Flat Elevator Cables

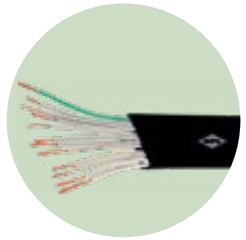
HPL Flat Elevator cables is a harmonized, flexible, 450/750 volt, PVC flat festoon control cable. Mainly used as a trailing cable for crane installations, floor conveyor systems, elevator control cables, shelf control units and in supply lines for moving machine parts. The flat construction allows cables to be stacked for applications where space is at a minimum and require smaller bending radius over that of round cables. Suitable for installations in dry and damp rooms. The outer PVC jacket is extensively resistant to oil, fat, acid and lye. standards and only available in 20AWG (0.50mm^2), 18 AWG (0.75mm^2) and 17 AWG (1.0mm^2) 15 AWG (1.5mm^2) sizes.

Construction

Fine bare copper strands
Strands to Class-5, IEC 60228 Cl-5
PVC core insulation
Color code IEC 60227 with ground
Cores laying parallel
PVC outer jacket - Black
Extremely oil & chemical resistant

Technical

Working Voltage : 300/500 V (H05)
Working Voltage : 450/750 V (H07)
Test Voltage : 3000 volts
Flexing Bending Radius : 10 x Ø
Flexing Temp : -5°C to +70°C
Static Temp : -30°C to +70°C
Flame Retardant : IEC 60332.1
Insulation Resistance: > 36.7 MΩ km



SIZE	NO. OF WIRE/SIZE	NO. OF CORE	NOMINAL OD
(IN SQ.MM)	(NOS./MM)	(NOS.)	WxH (MM x MM)
0.5	16/0.20	12	30.70 x 4.40
0.75	24/0.20	12	33.15 x 4.65
1.0	32/0.20	12	35.50 x 4.80
1.5	48/0.20	12	39.00 x 5.10
0.5	16/0.20	6	17.70 x 4.40
0.75	24/0.20	6	18.90 x 4.65
1.0	32/0.20	6	20.10 x 4.80
1.5	48/0.20	6	21.90 x 5.10

HPL OIL Resistant Battery Cables

Battery cables are used in Original Equipment by Indian Leading vehicle manufacturers.These cables are manufactured from electrolytic grade bright Annealed, bunched, bare copper conductors & insulated with a special grade PVC compound.This PVC is impervious to water, Petrol, Diesel, Acids, Engine & Lubricating oils & grease etc. These cables are ideally suited for extreme weather conditions & undergo stringent quality checks during manufacturing process & at final stage too. They are available in Red & Black colour or Red & White colours in 100 meter coils/Drums or as per customer Requirement.

PVC INSULATED BATTERY CABLES AS PER IS - 2465:1984				
Conductor			Cable Parameter	
Nominal Area	No of Wire / Dia of Strands (Nom.)	Resistance at 20°C (max.)	Radial Thickness of Insulation (Nom.)	Overall Diameter (Approx.)
Sqmm	mm	ohm/km	mm	mm
10	80/0.4	1.910	1.00	6.30
16	126/0.4	1.210	1.00	7.25
25	196/0.4	0.780	1.20	8.80
35	276/0.4	0.554	1.20	10.35
50	396/0.4	0.386	1.40	12.25
70	556/0.4	0.272	1.40	13.90
95	756/0.4	0.206	1.60	15.85
120	954/0.4	0.161	1.60	17.75
150	1192/0.4	0.129	1.80	18.85
185	1472/0.4	0.106	2.00	22.00
240	1910/0.4	0.0801	2.20	25.00

PVC INSULATED HIGH TENSION CABLES (IGNITION CABLES) IN BLACK COLOUR					
Conductor			Cable Parameter		
Nominal Area	No of Wire / Dia of Strands (Nom.)	Resistance at 20°C (max.)	Radial Thickness of Inner (Red)	Radial Thickness of Outer (Black)	Overall Diameter (Approx.)
Sqmm	mm	ohm/km	mm	mm	mm
1.2*	17/0.3	15.36	1.0	1.75	7.10
1.3*	19/0.3	14.01	1.0	1.75	7.10

* These sizes are not covered under IS 2465 : 1984

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