



HPL Speciality Cables



a smart way to power your projects

www.hplindia.com



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, Panipat 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 1900+ people, 90 branch offices & representative offices spread throughout the country with 2000 Authorized Dealers and 12000 Retailers across country. Who has committed to provide solutions and services to customer's delight.



Introduction

HPL Cables possess ISO 9001, ISO 14001, ISO 18001 ROHS Compliant cable manufacturing facility in India at Karnal, Haryana.

Committed to the environment public health and safety HPLs out class in ensurin Ecofriendly range with CE mark.

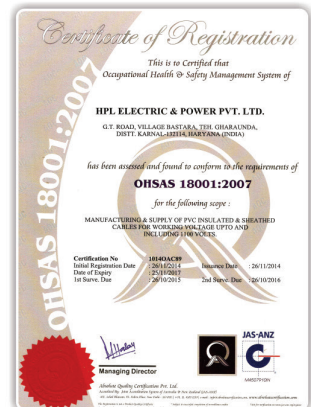
The plant also append Industry's preeminent R&D laboratory with test facilities as per IS, JIS, IEC, BS & various other international standards.

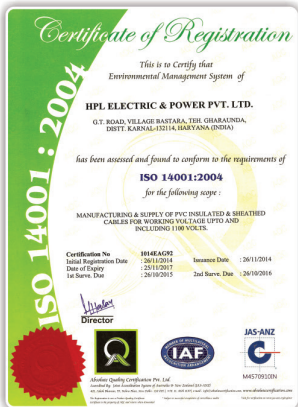
With a strong technical setup the company started manufacturing specialized cables with features like weather, gas, oil and water resistance, along with providing solutions for distortion free signalling, special bending radius, and cables that perform at temperatures ranging from minus 40°C to plus 750°C.





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 18001

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 18001 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 18001, 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

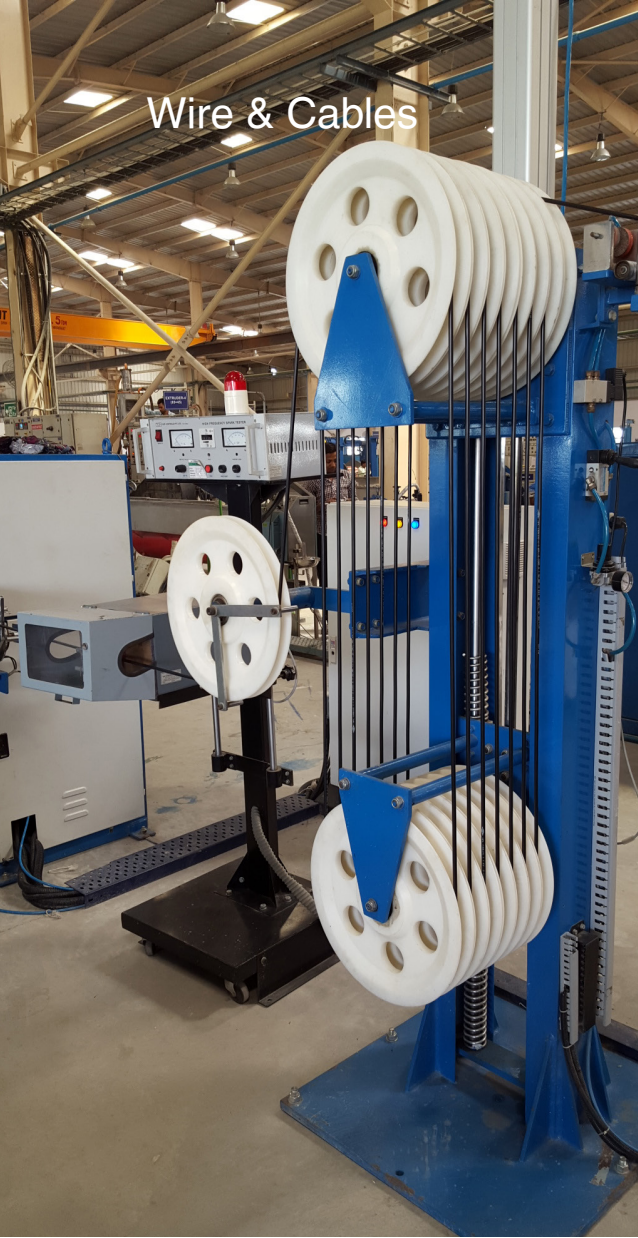
HPL Environmental Management System conforms to the ISO 14001 Environmental Management Standard.

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.



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

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 are only available in 20AWG (0.50mm²) 18 AWG (0,75mm²) and 17 AWG (1,0mm²) 15 AWG (1.5mm²) sizes.

Construction

- Fine bare copper strands
- Strands to VDE-0295 Class-5, IEC 60228 CI-5
- PVC core insulation
- Color code VDE-0293-308 with ground
- Cores laying parallel
- PVC outer jacket - Black
- Extremely oil & chemical resistant

Technical

- Working voltage: 300/500v. (H05)
- Working voltage: 450/750v. (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 (IN SQ.MM)	NO. OF WIRE/SIZE (NOS./MM)	NO. OF CORE (NOS.)	NOMINAL OD WxH (MM x MM)
0.5 SQ.MM	16/0.20 MM	12	30.70 x 4.40
0.75 SQ.MM	24/0.20 MM	12	33.15 x 4.65
1.0 SQ.MM	32/0.20 MM	12	35.50 x 4.80
1.5 SQ.MM	48/0.20 MM	12	39.00 x 5.10
0.5 SQ.MM	16/0.20 MM	6	17.70 x 4.40
0.75 SQ.MM	24/0.20 MM	6	18.90 x 4.65
1.0 SQ.MM	32/0.20 MM	6	20.10 x 4.80
1.5 SQ.MM	48/0.20 MM	6	21.90 x 5.10



DC Solar Cables

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

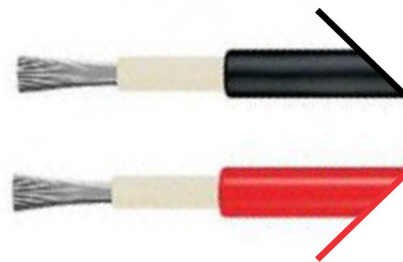
General Description

Flexible Single core cable with flexible electroplated tinned copper conductor insulated with special cross linked halogen free Elastomer, low smoke zero halogen sheathed, UV and Ozone resistant .The cable is able to satisfy the latest requirement for PV systems as per TUV Spec No. 2 Pfg -1169/08.2007.

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 :-

Halogen free fire retardant thermosetting Elastomer (cross linked) type IE 3 to IS 6380 and EI 3 to

EN 50363-1, according to table 4 of TUV Spec . 2Pfg-1169/08.2007.

Outer Sheath :-

Halogen free fire retardant thermosetting Elastomer (cross linked) outer sheath type SE4 to IS: 6380 and

EM 50363-1, according to table 4 of TUV Spec. No.2 Pfg-1169/08.2007. Standard Colours are Red or black. Both Profibus DP and Profibus PA work on RS 485.

SIZE (In Sq.mm)	No. of Cond./ Size of each wire (In Nos./ mm)	Cond. Dia (mm)	XL-LSOH Insulation Thickness Nominal (mm)	XL-LSOH Sheath Thickness Nominal (mm)	Overall Diameter Nominal (mm)
4.00	56/0.3	2.6	0.70	0.80	5.50 ± 0.20
6.00	84/0.3	3.2	0.80	0.90	6.50 ± 0.20
10.00	80/0.4	4.3	0.80	0.90	7.45 ± 0.20
16.00	126/0.4	5.4	0.80	0.90	8.45 ± 0.20

1x10¹⁴ Ohm cm @ 20°C

1x10¹¹ 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 TUV Specification 2 Pfg 1169/08.2007									
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	4.60 ± 0.20	13.70	30	29	24
2.50	0.26	50	0.70	0.80	5.00 ± 0.20	8.21	41	39	33
4.00	0.31	56	0.70	0.80	5.50 ± 0.20	5.09	55	52	44
6.00	0.31	84	0.80	0.90	6.50 ± 0.20	3.39	70	67	57
Array Junction Box to main Junction Box & MIB to Inverter as per TUV Specification 2 Pfg 1169/08.2007									
10.00	0.41	80	0.80	0.90	7.45 ± 0.40	1.95	98	93	79
16.00	0.41	126	0.80	0.90	8.45 ± 0.40	1.24	132	125	107
25.00	0.41	196	1.00	1.00	10.30±0.40	0.795	176	167	142
35.00	0.41	276	1.00	1.10	11.70±0.50	0.565	218	207	176
50.00	0.41	396	1.20	1.10	13.60±0.50	0.393	274	260	219
70.00	0.41	556	1.20	1.10	15.20±0.50	0.277	406	386	325
95.00	0.41	756	1.20	1.30	17.40±0.70	0.210	491	467	393
120.00	0.41	954	1.30	1.40	19.30±0.80	0.164	576	547	461
150.00	0.41	1192	1.50	1.60	21.75±0.80	0.132	670	637	536
185.00	0.41	1472	1.60	1.70	23.90±1.0	0.108	784	745	627
240.00	0.41	1910	1.80	1.90	27.10±1.0	0.0817	944	897	755



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	0.60	0.90	4.90 ± 0.40	13.30	28	26	22
2.50	0.26	50	0.70	0.90	5.40 ± 0.40	7.98	39	37	31
4.00	0.31	56	0.80	0.90	6.40 ± 0.50	4.95	50	48	40
6.00	0.31	84	0.80	0.90	6.90 ± 0.60	3.30	64	61	51
Array Junction Box to main Junction Box & MIB to Inverter (As per IS : 694 & IS:1554 Part-1 Guideline)									
10.00	0.41	80	1.00	0.90	8.20 ± 0.5	1.91	89	84	71
16.00	0.41	126	1.00	0.90	9.30 ± 0.5	1.21	119	113	95
25.00	0.41	196	1.20	1.00	10.70 ± 0.6	0.780	150	143	120
35.00	0.41	276	1.20	1.10	12.40 ± 0.6	0.554	191	182	153
50.00	0.41	396	1.40	1.30	14.75 ± 0.6	0.386	253	240	202
70.00	0.41	556	1.40	1.40	16.80 ± 0.8	0.272	374	350	299
95.00	0.41	756	1.60	1.50	19.30 ± 0.8	0.206	451	429	361
120.00	0.41	954	1.60	1.60	20.75 ± 0.8	0.161	530	504	424
150.00	0.41	1192	1.80	1.80	23.20 ± 1.0	0.129	618	587	494
185.00	0.41	1472	2.00	1.90	25.30 ± 1.0	0.106	721	685	577
240.00	0.41	1910	2.20	2.20	29.20 ± 1.0	0.0801	869	825	695



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	0.90	4.90 ± 0.40	13.30	25	24	20
2.50	0.26	50	0.70	0.90	5.40 ± 0.40	7.98	35	33	28
4.00	0.31	56	0.70	0.90	5.90 ± 0.50	4.95	45	43	36
6.00	0.31	84	0.70	0.90	6.40 ± 0.60	3.30	58	55	46
Array Junction Box to main Junction Box & MIB to Inverter (As per IS : 7098 Part-1 Guideline)									
10.00	0.41	80	0.70	0.90	7.40 ± 0.5	1.91	80	76	64
16.00	0.41	126	0.70	0.90	8.40 ± 0.5	1.21	106	101	85
25.00	0.41	196	0.90	1.00	10.40 ± 0.6	0.780	135	128	108
35.00	0.41	276	0.90	1.10	11.85 ± 0.6	0.554	173	164	138
50.00	0.41	396	1.00	1.20	13.90 ± 0.6	0.386	226	215	181
70.00	0.41	556	1.10	1.30	15.85 ± 0.8	0.272	336	319	269
95.00	0.41	756	1.10	1.50	18.20 ± 0.8	0.206	406	386	325
120.00	0.41	954	1.20	1.60	20.75 ± 0.8	0.161	476	452	381
150.00	0.41	1192	1.40	1.70	23.20 ± 1.0	0.129	555	527	444
185.00	0.41	1472	1.60	1.90	25.40 ± 1.0	0.106	649	616	519
240.00	0.41	1910	1.70	2.10	29.30 ± 1.0	0.0801	781	742	625





UV Resistant Cables

Owing to our consistent efforts for quality and providing the best, we have developed exhaustive range of domestic wires and cables suitable to Indian homes and varied conditions. Manufactured with best quality of Conductor (100% pure electrolytic grade copper), Flexibility, more Elongation and has superior flame retarding properties, finest grade of indigenously developed PVC compound, it can be bent in smaller radius, HPL Wires & Cables given maximum safety at no extra cost.

Construction:

- Conductor - Bare Annealed Copper.
- Insulation - Double layer HR Grade have 85°C and 105°C under normal operating conditions. HR grade can draw 18-20% more current, thus, suitable for higher ambient temperature or insulation subject to frequent overload.
- Std. Colour - Red, Yellow, Blue, Black, Green, Grey & White.
- Standard - Generally conforming to IS:694/1990
- Sizes - 0.75 SQMM To -16 SQMM.

Features :

- Electrolytic grade Copper with more than 100% conductivity which enables to reduce conductor resistance.
- Enhanced flexibility for easy electrification & installation.
- High bending capacity 15 to 20% more bending than existing wire
- Uniform annealing at copper provides more better flexibility.
- Double insulation with Ultra thin Layer provides better insulation resistance value.
- Due to low conductor resistance, current carrying capacity is more.

Technical Data

"HPL SEF-FR" 650/1100V Grade Multi Strand Flexible Annealed Bare Copper FR/FR-LSH/ZHFR/HR PVC Insulated and Unsheathed Single core cable generally conforming to IS:694/1990.

Nominal cross sectional area of the conductor (Sq. mm)	Nos. / nominal dia of strand (Nos./ mm)	Nominal thickness of insulation (mm)	Approx overall dia. (mm)	Max. DC conductor resistance at 20°C (Ω / km)	Current Rating (Amps) 2 wires, single phase #	
					In Conduit/ Trunking	Clipped directly to surface or cable tray
0.75	24/0.2	0.6	2.4	26	7	8
1.0	32/0.2	0.6	2.6	19.5	11	12
1.5	30/0.25	0.6	2.8	13.3	13	16
2.5	50/0.25	0.8	3.6	7.98	18	22
4.0	56/0.3	0.8	4.3	4.95	24	29
6.0	84/0.3	0.8	4.9	3.30	31	37
10	80/0.4	1.0	6.7	1.91	35	42
16	126/0.4	1.0	8.0	1.21	48	57

Note :

- Normal Packing Length - 200 mtrs & 500 Mtrs (on request with Bobbin cost Extra)
- Other tests carried out on our FR-LSH wires are - Flammability test as per IEC-332-1 & 3, IEEE-383, SS-424-175 (Class-F3)
- The Construction of Conductor mentioned in catalogue are only for guidelines as per the International practice which is also adopted by BIS, the size of the Conductor is decided by its resistance only. It may vary within the prescribed limit of IS:8130-1984, with related classes and tables.

Wind Power Cables

Owing to our consistent efforts for quality and providing the best, we have developed exhaustive range of domestic wires and cables suitable to indian homes and varied conditions . Manufactured with best quality of Conductor (100% pure electrolytic grade copper), flexibility, more Elongation and has superior flame retarding properties, finest grade of indigenously developed PVC compound,it can be bent in smaller radius.

HPL Wires & Cables give maximum safety at no extra cost.

Application:

Wind Turbine is especially designed to transfer power in wind turbine installations. It is also recommended as a portable cable for drilling rigs, on-shore or off-shore, railroad and transit car wiring, electric earth-moving equipment, in shipyard applications, arc welder supply leads, power and control jumper cable, and motor leads. The cable is suitable for use in wet or dry areas, conduit, ducts, troughs or trays, and where superior electrical properties are desired. The maximum continuous conductor temperature for normal operation in wet or dry locations is 90°C. Wind Turbine DLO resists oils, acids, alkalines, heat, flame, and has abrasion resistance.

These Cables are used in Wind Energy applications such as rotor blade pitch control, Yaw control, Top box, Anemometer feed back, Remote data logging ect. Construction of Cables shall be as per Customer requirement and conforming to various National/International Standards.

Construction:

Voltage Grade	: 600/1100V
Conductor	: Flexible class-5 bare copper conductors, made to IEC:60228/IS-8130
Range (Single core)	: 10 Sqmm to 300 Sqmm
Insulation	: EPR - in conformance to IEC-60502 /IS-6380
Sheath	: Special elastomer compound with Oil, Fire,Hydrolysis and Torsion Resistant properties. (Zero halogen sheath available on request)

Features

Maximum Conductor Temperature (Continuous)	: + 90° C
Short circuit temperature (max) for up to 5 seconds	: + 250° C
Maximum permissible tensile load on cable	: 15N/mm ²
Minimum bending radius	: 10D

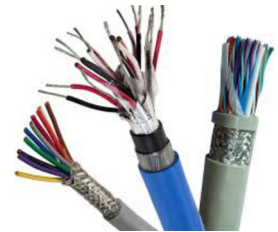


Instrumentation Cables

Instrumentation cables are multiple conductor cables that convey low energy electrical signals used for monitoring or controlling electrical power systems and their associated processes. These cables are used in diverse applications within industrial process manufacturing plant for control, communication, data (analog/digital) and voice transmission signals, industrial signaling and process control circuit required typically in process industries, oil, gas & petrochemical industry, fertilizers, cement, steel etc.

For Instrumentation cables screening

Plays a vital role; the Al-Mylar screen of the Instrumentation cables, designed and manufactured by HPL Cables, captures the external noise pickups. Also, the ATC drain wire earths the noise pickups which would otherwise cause interference in the low



level signals passed between the measuring end and display units. These cables are designed with a minimum overlap of 25% of the shield that ensures 100% coverage even when the cable is flexed. The carefully produced stranded copper conductors used in the cable maintain high system accuracy and sensitivity. Maximum rejection of electro magnetic noise is achieved by twisting the insulated conductors. Twisting causes the noise to be cancelled in adjacent sections of the wire. Instrumentation cables are generally designed & manufactured based on BS EN 50288 (formerly BS:5308), EIL 6-52-46 and generally as per IS 1554-1, IS 7098-1, IEC 60502-1.

General Parameters For Instrumentation Cables

Parameter	Unit	Conductor Area			
		0.5 Sq.mm	0.75 Sq.mm	1.0 Sq.mm	1.5 Sq.mm
Maximum mutual capacitance core to core (PVC insulated)	pF/mtr.	250	250	250	250
Maximum mutual capacitance core to core (PE, XLPE insulated)	pF/mtr.	115	115	115	115
L/R ratio maximum	μH/ohm	25	25	30	40
Electrostatic Noise Rejection Ratio as per IEEE Vol3 (minimum)	dB	76	76	76	76
Minimum Insulation Resistance at 27°C (PVC insulated) at 500V	MΩ/km	25	25	25	25
Minimum Insulation Resistance at 27°C (XLPE/PE insulated) at 500V	MΩ/km	100	100	100	100
High Voltage test	kV	1kV for 1 minute			

Sr. no	Description		2C X 0.50	2C X 0.75	2C X 1.0	2C X 1.5
1	Copper	Annealed flexible Bare Copper Conductor				
	(i) No of wire / size of strands (Approx.)	Nos./mm	16/0.200	24/0.200	32/0.200	30/0.25
	(ii) Conductor Resistance	ohm/km	39.00	26.00	19.50	13.30
2	Insulation	PVC Type - A				
	(i) Insulation Thickness (Nom./Min.)	mm	0.60 / 0.50	0.60 / 0.50	0.60 / 0.50	0.70 / 0.60
	(ii) Insulation Diameter	mm	2.20	2.40	2.55	2.90
3	Overall Shielding					
	(i) Inner Polyester Tape	mm	Applicable	Applicable	Applicable	Applicable
	(ii) Drain Wire ATC	Nos./mm	7/0.30	7/0.30	7/0.30	7/0.30
	(iii) Al-Mylar Tape	mm	Applicable	Applicable	Applicable	Applicable
	(iv) Outer Polyester Tape	mm	Applicable	Applicable	Applicable	Applicable
4	Outer Sheath	PVC ST-1				
	(i) Outer sheath thickness (Nom.)	mm	1.00	1.00	1.10	1.20
	(ii) Overall Diameter (Approx.)	mm	6.60	7.10	7.50	8.40

Fire Alarm Cables

Application:

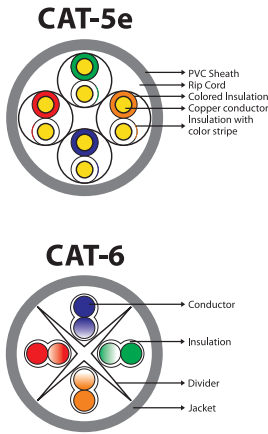
Fire Alarm Circuit Integrity - Conduit System (Nec Article 760), Emergency Systems (Nec Articles 700 And 517) Survivability From Attack By Fire (Must Be Connected To Fire Command Center To Meet Fire Alarm Code & Survivability Requirements.) Suitable for 2-Hour Fire Resistive Uses In Conduit*. Listed For Power-Limited Systems (72V). Suitable for Use In Non-Power Limited Systems (75°C)

Compliance:-

Nec Fplr (UI), 2-Hour Fire Resistive Test UI2196 In Conduit*. Nec Article 760, UI1424 For Power-Limited Fire-Alarm Circuits. Flame Rating UI1666, Nfpa-72. Features/Options: Minimums Apply, Consult Factory. *UL Classified Fire Resistive Cable For Use In Electrical Circuit Protective Systems - System 32. See UI Fire Resistive Directory.

Sr. no.	Description	Unit	2C X 1.0	4C X 1.0	6C X 1.0	8C X 1.0	12C X 1.0
1	Copper		Annealed Solid Bare Copper Conductor	Annealed Solid Bare Copper Conductor	Annealed Solid Bare Copper Conductor	Annealed Solid Bare Copper Conductor	Annealed Solid Bare Copper Conductor
	(i) No of wire / size of strands (Approx.)	Nos./mm	1/1.12	1/1.12	1/1.12	1/1.12	1/1.12
	(ii) Conductor Resistance	ohm/km	18.10	18.10	18.10	18.10	18.10
2	Insulation		HR PVC Type - C	HR PVC Type - C	HR PVC Type - C	HR PVC Type - C	HR PVC Type - C
	(ii) Insulation Thickness (Nom)	mm	0.60	0.60	0.60	0.60	0.60
	(iii) Insulation Diameter	mm	2.40±0.1	2.40±0.1	2.40±0.1	2.40±0.1	2.40±0.1
3	Drain Wire		ATC	ATC	ATC	ATC	ATC
	(i) No of wire / size of strands (Approx.)	Nos./mm	7 / 0.30	7 / 0.30	7 / 0.30	7 / 0.30	7 / 0.30
4	Inner Polyester Tape	mm	Applicable	Applicable	Applicable	Applicable	Applicable
5	APL Tape	mm	Applicable	Applicable	Applicable	Applicable	Applicable
6	Outer Polyester Tape	mm	Applicable	Applicable	Applicable	Applicable	Applicable
7	Outer Sheath		PVC Type ST-1	PVC Type ST-1	PVC Type ST-1	PVC Type ST-1	PVC Type ST-1
	(i) Colour	Visual	Red	Red	Red	Red	Red
	(i) Outer sheath thickness (Nom.)	mm	0.90	0.90	1.00	1.00	1.10
	(iii) Overall Diameter	mm	6.90+0.40	7.90+0.40	9.50+0.50	10.50+0.50	12.45+ 0.80





LAN Cable

LAN cables are used to connect one network device to other network devices or to connect two or more computers to share printer, scanner etc. Different types of network cables like Coaxial cable, Optical fiber cable, Twisted Pair cables are used depending on the network's topology, protocol and size.

- 4-Pair UTP CAT-5e and CAT-6e Cable.
- Solid 100% pure annealed Electrolytic Copper conductor.
- Low attenuation and Cross talk.
- Suitable for Voice, Data and Video.
- 100 Ohm Impedance Cable.

Technical Data Sheet For Lan Cable

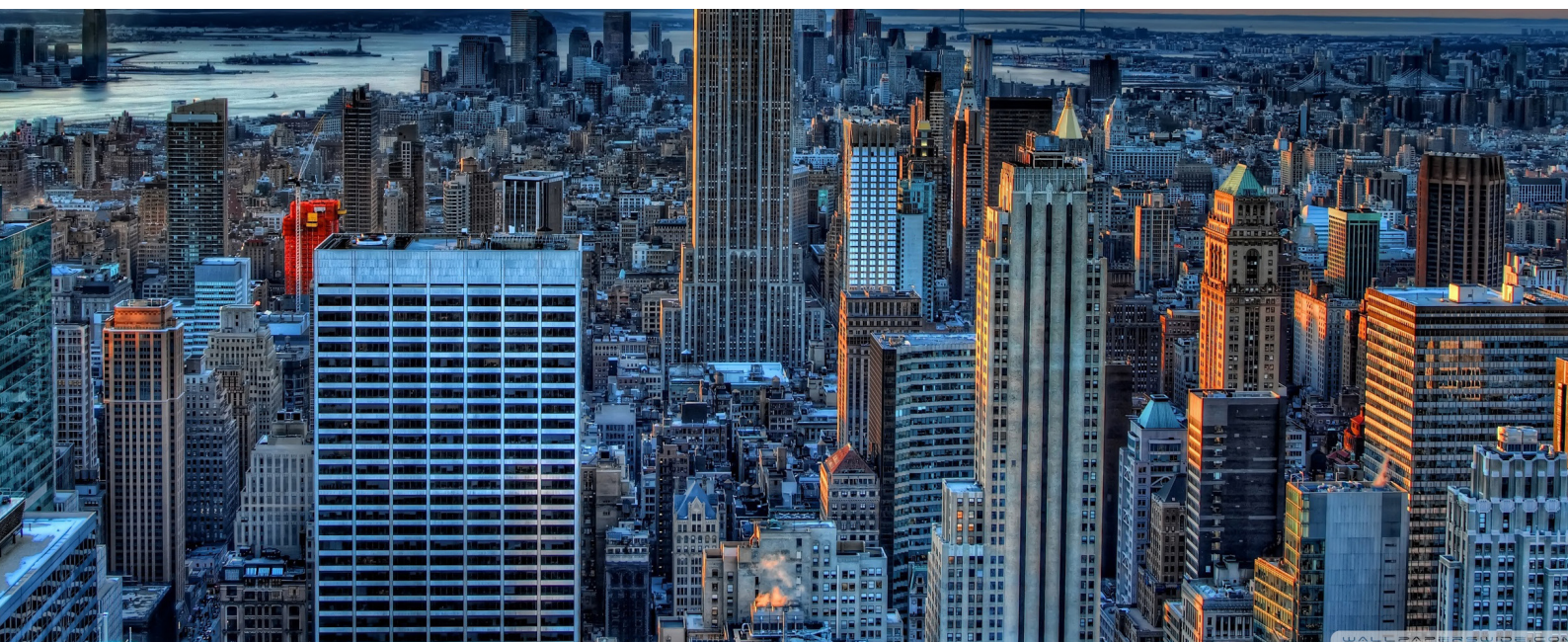
DESCRIPTION		4 Pair (24 AWG) UTP CAT5-E LAN Cable	4 Pair (23 AWG) UTP CAT5-6 LAN Cable						
1	Conductor	24 AWG(Annealed Bare Solid Conductor)	23 AWG (Annealed Bare Solid Conductor)						
2	Insulation	High Density polyethylene	High Density polyethylene						
3	Dielectric Constant	2.31	2.31						
4	Diameter of conductor & Insulation (mm)	Pair 1 : White - Blue	Pair 1 : White - Blue						
		Pair 2 : White - Orange	Pair 2 : White - Orange						
		Pair 3 : White - Green	Pair 3 : White - Green						
		Pair 4 : White - Brown	Pair 4 : White - Brown						
5	Diameter of conductor & Insulation (mm)	Colour	Diameter in mm	Pair Lay in mm	Colour	Diameter in mm	Pair Lay in mm		
			Conductor	Insulation		Conductor	Insulation		
		White	0.495	0.880	10.65	White	0.560	0.980	9.00
		Blue	0.495	0.880		Blue	0.560	0.980	
		White	0.495	0.870	17.30	White	0.560	0.960	15.30
		Orange	0.495	0.870		Orange	0.560	0.960	
		White	0.495	0.880	13.60	White	0.560	0.980	11.20
		Green	0.495	0.880		Green	0.560	0.980	
White	0.495	0.870	15.40	White	0.560	0.960	13.60		
Brown	0.495	0.870		Brown	0.560	0.960			
6	Sheath	Fire Retardant PVC Compound (FR)	Fire Retardant PVC Compound(FR)						
7	Approximate Cable Diameter in mm	5.50	6.50						
8	Minimum Radial Thickness in mm	0.50	0.50						
9	Colour of Sheath	Light Grey	Light Blue						
10	Operating Environment	Indoor	Indoor						
11	Flame Rating	60 deg.C,As per UL 1581 CMX rating	75 deg.C,As per Vertical Tray Flame Test as per UL 1685 CM rating						
Electrical Performance									
	Standard	As per TIA/EIA/568.C.2	As per TIA/EIA/568.C.2						
2	LF Parameters @ 1 KHz								
1	a) Maximum DC. Resistance @ 20°C	9.38 Ohms/100 Mtrs.	9.38 Ohms/100 Mtrs.						
	b) Maximum Resistance Unbalance	5.0%	5.0%						
	c) Mutual Capacitance	5.60 nf/100 Mtrs	5.60 nf/100 Mtrs						
	d) Capacitance Unbalance Pair to Pair	330 Pf/100 Mtrs	330 Pf/100 Mtrs						
3	HF Frequency Parameters	100 MHz	300 MHz						
	a) Characteristic Impedance	100 ± 15 Ohm	100 ± 15 Ohm						
	b) Velocity of Propogation (NVP)	65% Minimum @ 100 MHz	62.10% Minimum @ 250 MHz						
	c) Maximum Delay Skew @ 20°C	45 ns/100 Mtrs (1 MHz to 100 MHz)	45 ns/100 Mtrs (1 MHz to 250 MHz)						
	d) Maximum Propogation Delay @ 20°C	538 ns/100 Mtrs @100 MHz	536 ns/100 Mtrs @ 250 MHz						
Packaging									
		Tangle Free Cable pack in Laminated Corrugated Box							
4	Standard Length	305 Mtrs	305 Mtrs						

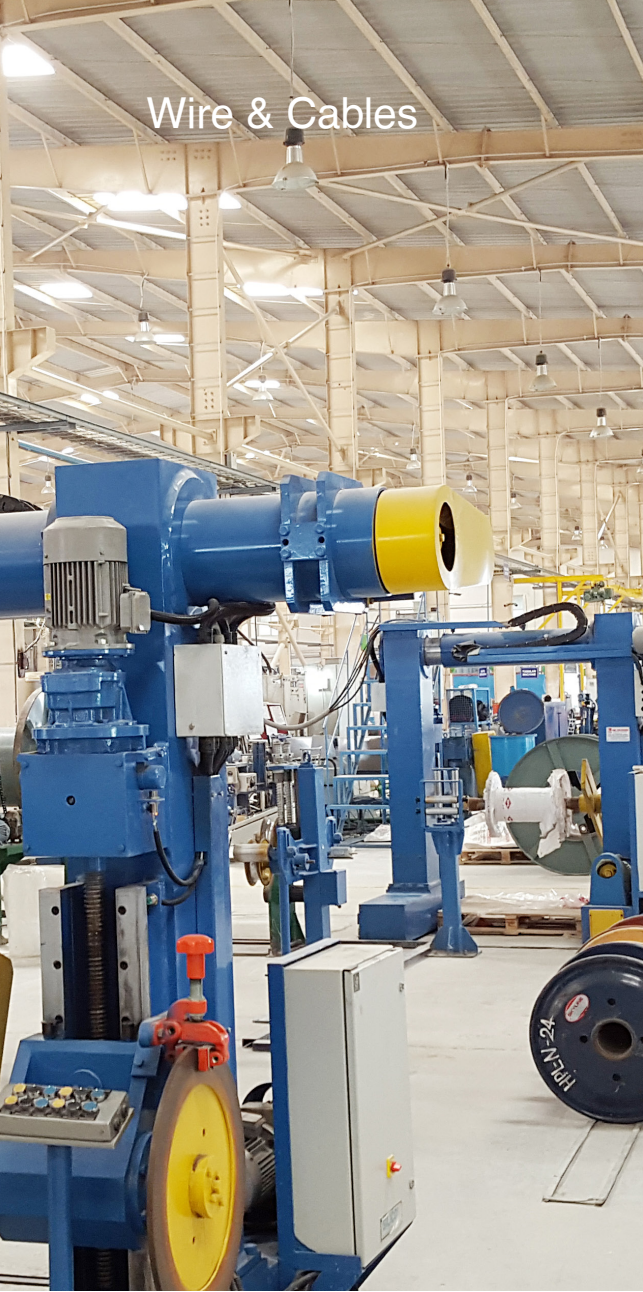
Fire Survival Cables As per BS:60702

Finds applications where electrical integrity of the cable has to remain intact for at least three hour, so as to activate and maintain crucial functions such as fire fighting, public announcements, smoke extraction systems, sprinklers, emergency lighting, evacuation path lighting systems etc.

The areas for fire Survival cable applications include places where large number of people congregate for short or limited period of time such as shopping malls, cinema theaters, educational institutions, airport terminals, mass transit systems (metro rail network), high rise office buildings atc. FR cables also find use in power generation facilities, petrochemical complexes, nuclear power facilities, mines atc. For phased shut down of the plant and to keep critical functions like communication, rescue and evacuation systems functional during a fire.

Fire Survival Cables Voltage Rating	As per BS:60702 500 Volts light Duty, 750 Volts Heavy Duty
Description	Mineral Insulated cable delivers ultimate fire performance. It guarantees data transmission and security of power and control circuits by exceeding the requirements of BS:8519-1 providing circuit integrity to 950°C. It also exceeds enhanced grade requirements defined by BS:5839-2-26.2e- the only universal cable that satisfy all Cat. 1,2 & 3 Power, and all Cat 1,2 & 3 Control requirements defined by BS:8519.
Construction	Solid copper conductor. Compressed magnesium oxide powder insulation. Solid copper sheath and optional thermoplastic LSZH sheath.
Operating Temperature	-10°C to + 250°C
Minimum Bending Radius	6 X Overall Diameter
Core identification	Coloured sleeving available
Lengths	LD - 100/500 mtrs. Special lengths available on request. HD - Cables available in nominal lengths .
Sheath Colour	Red, White or Orange. Other colours available
Manufacturing Standard	BSEN 60702-1 and BS EN 60702-2 Accessories (BS EN 60079)
Code of Practice	BS 5839-1 Clause 26.2e Enhanced BS 5266-- BS 5839 Category 1 & 2 Control For Category 3 and Power Applications see special Notes.
Fire Tests	BS 8434-2 BS EN 50200 PH30,PH60, PH120 BS 6387 CW2
Emissions and Flame Propagation	BSEN 50267 (IEC 60754) Acid Gas Emission BS EN 50268 (IEC 61034) Smoke Emission BS EN 50265,50266 (IEC 60332) Flame Propagation (In its bare copper form there are no emissions)

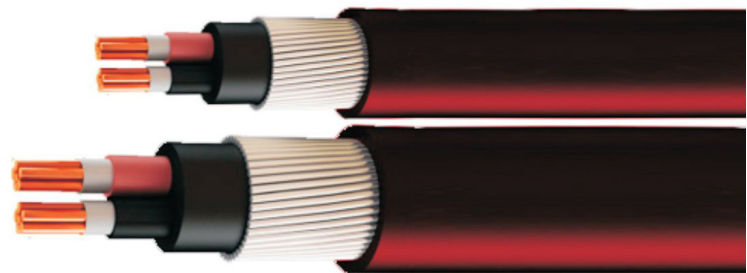




Fire Survival Cables As per BS:7846

Finds applications where electrical integrity of the cable has to remain intact for at least three hour, so as to activate and maintain crucial functions such as fire fighting, public announcements, smoke extraction systems, sprinklers, emergency lighting, evacuation path lighting systems etc.

The areas for fire Survival cable applications include places where large number of people congregate for short or limited period of time such as shopping malls, cinema theaters, educational institutions, airport terminals, mass transit systems (metro rail network), high rise office buildings atc. FR cables also find use in power generation facilities, petrochemical complexes, nuclear power facilities, mines atc. For phased shut down of the plant and to keep critical functions like communication, rescue and evacuation systems functional during a fire.



Fire Survival Cables Voltage Rating	As per BS: 7846 600/1000 Volts
Description	HPL Fire protect Impact Power cables are similar in construction to armoured cables, but provide additional protection to smaller cable sizes to ensure the best possible mechanical protection from a polymeric cable. Designed to meet the application of fire, direct impact and water jet as specified in BS8491, making them suitable for use as 120 minutes rated category 3 power
Construction	Stranded plain annealed copper conductor, Glass mica fire barrier tape. Cross linked polyethylene insulation (XLPE). LSZH bedding, steel wire armouring and LSZH outer sheath.
Operating Temperature	-10°C +90° C
Minimum Bending Radius	6 X overall diameter (8X for cable 25mm A2 and above)
Core identification	2 Core Bn, Be, 3 core Bn, Bk, Gy, 4 Core Bn, Bk, Gy, Be
Lengths	Cut Length on request
Sheath Colour	Black
Manufacturing Standard	BS 7846
Code of Practice	BS 5839- 1 Clause BS 7346, BS 8519 Category 1,2,3 26.2e Enhanced Control and category 1,2,3 Power BS 5266 BS 9999
Fire Tests	BS 8434-2 BS EN 50200 PH30, PH60, PH BS6387 CW2 & BS 8491
Emissions and Flame Propagation	BS EN 50267 (IEC 60754) Acid Gas Emission BS EN 50268 (IEC 61034) Smoke Emission BS EN 50265, 50266 (IEC 60332) Flame Propagation

Speaker Cable:

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°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



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 equipment. 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 characteristic 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			HPL ELECTRIC & POWER PVT. LTD.	HPL ELECTRIC & POWER PVT. LTD.
A. CONDUCTOR		Unit		
(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 Coaxial 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.	40	40
	(c.)No. of wires in each spindle	Nos.	5	5
	(d) Total no of spindle	Nos.	8	8
	(e) Nominal Diameter of Braiding wire	mm	0.112	0.112
	(f) Minimum Coverage	%	60	60
C. Polyester 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. Electrical Parameters				
	(a) Maximum Resistance at 20°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 TRANSMISSIONMTRS				

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Allahabad	Berhampur	Goa	Kanyakumari	Nagerkoil	Sholapur	Vellore
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Angul	Calicut	Jamshedpur	Mangalore	Rourkela	Trivandrum	
Bareilly	Cuttack	Jalandhar	Meerut	Salem	Udaipur	



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