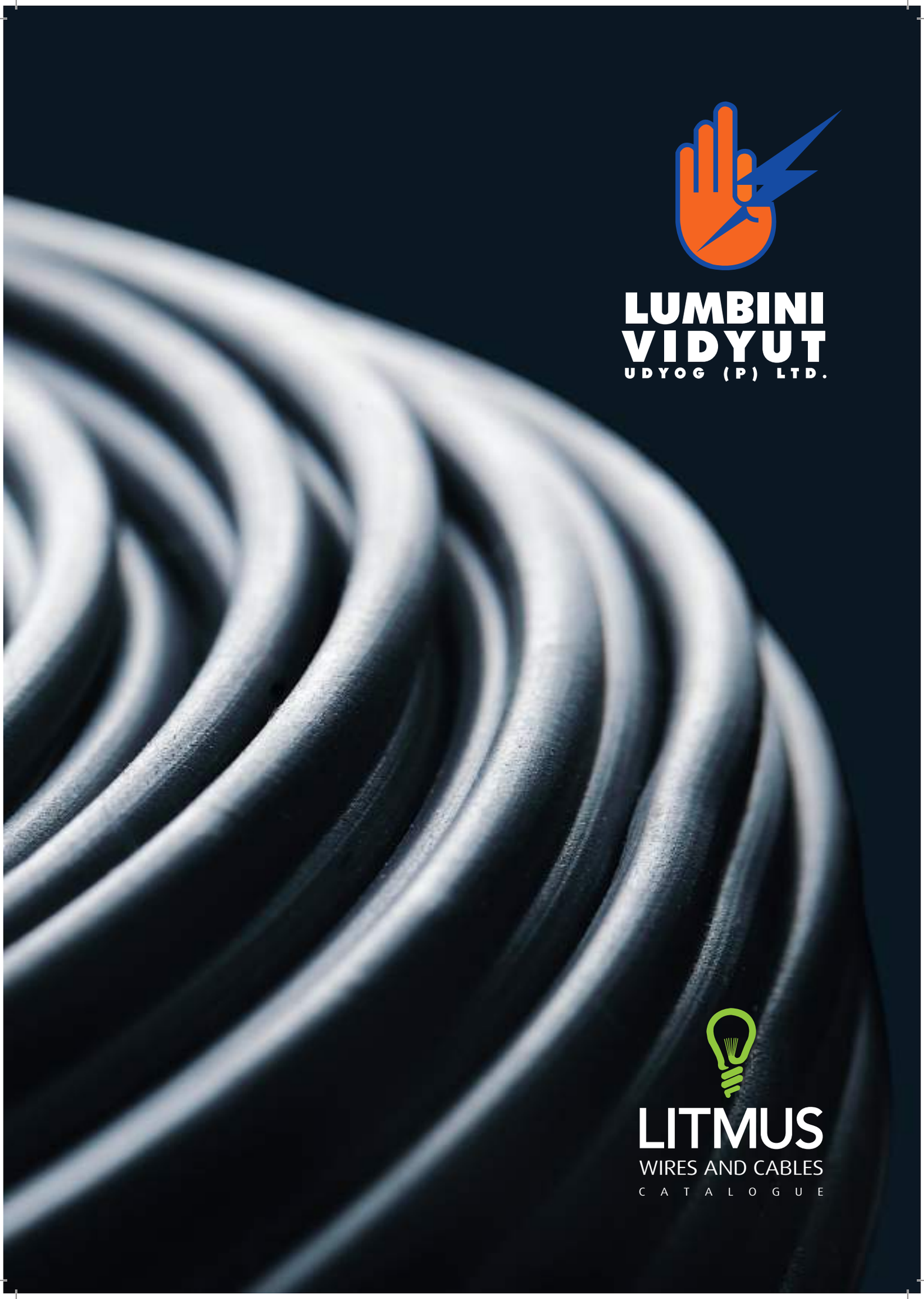


LUMBINI VIDYUT UDYOG (P) LTD.

LITMUS

WIRES AND CABLES

CATALOGUE

LITMUS

CABLES AND CONDUCTORS

LOTUS

ENAMELLED COPPER WINDING WIRES

LUMBINI VIDYUT UDYOG PVT. LTD. was established in 1977 as the first ACSR conductor manufacturing unit in Nepal and in the past four decades, it has expanded its product range in different types of Wires and Conductors. Today, it is one of the prominent and reputed players in the cable industry in Nepal. The company has grown under the umbrella of Lucky Group, one of the biggest private industrial and trading conglomerates in Nepal. The group has diverse businesses ranging from trading and manufacturing of various goods like Vegetable Oil/Ghee to engineering and chemical goods like Cement, PVC and PE Compounds, Masterbatch, PVC Pipes, Casing Capping, Enamelled Wires, Paper Insulated Copper Strips, Conductors and PVC/XLPE Insulated Power and Control Cables.

The company manufactures different sizes of House Wires, Multi-strand Cables, Power Cables with the brand name 'LITMUS' and the Enamelled Copper Winding Wires with the 'LOTUS' brand name. The Company's motto is to give the best products, services and solutions to consumers. It believes in the universal policy that Quality never sleeps.

The company is located at Butwal Industrial Estate, Butwal, Nepal. It wants to provide consumers with the best quality products for which it has a quality control team in place that constantly supervises the products at every step of the production process.

PRODUCT RANGE

DOMESTIC CABLES

HOUSE WIRING CABLES

NS: 344, BS: 6004, IS: 694

- Single Core
- Circular Twins, Three and Four Core
- Flat Twin or Three Core

FLEXIBLE CABLES

BS: 6004, IS: 694

- Multi-strand Flexible Cables
- Parallel or Twisted Twin
- Circular Twin, Three and Four Core
- Flat Twin and Three Core

PVC / XLPE POWER CABLES

BS: 6346, IS: 1554, IS 7098

- Copper Conductor - Armoured & Unarmoured
  (Single core up to 630 mm^2, Multi-core up to 400 mm^2)
- Aluminium Conductor - Armoured & Unarmoured
  (Single core up to 1000 mm^2, Multi-core up to 400 mm^2)

PVC CONTROL CABLES

BS: 6346, IS: 1554

- Copper Conductor - Armoured and Unarmoured
  (Up to 61 core in size 1.5 mm^2, 2.5 mm^2)

OTHER CABLES

- Concentric Cables — **BS: 6346**
- Drop Wires, Jumper Wires — **IEC: 189**
- Flat Cables (for submersible Pumps & Motors) — **IS: 694**

SPECIALITY CABLES

- FRLS Cables (Fire Retardant Low Smoke Cable) — **IS: 694, BS: 6346**
- Anti-Rodent/Anti-Termite Cables
- ZHFR (Zero Halogen Fire Retardant)
- Lead Free Cable
- Auto Cables — **IS: 2465 , BS: 6862**

WIRES

- Stay Wires/Earth Wires/Core Wires — **IS: 2141, IS: 12776, BS: 183**
- Bare Copper Wires — **IS: 8130, ASTM: B49/98**
- Bare Aluminium Wires — **BS: 2627**

OVERHEAD TRANSMISSION AND DISTRIBUTION CONDUCTORS — **BS: 215, NS: 259, IS: 398**

- Aluminium Conductor Steel Reinforced (ACSR) upto 61 Strands for overhead electrical power transmission
- All Aluminium Conductors (AAC) upto 61 Strands for overhead transmission of power
- All Aluminium Alloy Conductors (AAAC) upto 61 Strands for overhead transmission of power
- Ground Wires for Tranmission Line

INSULATED CONDUCTORS — **IS: 398, IS :7098**

AERIAL BUNCHED CABLES (ABC CABLES) — **IS: 14255, BS: 7870** **IEC: 208, IEC: 502**

ENAMEL COPPER WINDING WIRES — **IS: 13730**

PAPER INSULATED WIRES/STRIPS — **IEC: 60317**

SALIENT FEATURES

SOME SALIENT FEATURES OF LITMUS WIRES AND CABLES:

- Made from Quality raw materials.
- ISO 9001: 2008 certified company.
- Winner of the NS Quality Award 2010.
- Caters to the National Standard (NS) and International Standards (IS, BS, IEC).
- Manufacturing experience in the field of conductors and cables for over 3 decades.
- Well equipped machinery to produce 1.5 sq mm to 1000 sq mm power cables.
- Wires and Cables of all sizes available under one roof.
- In-house testing facility with inspection at every stage of the manufacturing process.
- Supervised by highly experienced and trained engineers and professionals.
- Well established packaging and delivery system.
- Quality product and services at competitive pricing.
- Clientele ranging from private to public sector.

QUALITY POLICY

It has always been Lumbini Vidyut Udyog's endeavour to give the best quality product with professional service. The management of Lumbini Vidyut Udyog Pvt. Ltd.is committed to produce and supply the best Electrical Cables and Conductors for customer satisfaction, safety and durability.

The Management has achieved this through:

- Implementing a Quality Management System as per ISO 9001: 2008.
- Effective utilization of available resources.
- Continuous training and appraisal of employees.
- Continuous improvement in the Quality Management System.

OUR CABLES ARE CERTIFIED UNDER

नेपाल गुणस्तर प्रमाण चिन्ह
ने गु. ३४४

IS:1554 (Part - I)

IS:694

JAS-ANZ
ISO 9001:2008

QUALITY OBJECTIVE

The Company has established quality measures at every level of the organization. The Quality measures are as follows:

- Establishing an effective system to reduce wastage and cost of products and increasing the productivity of the organization.
- Innovating new products as per the changing market needs.
- Standardizing raw materials and manufactured products.
- Ensuring improved process control, appropriate maintenance and optimum use of machinery and equipments.
- Maintaining efficiency and duly calibrated monitoring and measuring equipments.
- Achieving superior product quality.
- Creating company work culture in order to elevate staff morale, dedication and loyalty.
- Achieving customer satisfaction, reliability and ensuring drop-in customer complaints.

PRODUCTION PROCESS

The production process is the heart of the LITMUS branded wires and cables. Each step in the production process is considered to be a proper resource utilization and energy conservation step. Cable properties such as Conductivity, Tensile strength, Elongation, Insulation thickness, Insulation resistance, Continuity, Mass, Shape and Size of conductors are taken care of by the production and laboratory supervisors at every step of the production process.

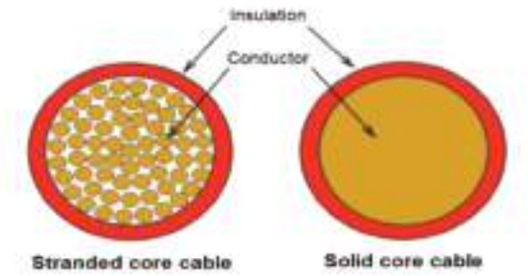
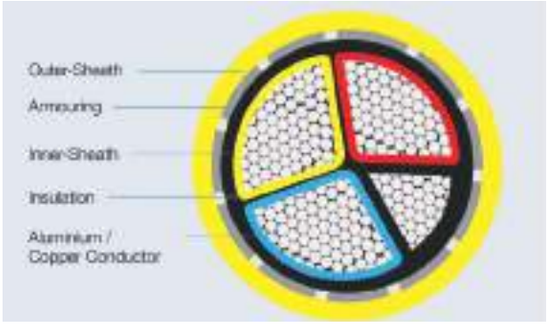
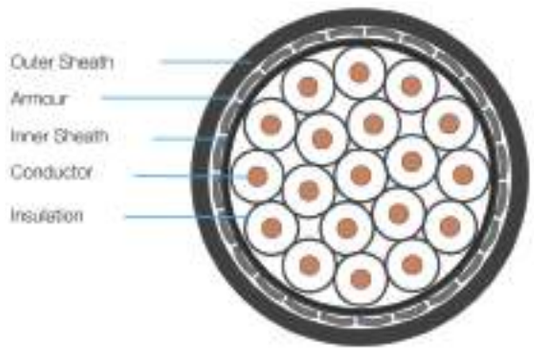
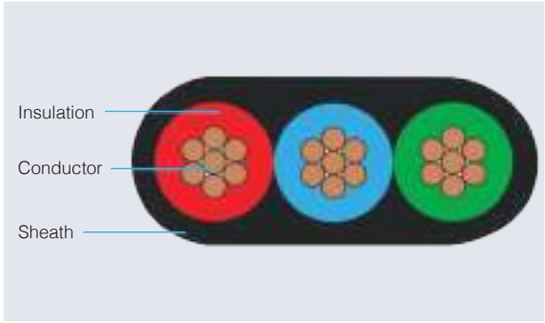
QUALITY ASSURANCE

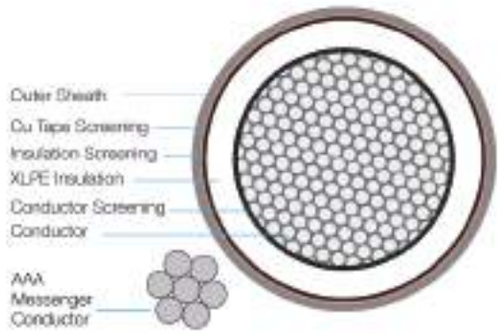
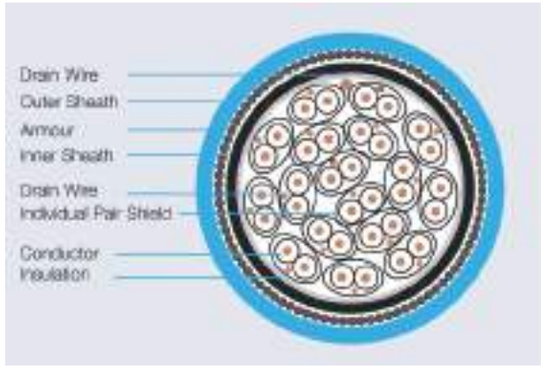
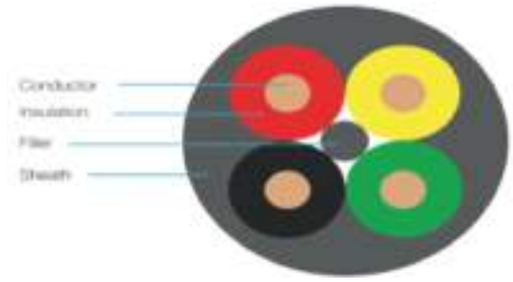
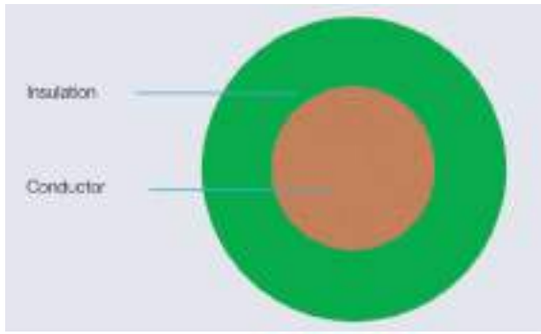
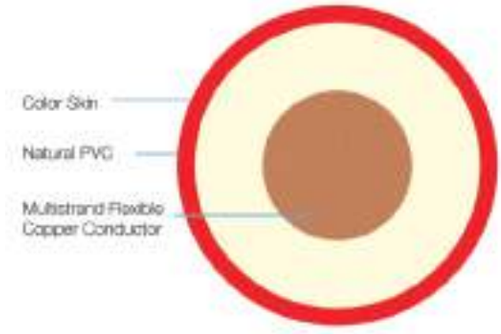
The Quality Control Department is equipped with impeccable quality control team that keeps a close eye on every aspect of the production process. The Routine Test is carried out for manufacturing process assurance. Type Test is carried out in sampling basis for each lot of the production process to confirm the relevant specification. Acceptance Test is done in the company laboratory as per customer demand. The final product is issued with a Test Certificate conforming to the relevant standard.

PACKING

The cable is marked with the brand name and size of the cable on insulation/ sheath after every one meter. Then the wire/cable is coiled and wrapped. The domestic wire/cable is marked with the packing details on the coil; however, the industrial cable is packed in non-returnable wooden drum.

CABLE RANGES AT A GLANCE

APPLICATION	TYPE & SIZE	OPTIONS	CROSS SELECTION VIEW
Cables for power supply to Residential, Commercial building for Internal Wiring	Domestic Cables for Household, Residential and Commercial Buildings **Sizes : Single Core, Circular Twins, Three Core, Four Core, Flat Twin or Three Core**	**Conductors** Stranded/Solid Circular/Shaped Copper **Insulation** PVC/FRLS	
Cables for Power Supply to Residential, Commercial and Industrial units	PVC/XLPE Power cables for 1.1kv for Electrical Substations as per IS:1554 **Sizes : For Aluminium Single Core up to 1000 sq. mm Multi-core up to 400 sq. mm Sizes: For Copper Single Core up to 630 sq. mm Multicore up to 400 sq. mm**	**Conductor** Stranded/Solid Circular/Shaped Aluminium/Copper **Insulation** - PVC **Inner Sheath** PVC/FRLS/PVC **Unarmoured/Armoured** G.S. Round Wire/ Flat Strip or Aluminum Wire/Flat Strip **Outer Sheath** PVC/FRLS PVC	
Copper Control Cables for Power Switch Yard Control/Relay Equipment	Annealed electrolytic copper conductor, PVC/XLPE insulated, PVC sheathed 650/1100V grade as per IS:1554-I and IS: 7098-I **Sizes : 1.5/2.5 sq. mm upto 61 core 4 & 6 Sq. mm up to 4 core**	**Conductor -** Solid/ Stranded, Plain, Tinned **Insulation** - PVC/HR PVC/XLPE **Innersheath** - PVC/HR PVC/FRLS/Zero Halogen Unarmoured/ Armoured - G.S. Round Wire/ Flat Strip **Outersheath** - PVC/HR PVC/FRLS/Zero Halogen Aluminium mylar tape with 100% coverage & 25% overlap on laid up cores for static noise rejection.	
Flat cables for Submersible Pumps & Motors	Stranded Plain copper, PVC insulated & PVC sheathed of 1.1kv grade as per IS: 694 Sizes : 3 core - 1.5 to 50 sq. mm	**Insulation** PVC/HR PVC **Sheathing** PVC/HR PVC	

APPLICATION	TYPE & SIZE	OPTIONS	CROSS SELECTION VIEW
Aerial Bunched/Bundled required for over head power distribution	PE/XLPE insulated 1.1kv as per IS:14255 & IS:7098-II	Conductor - Stranded Circular compacted Aluminium **Insulation** - PE/XLPE **Messenger Conductor** All Aluminium Alloy-Bare/Insulated **Street Light Cond.** Stranded Circular Compacted Aluminium, Bare/Insulated	
Instrumentation Signal Cables for Process Control and Instrumentation	PVC Sheathed 225 /650/1100 V grade cables as per BS: 5308/DIN VDE 0815 & 816/IS: 1554/ IEC: 189 **Sizes: 0.5/0.75/1.0/1.5 sq. mm**	**Conductor** - Stranded/ Solid, plain/tinned **Insulation** - PVC/ HR PVC/P.E/Zero Halogen **Shielding** - Individual pairs/over all pairs **Drain wire** Solid/Stranded **Innersheath** PVC/HR PVC **Zero Halogen Unarmoured/Armoured - G.S. Round** Wire, Flat Strip Outersheath - PVC/HR PVC/FRLS/ Zero Halogen	
Flexible & Cord Cables for Appliances, Machine Tools & Equipment Wiring	Multi-strand, Flexible, Bright Annealed Electrolytic Copper Conductor, PVC insulated and sheathed upto 1100V as per IS:694 **Sizes : Single, Two, Three or Four core upto 25 sq. mm**	Insulation - PVC/HR PVC/FRLS/ Zero Halogen Unsheathed/Sheathed - PVC/HR PVC/ FRLS/Zero Halogen	
Wiring Cables for electrical industry	Multi-strand Flexible, upto 1100V grade PVC Cables as per IS: 694 **Sizes : Single core 1.0 - 630 sq. mm**	Conductor - Bright Annealed Copper Insulation - PVC/HR PVC/FRLS PVC/ Zero Halogen	
Energy Cables for Power Supply to Telephone Exchanges/UPS/ Battery Backup/ Equipments	PVC Flexible Cables for 1.1kv graded as per IS: 694 **Sizes : 1.0 upto 240 Sq. mm**	**Conductor** Stranded/Solid bright annealed Copper **Insulation** PVC/HR PVC/FRLS/ Zero Halogen	

DOMESTIC CABLES

Table 1 : Single core PVC insulated Multi-strand Copper Conductor Cables for House Wiring Voltage Grade 650/1100 V

SIZE	NUMBER OF WIRES AND DIA OF WIRES	MINIMUM THICKNESS OF INSULATION	CONDUCTOR RESISTANCE AT 20° C PER KM (MAX)	CURRENT RATING
SQ MM	MM	MM	OHM	AMP
(1/18)	1/1.12	0.70	17.58	12
(3/22)	3/0.711	0.70	13.76	14
(3/20)	3/0.914	0.70	8.927	16
(7/22	7/0.711	0.80	5.879	22
(7/20)	7/0.914	0.80	3.815	29
(7/18)	7/1.12	0.80	2.555	37
(7/16)	7/1.63	1.0	1.207	68

Confirming Standard: NS 344 /2052 | Packing: Coil / Bags | Color: Red, Yellow, White, Blue, Green, Black | Conductor: Copper
* Outer Dia is for Conduit & Trunk guidance only.

Table 2 : Single core PVC insulated Multi-strand Copper Conductor Cables for Flexible Wiring Voltage Grade 650/1100 V

NOMINAL CS AREA OF CONDUCTOR	NUMBER OF WIRES AND DIA OF WIRES	NOMINAL THICKNESS OF INSULATION	CURRENT CARRYING CAPACITY IN CONDUIT/ TRUNKING	2 CABLES SINGLE Ø UNENCLOSED CLIPPED DIRECTLY TO A SURFACE OR ON CABLE TRAYS	CONDUCTOR RESISTANCE OHM/KM (MAX)
SQ MM	MM	MM	AMPS	AMPS	AT 20° C
1.0	14/0.3	0.70	11	12	18.10
1.5	21/0.30	0.70	13	16	12.10
2.5	36/0.30	0.80	18	22	7.41
4.0	56/0.3	0.80	24	29	4.95
6.0	85/0.3	0.80	31	37	3.30
10	80/0.4	1.00	42	51	1.91
16	126/0.4	1.00	57	68	1.21
25	196/0.4	1.20	71	86	0.780
35	276/0.4	1.20	91	110	0.554
50	396/0.4	1.40	120	145	0.386

Confirming Standard: IS 694/2009 | Packing: Coil / Bags | Color: Red, Yellow, White, Blue, Green, Black | Conductor: Copper
* Outer Dia is for Conduit & Trunk guidance only.

Table 3 : Multi-core Round Flexible PVC insulated Copper Conductor & Sheathed Cables for Flexible Wiring in Voltage Grade 650/1100 V

NOMINAL CS AREA OF CONDUCTOR	NUMBER/ NOM.DIA OF WIRES	THICKNESS OF INSULATION (NOM)	NOMINAL THICKNESS OF SHEATH				CURRENT RATING AC	VOLTAGE DROP		RESISTANCE MAX PER KM @200C
			TWIN CORE	THREE CORE	FOUR CORE	FIVE CORE		D/C 1 Ø AC	3 Ø AC	
MM	SQ. MM	MM	MM	MM	MM	MM	AMPS	MV	MV	OHMS
0.5	7 / 0.30	0.6	0.9	0.9	0.9	0.9	4	83	72	39.0
0.75	10 / 0.30	0.6	0.9	0.9	0.9	0.9	7	56	48	26.0
1.0	14 / 0.30	0.6	0.9	0.9	0.9	1.0	11	43	37	19.5
1.5	21 / 0.30	0.6	0.9	0.9	1.0	1.0	15	31	26	13.3
2.5	36 / 0.30	0.7	1.0	1.0	1.0	1.0	20	18	16	7.98
4.0	56 / 0.30	0.8	1.0	1.0	1.0	1.0	26	11	9.6	4.95

Confirming Standard: IS 694/2009 | Packing: Wooden Drum/ Coil| Color: White & Black | Conductor: Copper
* Outer Dia is for Conduit & Trunk guidance only.

POWER CABLES

Table 4: Current Ratings for PVC Insulated & PVC Sheathed (Unarmoured & Armoured) Power Cables Volt Grade 650/1100 V

SIZE	CORE	OUTER DIAMETER		CURRENT RATINGS			
		UNARMOURED	ARMOURED	ALUMINIUM		COPPER	
				IN GROUND	IN AIR	IN GROUND	IN AIR
SQ. MM		MM	MM	AMPS	AMPS	AMPS	AMPS
1.5	1	6.8	9.4	21	18	25	22
	2	11.0	12.2	18	16	23	20
	3	11.2	12.3	16	13	21	17
	4	11.4	13.1	16	13	21	17
2.5	1	7.5	10.0	28	25	35	30
	2	13.8	15.5	25	21	32	27
	3	14.4	14.6	21	18	27	24
	4	14.5	14.6	21	18	27	24
4	1	8.2	10.8	31	27	39	35
	2	15.5	15.8	32	27	41	35
	3	16.0	16.2	28	23	36	30
	4	14.5	16.2	28	23	36	30
6	1	8.8	11.4	39	35	49	44
	2	16.5	17.0	40	35	50	45
	3	17.5	17.7	35	30	45	39
	4	15.7	16.8	35	30	45	39
10	1	9.8	12.4	51	47	65	60
	2	18.4	19.2	55	47	70	60
	3	18.5	18.9	46	40	60	52
	4	17.7	18.5	46	40	60	52
16	1	10.7	13.3	66	64	85	82
	2	20.5	21.2	70	59	90	78
	3	21.5	21.5	60	51	77	66
	4	20.0	20.8	60	51	77	66
25	1	12.8	15.3	86	84	110	110
	2	21.8	22.2	86	75	115	105
	3	22.8	23.0	76	70	99	90
	3.5	23.1	23.5	76	70	99	90
	4	24.1	24.5	76	70	99	90
35	1	13.6	16.2	100	105	130	130
	2	23.5	24.0	110	99	140	125
	3	25.0	25.4	92	86	120	110
	3.5	25.0	25.4	92	86	120	110
	4	26.6	27.1	92	86	120	110
50	1	15.5	18.0	120	130	155	165
	2	25.0	25.8	135	125	165	155
	3	27.5	28.6	110	105	145	135
	3.5	29.0	29.7	110	105	145	135
	4	30.7	31.5	110	105	145	135

70	1	17.7	20.6	140	155	190	205
	2	30.2	30.5	160	150	205	195
	3	32.0	32.5	135	130	175	165
	3.5	32.8	33.6	135	130	175	165
	4	34.7	35.2	135	130	175	165
95	1	19.9	22.4	175	190	220	245
	2	32.8	33.2	190	185	240	230
	3	35.5	36.5	165	155	210	200
	3.5	37.4	37.7	165	155	210	200
	4	39.5	40.3	165	155	210	200
120	1	21.5	24.0	195	220	250	280
	2	36.5	37.5	210	210	275	265
	3	39.0	39.5	185	180	240	230
	3.5	40.7	41.4	185	180	240	230
	4	42.8	43.7	185	180	240	230
150	1	23.4	25.9	220	250	280	320
	2	38.2	38.8	240	240	310	305
	3	43.0	43.8	210	205	270	265
	3.5	44.6	45.2	210	205	270	265
	4	47.8	48.5	210	205	270	265
185	1	25.7	28.6	240	290	305	370
	2	40.5	40.8	275	275	350	350
	3	46.5	48.3	235	240	305	300
	3.5	49.8	50.3	235	240	300	305
	4	52.4	53.5	235	240	300	305
240	1	28.8	32.1	270	335	345	425
	2	45.0	46.0	320	325	405	410
	3	52.0	54.2	275	280	345	355
	3.5	55.8	56.2	275	280	345	355
	4	59.2	60.2	275	280	345	355
300	1	31.8	35.0	295	380	375	475
	2	49.0	49.5	355	365	450	465
	3	57.5	60.1	305	315	385	400
	3.5	62.1	62.4	305	315	385	400
	4	65.9	66.6	305	315	385	400
400	1	35.4	39.1	325	435	400	550
	2	56.0	57.5	385	420	490	530
	3	65.0	68.1	335	375	425	455
	3.5	70.3	71.5	335	375	425	455
	4	74.6	75.6	335	375	425	455
500	1	40.2	44.3	345	480	425	590
630	1	44.7	49.9	390	550	470	660
800	1	49.0	54.8	440	600	530	725
1000	1	53.8	59.9	490	720	590	870

Confirming Standard: BS 6346, IS 1554 Packing: Wooden Drum Insulation: PVC Conductor: Aluminium / Copper (Armoured / Unarmoured) * Outer Dia is for Conduit & Trunk guidance only.

XLPE CABLES

Table 5 : XLPE Insulated PVC Sheathed Power Cables

SIZE	CORE	OVER ALL DIAMETER		CURRENT RATING			
		UNARMOURED	ARMOURED	ALUMINIUM		COPPER	
				IN GROUND	IN AIR	IN GROUND	IN AIR
SQMM	NUMBER	MM	MM	AMP	AMP	AMP	AMP
1.5	1	6.4	8.7	22	19	26	23
	2	9.4	11.1	20	18	25	22
	3	9.8	11.5	18	15	21	17
	4	10.5	12.2	18	15	21	17
2.5	1	6.8	9.1	28	25	35	30
	2	10.2	11.9	26	22	32	27
	3	10.7	12.3	23	20	27	24
	4	11.5	13.1	23	20	27	24
4	1	7.2	9.5	36	31	47	42
	2	11.1	12.8	40	34	51	44
	3	11.6	13.3	34	31	43	36
	4	12.5	14.2	34	31	43	36
6	1	8.2	10.5	44	31	59	53
	2	13.4	15.0	50	39	63	56
	3	14.0	15.7	43	44	54	47
	4	15.3	15.8	43	50	54	47
10	1	9.1	11.3	59	53	78	72
	2	15.1	16.8	69	59	88	75
	3	15.9	17.0	57	67	72	62
	4	17.4	18.2	57	67	72	62
16	1	10.1	12.4	76	73	102	98
	2	16.2	18.0	88	74	113	98
	3	18.2	18.5	73	70	92	79
	4	19.0	20.0	73	70	92	79
25	1	11.8	14.1	96	98	132	132
	2	17.0	18.5	112	98	144	131
	3	20.0	20.5	94	96	119	108
	3.5	21.0	22.8	94	96	119	108
	4	22.0	23.4	94	96	119	108
35	1	12.9	15.2	114	121	156	156
	2	19.0	20.0	138	124	175	150
	3	21.5	23.0	113	117	144	132
	3.5	22.8	25.0	113	117	144	132
	4	23.5	26.0	113	117	144	132
50	1	14.6	16.9	135	150	186	198
	2	21.0	22.5	169	156	206	194
	3	24.5	25.5	133	142	174	162
	3.5	25.0	27.0	133	142	174	162
	4	27.9	29.5	133	142	174	162

	1	16.6	18.9	166	187	228	246
	2	23.0	25.5	200	188	256	244
70	3	29.0	30.0	164	179	210	198
	3.5	28.2	30.0	164	179	210	198
	4	30.5	33.8	64	79	210	198
	1	18.3	21.3	198	230	264	294
	2	26.5	28.0	238	231	300	288
95	3	32.5	33.5	196	221	252	240
	3.5	32.0	33.8	196	221	252	240
	4	33.5	37.6	196	221	252	240
	1	20.2	23.2	225	268	300	336
	2	28.5	30.5	262	262	344	331
120	3	34.5	35.5	223	257	288	276
	3.5	35.4	37.0	223	257	288	276
	4	37.5	40.5	223	257	288	276
	1	22.5	25.1	253	309	336	384
	2	32.0	34.0	300	300	388	381
150	3	38.5	40.5	249	292	324	318
	3.5	41.0	42.0	249	292	324	318
	4	42.2	43.5	249	292	324	318
	1	24.7	27.3	286	360	366	444
	2	35.5	37.0	344	344	438	438
185	3	43.5	44.5	282	337	360	366
	3.5	46.5	47.5	282	337	360	366
	4	48.0	49.2	282	337	360	366
	1	27.4	30.3	332	433	414	510
	2	39.5	41.0	400	406	506	512
240	3	48.5	49.0	326	399	414	426
	3.5	52.5	53.5	326	399	414	426
	4	54.0	55.8	326	399	414	426
	1	30.1	33.8	376	501	450	570
	2	43.5	45.5	444	456	562	581
300	3	51.5	53.0	367	455	462	480
	3.5	56.0	57.0	367	455	462	480
	4	58.0	59.5	367	455	462	480
	1	34.1	37.6	431	596	480	660
	2	49.0	51.0	481	525	612	662
400	3	59.5	59.8	420	530	510	546
	3.5	64.0	65.0	420	530	510	546
	4	66.5	68.0	420	530	510	546
500	1	38.1	42.4				
630	1	42.2	47.4				
800	1	46.7	52.7				
1000	1	52.1	58.0				

Confirming Standard: BS 6346, IS 1554 Packing: Wooden Drum Insulation: PVC Conductor: Aluminium / Copper (Armoured / Unarmoured) * Outer Dia is for Conduit & Trunk guidance only.

CONTROL CABLES

Table 13: LITMUS PVC insulated Armoured and Unarmoured Control Cable with Copper Conductor

SIZE	CORES	MAX. OUTER DIA.		MAX DC RESISTANCE AT 200 C	CURRENT RATING		
		UNARM	ARM		DIRECT IN GROUND	IN DUCT	LAID IN AIR
SQ MM		MM	MM	OHM/KM	AMPS	AMPS	AMPS
1.5	2	11.7	13.6	12.1	23	20	20
	3	12.3	14.1	12.1	21	17	17
	4	13.1	14.9	12.1	21	17	17
	5	14.3	16.1	12.1	21	17	17
	6	15.3	17.1	12.1	15	13	13
	7	15.3	17.1	12.1	14	13	13
	10	18.6	20.8	12.1	13	11	11
	12	19.2	19.8	12.1	12	10	10
	14	20	21	12.1	11	10	10
	16	21	22	12.1	11	9	9
	19	22.4	23.2	12.1	10	9	9
	24	25.8	26.4	12.1	9	8	8
	27	26.2	26.9	12.1	9	8	8
	30	27.2	27.8	12.1	9	7	7
	37	29.1	29.7	12.1	8	7	7
	44	32.3	33.4	12.1	7	6	6
	52	34	35	12.1	7	6	6
	61	36.3	36.9	12.1	6	6	6
2.5	2	12.8	15	7.41	32	27	27
	3	13.7	15.5	7.41	27	24	24
	4	14.7	16.5	7.41	27	24	24
	5	16	18	7.41	27	24	24
	6	17	19	7.41	21	18	18
	7	17	19	7.41	20	17	17
	10	21.1	23.8	7.41	18	15	15
	12	20.3	22.8	7.41	17	14	14
	14	23.2	23.9	7.41	16	13	13
	16	24.4	25	7.41	15	12	12
	19	25.7	26.3	7.41	14	12	12
	24	29.7	30.3	7.41	13	11	11
	27	30.3	30.9	7.41	12	10	10
	30	31.3	32.3	7.41	12	10	10
	37	34.2	34.9	7.41	11	9	9
	44	38.2	38.9	7.41	10	9	9
	52	39.9	40.3	7.41	10	8	8
	61	41.9	42.5	7.41	9	8	8

Confirming Standard: BS 6346, IS 1554 Packing: Wooden Drum Insulation: PVC
Conductor: Aluminium / Copper (Armoured / Unarmoured) * Outer Dia is for Conduit & Trunk guidance only.

POWER CABLES

XLPE CABLES

CONTROL CABLES

SPECIALITY CABLES

FLAME RETARDANT LOW SMOKE CABLES (FRLS)

Traditionally cables like House Wiring Cables, Power Cables and Control Cables are jacketed with PVC. Although PVC is almost immune to fire, it can be hazardous in a high temperature environment when exposed to fire from an external source. To cater to such needs and changing dynamics of infrastructure, we have developed a new range of FRLS Cables. These cables are made from special PVC, FRLS compound which restricts the spread of flames and ensures low smoke emission as compared to ordinary cables.

The FRLS compound has the following special properties :

- High resistance to ignition.
- High resistance to flame propagation.
- Low smoke emission.
- Low emission of acid fume.
- High critical oxygen index, which is much greater than general purpose PVC.

ANTI-TERMITE/ANTI-RODENT CABLES

Anti-Termite/Anti-Rodent Cables are used mainly for the areas where the presence of termites and rats are high. It is used for mains, sub-mains and sub-circuits which are unenclosed, enclosed in conduit, buried directly or for underground ducts for buildings and industrial plants which are not subjected to mechanical damage. On special requirements of customers, Lumbini Vidyut Udyog manufactures these special cables.

AUTO CABLES

Table 14 : LITMUS AUTO CABLES

AS PER BS: 6862				AS PER IS: 2465			
COND. SIZE MM	COND. AREA SQ. MM	CURRENT RATING AMP	OVERALL DIAMETER AMP	COND. SIZE MM	COND. AREA SQ. MM	CURRENT RATING AMP	OVERALL DIAMETER MM
7/0.3 (2mm)	0.5	4	2.1	10/0.30	0.7	6	2.5
9/0.3 (3mm)	0.6	6	2.5	15/0.30	1.0	11	2.7
14/0.3 (4mm)	1.0	11	2.7	22/0.30	1.5	15	3.0
28/0.5 (5mm)	2.0	17	3.4	29/0.30	2.0	17	3.2
35/0.3 (6mm)	2.5	19	3.8	36/0.30	2.5	19	3.4
44/0.3 (7mm)	3.0	22	4.2	57/0.30	4.0	26	4.8
65/0.3 (8mm)	4.5	28	5.1	85/0.30	6.0	34	5.6

* Outer Dia is for Conduit & Trunk guidance only.

WIRES

BARE COPPER WIRE (EITHER HARD OR ANNEALED)

- **Earthing Wires**: Bare Copper Wires such as SWG 8 to SWG 22 are used for Earthing.
- **Grounding Wires**: Are the Stranded Copper Wire ranging from 25 sq mm to 300 sq mm that are used as Grounding or Earthing conductor.
- **Bare Annealed Copper Wire** ranging from 0.15 sq mm to 7.5 sq mm is used for manufacturing Cables & Enamel Wire.

BARE ALUMINIUM WIRES

- Are hard drawn wires used in Binding of ACSR Conductors.

CONTINUOUS CURRENT RATINGS

The current ratings given in Tables (1 to 17) are based on the following conditions of laying:

Maximum Conductor Temperature Cables	: 70 degree C for General Purpose PVC insulated cables
	: 85 degree C for Heat Resisting PVC insulated cables
	: 90 degree C for XLPE insulacables
Ground temperature	: 30 degree C
Ambient air temperature	: 40 degree C
Thermal resistivity of Soil	: 150 (cm degree C) / W
Depth of laying (For cable laid direct in ground and duct)	: 750 mm
Type of installation	
Twin, Three & Multi-core Cable	: Laid singly
Single-core cable	: 3 cables in close Trefoil Formation

RATINGS FACTORS

In actual practice, the conditions in which the installation takes place may be different from those given above. Therefore to determine the continuous current rating under the actual operating conditions, the current rating should be multiplied by the appropriate rating factors as shown below.

Variation in Ambient Air Temperature								
Ambient Temperature (°C)	25	30	35	40	45	50		
Rating Factor	1.25	1.16	1.09	1.00	0.90	0.80		
Variation in Ground Temperature								
Ground Temperature (°C)	15	20	25	30	35	40	45	50
Rating Factor	1.17	1.12	1.06	1.00	0.94	0.87	0.79	0.71
Variation in Depth of Laying in Ground								
Voltage Depth of Laying cm	75	90	105	120	150	180 & above		
Grade Upto 25mm2	1.00	0.99	0.98	0.97	0.96	0.95		
1.1kv Above 25 & upto 300 m2	1.00	0.98	0.97	0.96	0.94	0.93		
Above 300mm2	1.00	0.97	0.96	0.95	0.92	0.91		

Note: The Rating Factor for other different variation can be made available to our customers on request.

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SHORT CIRCUIT RATINGS

$Ish = KA/\sqrt{t}$

Where,

Ish = Short circuit Current in kilo amps during time t.
A = Cross sectional area of conductor in sq mm
t = Duration of short circuit in seconds
K = Constant

For PVC insulated cables for Aluminium, K = 75.8 and for Copper K = 109.
For XLPE insulated cables for Aluminium, K = 94 and for Copper K = 144.

Note: The detailed Short Circuit Ratings are available on request.

SELECTION OF DISTRIBUTION SYSTEM

FORMULA FOR ELECTRICAL CALCULATION

To Calculate	Given	D.C	A.C. Single Phase	A.C. Phase
Current (A)	KW	$A = \frac{1000 \times KW}{V}$	$A = \frac{1000 \times KW}{V \times Pf}$	$A = \frac{1000 \times KW}{1.73 \times V \times Pf}$
Current (A)	KVA	-	$A = \frac{1000 \times KVA}{V}$	$A = \frac{1000 \times KVA}{1.73 \times V}$
Current (A)	hp	$A = \frac{746 \times hp}{V \times eff}$	$A = \frac{746 \times hp}{V \times eff \times pf}$	$A = \frac{746 \times hp}{1.73 \times V \times eff \times pf}$
Power (Kw)	VA	$KW = \frac{A \times V}{1000}$	$KW = \frac{A \times V \times pf}{1000}$	$KW = \frac{1.73 \times A \times V \times pf}{1000}$
Apparent Power (KVA)	VA	-	$KW = \frac{A \times V}{1000}$	$KW = \frac{1.73 \times A \times V}{1000}$

Pf = Power factor of equipment or system under consideration
Eff = Efficiency of motor or machinery
V = Line Voltage

OVERHEAD VERSUS UNDERGROUND SYSTEM

UNDERGROUND SYSTEM	OVERHEAD SYSTEM
1. Public Safety: This system is more safe because wiring is placed underground.	1. Public Safety: This system is less safer because wiring is placed overhead.
2. Initial Cost: The initial cost is five to ten times more because of trenching, conduits, cables etc.	2. Initial Cost: The initial cost is lower than underground system.
3. Flexibility: The underground system can't be easily shifted and is not flexible than overhead system.	3. Flexibility: The overhead system, poles, wires, transformers can be easily shifted and is more flexible than underground system.
4. Faults: The chances of faults in underground system are very rare as the cables are laid underground and are provided with better insulation.	4. Faults: The chances of faults in overhead system are more than underground system.
5. Fault location and Repairs: In underground system, the conductors are invisible and not accessible so that fault location and repairs can't be easily made.	5. Fault location and Repairs: In overhead system, the conductors are visible and easily accessible so that fault location and repairs can be easily made.
6. Appearance: The appearance of an underground system is better as all the distribution lines are invisible.	6. Appearance: The appearance of an overhead system is not as good compared to underground.
7. Current carrying capacity and voltage drop: Underground conductor has considerably lower current carrying capacity.	7. Current carrying capacity and voltage drop: Overhead conductor has considerably higher current carrying capacity than underground cable because of high conductor spacing.
8. Useful life: Underground system may have a useful life of more than 50 years.	8. Useful life: An overhead system may have useful life of 25 years.
9. Maintenance Cost: The maintenance cost of underground system is very low because of less chances of faults and service interruptions from wind, lightening, traffic hazards etc.	9. Maintenance Cost: The maintenance cost of overhead system is high as compared with that of underground system because of chances of faults and service interruptions from wind, lightening, traffic hazards etc.
10. Interference with communication circuits: An overhead system causes electromagnetic interference with the telephone lines.	10. Interference with communication circuits: There is no such interference with the underground system.

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SELECTION OF CABLES

The following factors should be taken into account while selecting the cables of correct sizes.

- Select the System Voltage - AC or DC.
- Select the Phase - Single Phase or Tripple Phase.
- Select Mode of Installation - Single-core or Multi-core.
- Select Laying Condition of Cable - Ground Armoured or Air Unarmoured.
- Select the maximum Continuous Current Expected as per required load.

  Example: For 3 Phase AC motor of 50 HP with 90% efficiency having P. f. 0.80 with 400 V line voltage, the maximum continuous current will be

$$IL = \frac{H.P. \times 746}{1.732 \times \text{Line voltage} \times \text{efficiency} \times \text{p.f.}}$$

$$= \frac{50 \times 746}{1.732 \times 400 \times 0.9 \times 0.8}$$

$$= 74.77 \approx 75 \text{ A}$$

- Select the conditions of Laying and apply relevant correction factor (Table 25-36)
- Select the Grouping correction factor and correct the current, I= IL/Cg

  Example: If two cable sets of two 3-phase circuit is grouped together, laid direct in ground, single layer and touching, I = 75/0.79 = 94.93 ≈ 95 A
- Find the nearest higher Current Carrying Capacity of relevant conductor cross sectional area from given table 1-24 and select the corresponding cable of your requirement.

  Example: Current Carrying Capacity 95 A is shown in table for 25 sq mm x 3.5 core armoured copper PVC insulated cable armoured cable.
- Calculate the Voltage Drop across the selected cable for the length of the installation. If the drop of voltage is less than 2.5% then the selected cable is suitable for the installation, otherwise select the next higher cross sectional area of the conductor.
- Besides the above factors, atmospheric conditions of the area, types of industries, standardization of cable sizes, minimum running cost, future expansion, standardization of accessories, etc should be considered before finalizing the type of cable (especially for large distribution systems).

"Litmus Cables stands resolutely by its assurance of consistently providing the finest Quality in tandem with precise Quantity. It is with this commitment over the years that the company has earned the coveted reputation of Total Reliability. This means more than an achievement for us. It is a benchmark to live and lead by."

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