COPPERGAT™
شرکتہ الکابلات
CABLES

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COPPERGAT™
شرکتہ الکابلات
CABLES

COMPANY PROFILE

Gateway to
Quality

BRITISH standard IEC
UL-AMERICAN standard
PVC-XLPE-LSZH-MGT-SWA
Compacted Shaped Technology

COMPANY PROFILE

An icon of trust and reliability COPPERGAT Wires & Cables is a Value Based Organization (VBO). With over 2 decades of expertise in the field of wires and cables we have grown to be a trustworthy and reliable source for quality in the building wires and power cables industry. COPPERGAT's products are manufactured to perform their best even in the harshest of weathers. Striving for technological advancement and excellence COPPERGAT not only has made its mark in the national market but is also a well-known name in the SAARC region. Committed to innovation and originality we resolve to become a global entity.

With state of the art manufacturing plant (installation of American Extrusion Lines for XLPE-PVC) and stringent quality checks by internationally acclaimed labs such as Pakistan Standards & Quality Control Authority (PSQCA), Pakistan Council of Scientific & Industrial Research (PCSIR),High Voltage Testing Labs of University of Engineering & Technology , Metal Industry Research & Development Center (MIRDC) and American Global Standards (AGS) under all applicable standards of IEC, BSS, UL83, ANSI, VDE & DIN we manufacture products that are suitable for all electrical operations and are guaranteed for life.

Modern infrastructure at factory, purpose built buildings for production, logistic center and laboratories are adding value to COPPERGAT's quality of products
and capacity of production to meet and exceed the expectations of our customers.

Imported cable grade material is used in manufacturing because if copper does not have 100% conductivity, cable will have less conductivity and greater resistance which means increased electricity bills. This is the reason that our growth and operational excellence has been awarded with strong business competencies that have served as a solid foundation for our expansion. The Company has been accredited with:

- ISO-9001: QUALITY MANAGEMENT SYSTEM,
- ISO-14001: ENVIRONMENT MANAGEMENT SYSTEM
- OHSAS-18001: OCCUPATIONAL HEALTH & SAFETY ADVISORY SERVICES
- CE and
- RoHS-COMPLIANT

Vision

"To be one of the most progressive institutions in building wires and power cables by providing quality products to our clientele in a superior manner. We aim to establish a global corporation empowered with business role model of Sadiq & Ameen."

Mission

We provide the service that enables people and businesses to extend themselves so they can reach new heights, fulfill their aspirations and achieve the best that's on offer. With our customer knowledge and insight, we are determined to be a truly customer driven business. We are committed to delivering customer satisfaction, developing business integrity, and establishing worldwide presence.

Values

Nationalistic-Concerned about our people and our land

Respect-We believe in respect for our customers, employees, stakeholders and community

Trusting- We believe in building strong relationships with our customers

Reliable- We believe our customers are number one

Teamwork-We believe that we can achieve more by working together with teamwork

Accountability-We take ownership and full responsibility for our actions

Professional- We are passionate about giving our customers a world-class service

Product Range

- Building wires& cables
- LT /HT power cables with copper/aluminum conductors
- Armoured and un-armoured cables
- AAC and ACSR conductor as per WAPDA standards
- Flexible DC cables single & multi core 300/500 volts
- Flexible special cables for instrumentation & control
- Telecommunication cables
- RG-type cables
- Flame Retardant LSZH Cables
- Fire Retardant MGT-Mica Glass Taped Cables
- Cables For Wind and Solar Energy
- Customized cables

Our manufacturing range with Comparison of Imperial and Metric Sizes of cables and Current Ratings.

IMPERIAL Stranding Formation	**CONVERTED TO** (mm2)	**Nearest** available metric Size (mm2)	**Current** in Amperes
1/.044"	0.981	1.0	13.5
3/.029"	1.290	1.5	17.5
3/.036"	1.970	1.5	17.5
7/.029"	2.982	2.5	24.0
7/.036"	4.597	4.0	32.0
7/.044"	6.861	6.0	41.0
7/.052"	9.591	10.0	57.0
7/.064"	14.528	16.0	76.0
19/.052"	26.033	25.0	101.0
19/.064"	39.434	35.0	125.0
19/.072"	49.909	50.0	151.0
19/.083"	66.323	70.0	192.0
37/.072"	97.191	95.0	232.0
37/.083"	129.156	120.0	269.0
37/.093"	162.153	150.0	300.0
37/.103"	198.899	185.0	341.0
61/.093"	267.333	240.0	400.0
61/.103"	327.915	300.0	458.0
91/.093"	398.809	400.0	546.0
91/.103"	489.185	500.0	617.0
127/.103"	682.709	630.0	694.0
Flexible Cables	Flexible Cables	Flexible Cables	Flexible Cables
14/.0076"	0.409	0.5	03
23/.0076"	0.613	0.75	06
40/.0076"	1.171	1.0	10
70/.0076"	2.049	1.5	16
110/.0076"	3.219	2.5	25
162/.0076"	4.741	4.0	32

Current Carrying Capacity (IN AMPERES)

Table 1: Single-core copper conductor, 70°C PVC insulated, non-armored, with or without sheath cables, Ambient air temperature: 30°C, Ambient ground temperature: 20°C, Soil thermal resistivity (cable buried in ground): 2.5K.m/W.

Conductor Cross - Sectional Area	Reference Method A (enclosed in conduit In thermally insulating Wall etc)		Reference Method B (enclosed in conduit On wall or in trunking etc)		Reference Method C (clipped direct)		Reference Method F (n free air or on a perforated cable tray horizontal or vertical)				
							Touching			Spaced by One Cable Diameter	
	2 Cables, Single -Phase a.c. or d.c.	3 or 4 Cables, 3-Phase a.c.	2 Cables, Single - Phase a.c. or d.c.	3 or 4 Cables, 3- Phase a.c.	2Cables, Single Phase a.c. Flat and Touching	3 or 4 Cables, 3-Phase a.c. Flat and Touching or Trefoil	2 Cables, Single - Phase a.c. or d.c. Flat	3 Cables, 3- Phase a.c. Flat	3 Cables, 3- Phase a.c. Trefoil	2 Cables, Single -Phase a.c. or d.c., or 3 Cables, 3 -Phase a.c. Flat	
										Horizontal	Vertical
mm^2	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**	**A**
1.0	11	10.5	13.5	12	15.5	14	-	-	-	-	-
1.5	14.5	13.5	17.5	15.5	20	18	-	-	-	-	
2.5	20	18	24	21	27	25	-	-	-	-	-
4	26	24	32	28	37	33		-	-	-	
6	34	31	41	36	47	43	-	-	-	-	-
10	46	42	57	50	65	59	-	-	-	-	-
16	61	56	76	68	87	79	-	-	-	-	-
25	80	73	101	89	114	104	131	114	110	146	130
35	99	89	125	110	141	129	162	143	137	181	162
50	119	108	151	134	182	167	196	174	167	219	197
70	151	136	192	171	234	214	251	225	216	281	254
95	182	164	232	207	284	261	304	275	264	341	311
120	210	188	269	239	330	303	352	321	308	396	362
150	240	216	300	262	381	349	406	372	356	456	419
185	273	245	341	296	436	400	463	427	409	521	480
240	321	286	400	346	515	472	546	507	485	615	569
300	367	328	458	394	594	545	629	587	561	709	659
400	-	-	546	467	694	634	754	689	656	852	795
500			626	533	792	723	868	789	749	982	920
		-	720	611	904	826	1005	905	855	1138	1070

Table 1

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Table 2: : Rating factors for ambient air temperatures other than 30°C to be applied to the current carrying capacities for cables in free air.

Ambient Temperature	PVC	XLPE
25	1.03	1.02
30	1.00	1.00
35	0.94	0.96
40	0.87	0.91
45	0.79	0.87
50	0.71	0.82
55	0.61	0.76
60	0.50	0.71
65	-	0.65
70	-	0.58
75	-	0.50
80	-	0.41
85	-	-
90	-	-
95	-	-

Table 2

Table 3: Rating factors for ambient ground temperatures other than 20°C to be applied to the current-carrying capacities for cables buried to ground.

Ground Temperature	PVC	XLPE
10	1.10	1.07
15	1.05	1.04
20	1.00	1.00
25	0.95	0.96
30	0.89	0.93
35	0.84	0.89
40	0.77	0.85
45	0.71	0.80
50	0.63	0.76
55	0.55	0.71
60	0.45	0.65
65	-	0.60
70	-	0.53
75	-	0.46
80	-	0.38

Table 3

Rating Factor for Soil Thermal Resistivities

Table 4: Rating factors for cables buried direct in the ground or in an underground conduit system to BS EN 50086-2-4 for soil thermal resistivities other than 2.5 K.m/W to be applied to the current-carrying capacities for Reference Method D

Thermal resisvitity K.m/W	0.5	0.8	1	1.5	2	2.5	3
Rating factor for buried In ducts	1.28	1.20	1.18	1.1	1.05	1	0.96
Rating factor for direct buried	1.88	1.62	1.5	1.28	1.12	1	0.90

Table 4

US-American and British units

Conversion of usual measuring units
(Units for cables and wires)
In the US the measurements are mainly used in AWG-numbers (AWG = American Wire Gauge).
The AWG-numbers conform the British B&S-numbers (B&S = Brown & Sharp)

AWG	mm2	AWG	mm2	AWG	mm2	AWG	mm2
30	0.05	18	0.75	6	16	300 MCM	150
28	0.08	17	1.00	4	25	350 MCM	185
26	0.14	16	1.5	2	35	500 MCM	240
24	0.25	14	2.5	1	50	600 MCM	300
22	0.34	12	4	2/0	70	750 MCM	400
21	0.38	10	6	3/0	95	1000 MCM	500
20	0.50	8	10	4/0	120		

1 CM = 1 Circ. mil. = 0,0005067 mm2 1 MCM = 1000 Circ. mils = 0,5067-mm2
This cross reference list shows equivalent nominal values(mm2). Actual cross sections may vary.

Table 6

ELECTRICAL FORMULAS

Electrical formulas for determining ampere, Kilowatt, Kilovolt – ampere and horse power.

DIRECT CURRENT (DC)	ALTERNATING CURRENT (AC)	
	SINGLE PHASE	THREE PHASE
$A = \frac{KW \times 1000}{V}$	$A = \frac{KW \times 1000}{Vx\ P.F.}$	$A = \frac{KW \times 1000}{1.73 \times V \times P.F.}$
$A = \frac{KVA \times 1000}{V}$	$A = \frac{KVA \times 1000}{V}$	$A = \frac{KVA \times 1000}{1.73 \times V}$
$A = \frac{HP \times 746}{V \times (\%Eff.)}$	$A = \frac{HP \times 746}{V \times (\%Eff.) \times P.F.}$	$A = \frac{HP \times 746}{1.73 \times V \times (\%Eff.) \times P.F.}$
$KW = \frac{A \times V}{1000}$	$KW = \frac{A \times V \times P.F.}{1000}$	$KW = \frac{A \times V \times 1.73 \times P.F.}{1000}$
$KVA = \frac{A \times V}{1000}$	$KVA = \frac{A \times V}{1000}$	$KVA = \frac{A \times V \times 1.73}{1000}$
$HP = \frac{A \times V \times (\% Eff.)}{746}$	$HP = \frac{A \times V \times (\% Eff.) \times P.F.}{746}$	$HP = \frac{A \times V \times 1.73 \times (\% Eff.) \times P.F.}{746}$

CABLE SIZE & H.R.C. FUSE RATING FOR MOTORS

Motor H.P.	Full Load Current	HRC Fuse Rating	Cable Size (Metric)
1.0	1.9	6.0	2.5 mm2
1.5	2.5	10.0	2.5 mm2
2.0	3.4	15.0	2.5 mm2
3.0	4.8	15.0	4.0 Mm2
4.0	6.4	20.0	4.0 mm2
5.0	7.8	20.0	4,0 mm2
7.5	11.6	30.0	4.0 mm2
10.0	14.4	35.0	6.0 mm2
12.5	17.3	50.0	6.0 mm2
15.0	21.0	30.0	6.0 mm2
20.0	28.0	35.0	10.0 mm2
25.0	35.0	50.0	16.0 mm2
30.0	41.0	50.0	16.0 mm2
40.0	55.0	60.0	25.0 mm2
50.0	69.0	80.0	35.0 mm2
60.0	83.0	100.0	50.0 mm2
70.0	97.0	100.0	70.0 mm2
80.0	110.0	125.0	70.0 mm2
90.0	123.0	125.0	70.0 mm2
100.0	136.0	150.0	70.0 mm2
125.0	171.0	200.0	95.0 mm2
150.0	200.0	250.0	120.0 mm2
175.0	231.0	300.0	150.0 mm2
200.0	263.0	350.0	185.0 mm2
250.0	-	-	240 mm2
300.0	-	-	300 mm2

Table 5

Latest Cables Color Codes

Number of Cores	Colors to IEC 60502-1	Colors to BS 5467 (A:2008)
1	Red or Black	Brown or Blue
2	Red & Black	Brown & Blue
3	Red, Yellow and Blue	Brown, Black and Grey
4	Red, Yellow, Blue and Black	Blue, Brown, Black and Grey
5	Red, Yellow, Blue, Black and Green / Yellow	Green / Yellow, Blue, Brown, Black and Grey

COPPERGAT™
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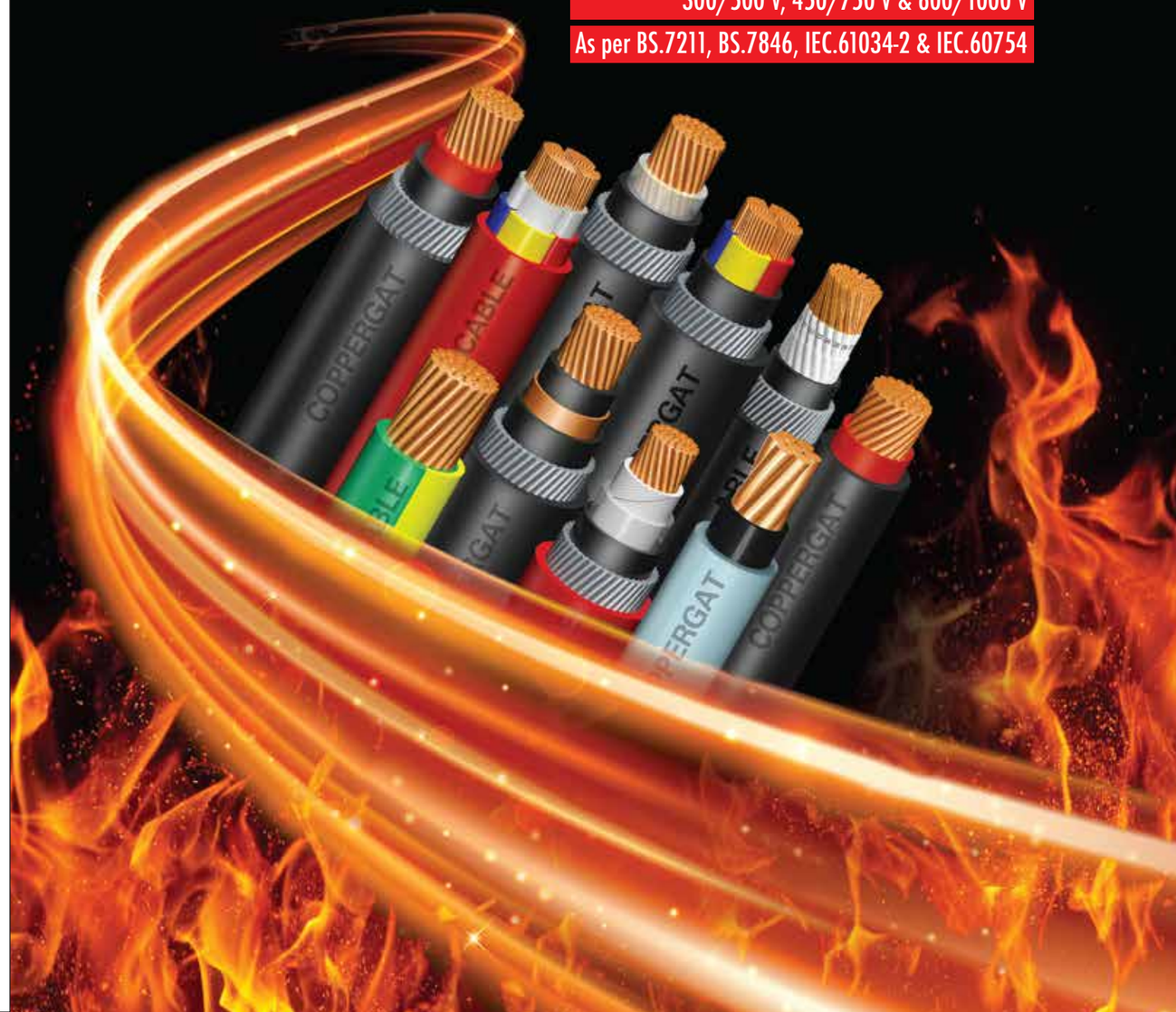
CABLES

LSZH, FR PVC & HR CABLES

300/500 V, 450/750 V & 600/1000 V

As per BS.7211, BS.7846, IEC.61034-2 & IEC.60754



WHAT
are Halogens?

Halogens, The symbol X is often used generically to refer to any halogen, include:
1) Astatine
2) Bromine
3) Chlorine
4) Flourine
5) Iodine

Highly reactive:
1) Produce bio-accumulative and toxic chemicals
2) Fire - hydrogen chloride/fluoride/ bromide/iodide
3) Water - hydrochloric/flouric/bromic/iodic acids
4) toxic to environment and humans in sufficient quantities

Transfer rather easily among air, water, and land, and span boundaries of programs, geography, and generations.

Use of LSZH,
WHY?

Materials contain halogens, such as:
CPE, PVC Neoprene, FEP.
LSZH are commonly used because they are durable, resistant to fire, and relatively inexpensive.

Advantages of LSZH

1) Safety: LSZH minimize the effects from smoke and harmful corrosive gases in event of combusion.
2) Superior Flame Retardancy
3) Inexpensive
4) Durability

Performance and Specification Standards

Low smoke zero halogen cables are manufactured and tested to different standards.
1) Smoke Density Test- (IEC 61034)
2) Testing the Content of Acidic Halogen Gases- (IEC 60754-1)
3) Testing Acidity and Conductivity for the burned halogens- (IEC 60754-2)
4) Flame Retardant Test- (IEC 60332-1)

1) Smoke Density Test- (!EC 61034):
The smoke emission of cables is measured using a room chamber by putting the cables to be tested horizontally upon alcoholic tray as a source of fire with limited amount of smoke (the number of samples to be determined according to the required specification), in addition to scalar lamp in one of the sides of the room facing a electro-photocell to measure the density of light in the opposite wall connected to an electric circuit and computer to record the value of observation. The level of smoke density shall be determined on the basis that before the test the density of the absorbed light shall be considered to be 100% as there is no smoke that hampers the light to reach from the source.

After starting the test and result of the smoke emission due to burning cables that causes hindering the light from the emitted by the lamp from reaching the electro-photocell, then the amount of light starts to be less gradually and according to the increment and the density of smoke, the electric photocell starts to calculate the percentage of transmitted light during the test.

The duration of the test according to the specification IEC 61034 is (40 minutes),
in addition, the minimum percentage of transmitted light required according to the international specification is 60%.

2) Testing the Content of Acidic Halogen Gases- (IEC 50754-1):
It is required in cables of zero halogen that all insulation, inner and outer sheath materials to pass a test to determine the percentage of halogen content within each component (IEC 60754-1). This percentage should not exceed 0.5%. The test is conducted by burning a small sample of insulation or the covering inside a tubular furnace at 800 oC in the presence of a source of dry and clean air. The result of burning process to be collected and then to be analyzed chemically in order to determine the percentage of halogen, which should be no more 0.5%. This is called the direct way.

3) Testing Acidity and Conductivity for the burned halogens- (IEC 60754-2):
The percentage of halogen could be measured indirectly through the degree acidity and conductivity. The percentage of acidity (which has a direct relation with halogen) should be more than 4.3% per every one letter of the distilled water. In this method, a sample of the insulation or the outer covering to be burned as per the first method but with higher temperature (935 oC), the result of the burning process to be collected in a distilled water, then measuring the acidity which should be no more than 4.3% representing a low degree of acidity.

When measuring the percentage of conductivity, it should be more than 1.OptS/mm.

4) Flame Retardant Test- (IEC 60332-1):
Where each sample of length of 60cm fixed vertically is exposed to a flame of 3.5Btu/h for a period according to the cable diameter, the measure for passing the test that fire is self-extinguished when moving the flame away and that the affected part by fire should not be more than 5 cm below the top of the upper support. Cables that complying with this test is safe enough in case of using a single cable ladder or any other place within this site.

Table 1 - LSOH insulated, non-sheathed, single core cables, 450/750 V

Construction:
Annealed copper conductor, class 1 solid conductor and class 2 stranded conductor, as specified below.
LSOH insulation.
Colours for cable identification: green/yellow, blue or other colours

Nominal cross-sectional area of conductor (mm^2)	Class of conductor	Radial Thickness of insulation (mm)	Mean overall diameter		Current Carrying Capacity (A)
			lower limit (mm)	upper limit (mm)	
1.5	1	0.7	2.6	3.3	19
1.5	2	0.7	2.7	3.4	19
2.5	1	0.8	3.2	4.0	26
2.5	2	0.8	3.3	4.1	26
4	1	0.8	3.6	4.6	35
4	2	0.8	3.8	4.7	35
6	1	0.8	4.1	5.2	45
6	2	0.8	4.3	5.4	45
10	1	1.0	5.3	6.6	61
10	2	1.0	5.6	7.0	61
16	2	1.0	6.4	8.0	81
25	2	1.2	8.1	10.1	106
35	2	1.2	9.0	11.3	131
50	2	1.4	10.6	13.2	158
70	2	1.4	12.1	15.1	200
95	2	1.6	14.1	17.6	241
120	2	1.6	15.6	19.4	278
150	2	1.8	17.3	21.6	318
185	2	2.0	19.3	24.1	362
240	2	2.2	22.0	27.5	424
300	2	2.4	24.0	30.6	486
400	2	2.6	27.5	34.3	558
500	2	2.8	30.5	38.2	642
630	2	2.8	34.0	42.5	739
1.5	5	0.7	2.8	3.5	19
2.5	5	0.8	3.4	4.3	26
4	5	0.8	3.9	4.9	35
6	5	0.8	4.4	5.5	45
10	5	1.0	5.7	7.1	61
16	5	1.0	6.7	8.4	81
25	5	1.2	8.4	10.6	106
35	5	1.2	9.7	12.1	131
50	5	1.4	11.5	14.4	158
70	5	1.4	13.2	16.6	200
95	5	1.6	15.1	18.8	241
120	5	1.6	16.7	20.9	278
150	5	1.8	18.6	23.3	318
185	5	2.0	20.6	25.8	362
240	5	2.2	23.5	29.4	424

Table 2 - LSOH insulated, non-sheathed, single core cables, 300/500 V

Construction:
Annealed copper conductor, class 1 solid conductor, as specified below.
LSOH insulation.
Colours for cable identification: green/yellow, blue or other colours

Nominal cross-sectional area of conductor (mm^2)	Class of conductor	Radial Thickness of insulation (mm)	Mean overall diameter		Current Carrying Capacity (A)
			lower limit (mm)	upper limit (mm)	
0.5	1	0.6	1.9	2.4	3
0.75	1	0.6	2.1	2.6	6
1	1	0.6	2.2	2.8	10

b) Flexible copper conductor
Construction:
Annealed copper conductor, class 5 flexible conductor, as specified below.
LSOH insulation.
Colours for cable identification: green/yellow, blue or other colours

Nominal cross-sectional area of conductor (mm^2)	Class of conductor	Radial Thickness of insulation (mm)	Mean overall diameter		Current Carrying Capacity (A)
			lower limit (mm)	upper limit (mm)	
0.5	5	0.6	2.1	2.6	3
0.75	5	0.6	2.2	2.8	6
1	5	0.6	2.4	2.9	10

Table 3 - LSOH insulated, non-sheathed, single core cables, 450/750 V

Construction:
Annealed copper conductor, class 1 solid conductor and class 2 stranded conductor, as specified below.
LSOH insulation.
Colours for cable identification: green/yellow, blue or other colours
Sheath type: LSOH
Colour of sheath: White (other colour may be used by agreement between manufacturer and customer).

Nominal cross-sectional area of conductor (mm^2)	Class of conductor	Radial Thickness of insulation (mm)	Radial Thickness of sheath (mm)	Mean overall diameter		Current Carrying Capacity (A)
				lower limit (mm)	upper limit (mm)	
1x1	1	0.7	0.8	3.9	4.8	10
	2	0.7	0.8	4.0	4.9	19
1x1.5	1	0.7	0.8	4.2	5.0	26
	2	0.7	0.8	4.3	5.2	35
1x2.5	1	0.7	0.8	4.6	5.5	45
	2	0.7	0.8	4.7	5.6	61
1x4	1	0.7	0.8	5.0	6.0	81
	2	0.7	0.9	5.3	6.4	106
1x6	1	0.7	0.9	5.7	6.8	131
	2	0.7	0.9	5.9	7.1	158
1x10	2	0.7	0.9	6.7	8.1	200
1x16	2	0.7	0.9	7.6	9.2	241
1x25	2	0.9	1.0	9.4	11.4	278
1x35	2	0.9	1.1	10.6	12.8	318

Table 4 - LSOH insulated, twin, 3-core, 4-core and 5-core circular sheathed cables, 450/750 V

Construction:
Annealed copper conductor, class 1 solid conductor and class 2 stranded conductor, as specified below.
LSOH insulation.
The cores shall be twisted together. Acenter filler may be used.
Colours for cable identification: brown or blue
Sheath type: LSOH
Colours for core identification:
Twin: brown and blue
3-core: brown, black and grey
4-core: blue, brown, black and grey
5-core: green/yellow,blue, brown, black and grey
Colour of sheath: White

Nominal cross-sectional area of conductor (mm^2)	Class of conductor	Radial Thickness of insulation (mm)	Radial Thickness of sheath (mm)	Mean overall diameter		Current Carrying Capacity (A)
				lower limit (mm)	upper limit (mm)	
2x1	1	0.7	1.2	7.9	9.50	14
	2	0.7	1.2	8.1	9.70	14
2x1.5	1	0.7	1.2	8.4	10.1	19
	2	0.7	1.2	8.5	10.3	19
2x2.5	1	0.7	1.2	9.1	11.0	26
	2	0.7	1.2	9.3	11.3	26
2x4	1	0.7	1.2	10.0	12.1	35
	2	0.7	1.2	10.3	12.4	35
2x6	1	0.7	1.2	10.9	13.2	45
	2	0.7	1.2	11.3	13.7	45
2x10	1	0.7	1.4	12.9	15.5	61
	2	0.7	1.4	13.8	16.7	61
2x16	2	0.7	1.4	15.6	18.8	81
2x25	2	0.9	1.4	19.2	23.2	106
2x35	2	0.9	1.6	21.5	26.0	131
3x1	1	0.7	1.2	8.30	10.0	13
	2	0.7	1.2	8.80	10.2	17
3x1.5	1	0.7	1.2	8.80	10.6	17
	2	0.7	1.2	9.00	10.9	23
3x2.5	1	0.7	1.2	9.60	11.6	23
	2	0.7	1.2	9.80	11.9	23
3x4	1	0.7	1.2	10.5	12.7	31
	2	0.7	1.2	10.8	13.1	31
3x6	1	0.7	1.2	11.8	13.2	40
	2	0.7	1.4	12.4	13.7	40
3x10	1	0.7	1.4	14.0	15.5	54
	2	0.7	1.4	14.6	16.7	54
3x16	2	0.7	1.4	16.5	18.8	73
3x25	2	0.9	1.4	20.4	23.2	95
3x35	2	0.9	1.6	22.9	26.0	117
4x1	1	0.7	1.2	8.90	10.0	14

Table 4 - (Continued)

Nominal cross-sectional area of conductor (mm^2)	Class of conductor	Radial Thickness of insulation (mm)	Radial Thickness of sheath (mm)	Mean overall diameter		Current Carrying Capacity (A)
				lower limit (mm)	upper limit (mm)	
	2	0.7	1.2	9.50	10.2	14
4x1.5	1	0.7	1.2	9.50	10.6	17
	2	0.7	1.2	9.70	10.9	17
4x2.5	1	0.7	1.2	10.4	11.6	23
	2	0.7	1.2	10.6	11.9	23
4x4	1	0.7	1.2	11.4	12.7	31
	2	0.7	1.2	11.6	13.1	31
4x6	1	0.7	1.4	13.0	13.2	40
	2	0.7	1.4	13.8	13.7	40
4x10	1	0.7	1.4	15.2	15.5	54
	2	0.7	1.4	15.9	16.7	54
4x16	2	0.7	1.4	18.0	18.8	73
4x25	2	0.9	1.6	22.7	23.2	95
4x35	2	0.9	1.6	25.4	26.0	117
5x1	1	0.7	1.2	9.60	10.0	13
	2	0.7	1.2	10.2	10.2	13
5x1.5	1	0.7	1.2	10.2	10.6	17
	2	0.7	1.2	10.5	10.9	17
5x2.5	1	0.7	1.2	11.2	11.6	23
	2	0.7	1.2	11.5	11.9	23
5x4	1	0.7	1.4	12.8	12.7	31
	2	0.7	1.4	13.6	13.1	31
5x6	1	0.7	1.4	14.5	13.2	40
	2	0.7	1.4	15.0	13.7	40
5x10	1	0.7	1.4	16.5	15.5	54
	2	0.7	1.4	17.3	16.7	54
5x16	2	0.7	1.4	20.0	18.8	73
5x25	2	0.9	1.6	25.2	23.2	95
5x35	2	0.9	1.6	27.8	26.0	117

Table 5 - LSOH insulated, twin,3-core, 4-core and 5-core circular sheathed cables with cables with circuit protective conductor, 300/500 V

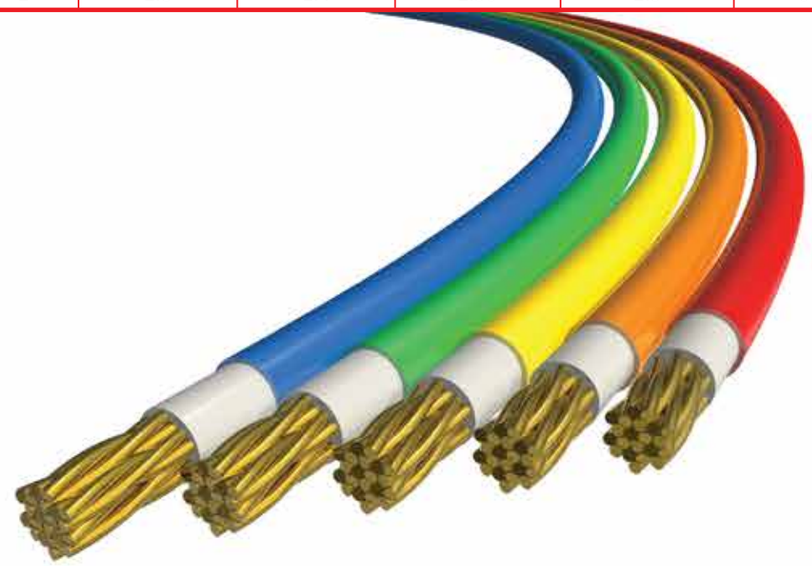
Construction:
Annealed copper conductor, class 1 solid conductor and class 2 stranded conductor, as specified below.
LSOH insulation.
The core or cores shall be laid parallel with the uninsulated circuit protective conductor.
Colours for cable identification:
Single core: brown or blue
Twin core: brown and blue
3-core: brown, black (centre core) and grey
Position of circuit protective conductor:
Twin: centrally placed between cores in same plane
3-core: centrally placed between black and grey cores in same plane
Sheath type: LSOH
Colour of sheath:
White

Nominal cross-sectional area of conductor (mm^2)	Class of conductor (mm)	Radial Thickness of insulation (mm)	Radial Thickness of sheath (mm)	Mean overall diameter		Circuit protective conductor, minimum nominal cross sectional area of conductor (mm^2)	Class of circuit protective conductor	Current Carrying Capacity (A)
				lower limit (mm)	upper limit (mm)			
1x1	1	0.7	0.9	4.1x5.2	5x6.3	1	1	14
1x1.5	1	0.7	0.9	4.4x5.4	5.3x6.6	1	1	19
2x1	1	0.7	0.9	4.1x7.6	5x9.1	1	1	14
	2	0.7	0.9	4.2x7.8	5.1x9.4	1	1	14
2x1.5	1	0.7	0.9	4.4x8.1	5.3x9.7	1	1	19
	2	0.7	0.9	4.5x8.3	5.4x10	1	1	19
2x2.5	1	0.7	1.0	4.9x9.3	6x11.2	1.5	1	26
	2	0.7	1.0	5x9.5	6.1x11.4	1.5	1	26
2x4	2	0.7	1.0	5.5x10.4	6.7x12.6	1.5	1	35
2x6	2	0.7	1.1	6.2x12	7.5x14.6	2.5	1	45
2x10	2	0.7	1.2	7.3x14.5	8.8x17.6	4	2	61
2x16	2	0.7	1.3	8.4x17	10.1x20.5	6	2	81
3x1	1	0.7	0.9	4.1x10	5.1x12.1	1	1	13
3x1.5	1	0.7	0.9	4.4x10.7	5.3x12.9	1	1	17
3x2.5	1	0.7	1.0	4.9x12	6x14.6	1	1	23
3x4	2	0.7	1.0	5.5x14	6.7x16.9	1.5	1	31
3x6	2	0.7	1.1	6.2x16.2	7.5x19.5	2.5	1	40
3x10	2	0.7	1.2	7.3x19.5	8.8x23.6	4	2	54
3x16	2	0.7	1.3	8.4x22.8	10.1x27.6	6	2	73

Table 6 - LSOH insulated, LSOH sheathed, single core Armoured cables, 600/1000 V

Construction:
Annealed copper conductor, class 1 solid conductor and class 2 stranded conductor, as specified below.
Insulation: LSOH
Bedding: LSOH
Sheath: LSOH
Colours for cable identification: black or other colours

Nominal cross-sectional area of conductor (mm^2)	Class of conductor	Radial Thickness of insulation (mm)	Thickness of extruded bedding (mm)	Nominal aluminium wire diameter	Thickness of sheath	Aproximate Overall diameter (mm)
50	2	1.0	0.8	0.90	1.5	17.2
70	2	1.1	0.8	1.25	1.5	20.5
95	2	1.1	0.8	1.25	1.6	22.3
120	2	1.2	0.8	1.25	1.6	24.2
150	2	1.4	1.0	1.60	1.7	27.4
185	2	1.6	1.0	1.60	1.8	30.0
240	2	1.7	1.0	1.60	1.8	32.8
300	2	1.8	1.0	1.60	1.9	35.6
400	2	2.0	1.2	2.00	2.0	40.5
500	2	2.2	1.2	2.00	2.1	44.2
630	2	2.4	1.2	2.00	2.2	48.8
800	2	2.6	1.4	2.50	2.4	55.4
1000	2	2.8	1.4	2.50	2.5	60.6



1) FIRE RESISTANT LSZH CABLE (≤ 0.6/1kV):

Fire resistant cable is cable which will continue to operate normally in the presence of prolonged fire for a specified time under defined conditions, or, Fire resistant cables are designed to maintain circuit integrity of those vital emergency service during fire conditions.

Construction of Fire Resistant LSZH Cable:

The fire resistant cable are constructed in the following typical format:

- Stranded annealed copper conductor
- Mica tape fire resisting barrier
- Flame retardant PVC/LSOH as Insulation & Bedding use
- Finally outer sheath of LZSH

Operating Temperature & Mechanical values:

Maximum continuous normal operating temperature: **90 °C**
Maximum permissible temperature at short circuit: **250 °C**
Elongation of LSZH: **125 %**
Tensile strength of LSZH: **10 N/mm²**

Applications & Characteristics of Fire Resistant LSZH Cable:

Fire resistant cable is mainly used for high building, subway, plant station and other places where require fire-control. Fire resistant cable not only can delivery power with rated voltage **0.6/1kV** also would remain working safely for 3 hours in the case of **950-1000 °C** high temperature flame burning. Thus it can be seen that fire resistance cable has the highest safety factor than non-fire resistant cable.

International Standard Compliance for Fire Resistance LSZH Cable:

- IEC. 60331 -fire resistance test
- BS. 6387 -fire resistance test
- British standard specification (BS. 6746 & BS. 7655)

2) FLAME RETARDANT PVC CABLE (≤ 0.6/1kV):

Flame retardant cable are not rated to continue to operate under fire circumstances but it will resist propagate of fire into a few area by having behavior in fire under defined conditions.

Construction of Flame Retardant Cable:

The flame retardant cable are constructed in the following typical format:

- Stranded annealed copper conductor
- Flame retardant PVC as Insulation & Bedding use
- Finally outer sheath of PVC

Operating Temperature & Mechanical values:

Maximum continuous normal operating temperature: **70 °C**
Maximum permissible temperature at short circuit: **160 °C**
Elongation of PVC (FR): **150 %**
Tensile strength of PVC (FR): **12.5 N/mm²**

Applications & Characteristics of Flame Retardant PVC Cable:

Flame retardant PVC cables are designed for use in fire situations where the spread of flames along a cable route needs to be retarded.

International Standard Compliance for Flame Retardant Cable:

- IEC. 60332-1/BS. 4066-1 –flame test on single vertical insulated wires/cables
- IEC. 60332-3/BS. 4066-3 –flame test on bunched wires/cables
- UL standard for flame retardant cable
- British standard specification (BS. 6746 & BS. 7655)

3) HEAT RESISTANCE PVC CABLE (300/500V):

Heat resistance (Thermal resistance) is a heat property and a measurement of a temperature difference by witch an object or material resists a heat flow.

Construction of Heat Resistance Cable:

The heat resistance cable are constructed in the following typical format:

- Stranded annealed copper conductor
- Flame retardant PVC as Insulation & Bedding use
- Finally outer sheath of PVC

Technical Data:

Maximum continuous normal operating temperature: **90 °C**
Maximum permissible temperature at short circuit: **250 °C**
Elongation of PVC (HR): **150 %**
Tensile strength of PVC (HR): **12.5 N/mm²**

Applications & Characteristics of Heat Resistance Cable:

High or low temperatures, heat and cold influences, permanent temperature changes demand cable types with special insulation and jacket material depending on the different applications.
COPPERGAT Cables supplies these special cables which are used in power stations, iron works, steel-works and rolling mill, in foundries, cement, construction and shipbuilding, in brickworks, kitchen appliances, measuring and heat appliances as well as in many other areas.
Depending on their individual temperature limits these cables are split in different resistant classes which cover temperature ranges.

International Standard Compliance for Heat Resistance Cable:

- British standard specification (BS. 6231 & BS. 6004)
- IEC. 60502

4) LOW SMOKE ZERO HALOGEN-LSZH (≤ 450/750V):

Halogens:
Halogens, the symbol "X" is often used generically to refer to any halogen, include:
Astatine, Bromine, Chlorine, Flourine & Astatine.
Produce bio-accumulative and toxic chemicals
Fire - hydrogen chloride/fluoride/bromide/iodide
Water - hydrochloric/flouric/bromic/iodic acids

Toxic to environment and humans in sufficient quantities

Construction of Fire LSZH Cable:
The LSZH cable are constructed in the following typical format:

- Stranded annealed copper conductor
- Flame retardant LSOH as Insulation & Bedding use
- Finally outer sheath of LZSH

Operating Temperature & Mechanical values:
Maximum continuous normal operating temperature: **90 ^{o}C**
Maximum permissible temperature at short circuit: **250 ^{o}C**
Elongation of LSZH: **125 %**
Tensile strength of LSZH: **10 N/mm^2**

Applications & Characteristics of Heat Resistance Cable:
Because of their low smoke and toxicity benefits, LSZH cables are often chosen for a multitude of applications. These include: Railway station, airports and other mass transit facilities, public entertainment and sport facilities, hotels, hospitals & Computer/data centers.

Materials contain halogens, such as:
CPE, PVC Neoprene, FEP.
LSZH are commonly used because they are durable, resistant to fire, and relatively inexpensive.
Safety: LSZH minimize the effect from smoke and harmful corrosive gases in event of combustion.

COPPERGAT

7 REASONS TO BUY COPPERGAT CABLES

1 **Product Reliability**
Leading Laboratories and institutions in the country and abroad such as central testing Labs, PCSIR, PSQCA , Hi-Voltage testing Labs of UET and SMIS-AGS (Systems Machinery & Inspection Services-American Global Standards) have confirmed our claim of quality products.

2 **Safety**
Safety is always a top priority and we ensure that no detail is ever over looked so that we can guarantee safety of our product, people and premises.

3 **Technical support:**
Our technical staff is available 24/7 for your support and queries. We believe in providing solutions even after the purchase.

4 **Knowledge & Experience:**
Confident in our knowledge and expertise we have the skills set to solve the issues that may arise during the execution of projects.

5 **Timely & Flexible Delivery Option**
Timed delivery with special off loading, prompt and urgent deliveries are standard for us.

6 **Quality assurance:**
Our product is tested according to international standards along with a third party inspection & testing options by-American Global Standards.

7 **Direct Marketing & Selling Policy**
We provide cables directly from our plant to the customer project sites without involvement of any distribution channel at competitive prices without compromising on quality.