

FIRE RESISTANT CABLE

Universal Cable (M) Berhad (UCMB), incorporated in 1967; one of the flagship subsidiaries of Leader Universal Holdings Berhad, a company listed in the Kuala Lumpur Stock Exchange, has grown steadily to become the country's single largest cable manufacturer today.

Through its far-sighted planning and unceasing product and service innovation, UCMB has successfully cultivated a manufacturing profile of an extensive range of cable and wire products. It has achieved a distinguished reputation as a leading supplier of power and telecommunication cable to major corporations both local and foreign.

Today, UCMB has one of the most advanced facilities for manufacturing of fire resistant cable in the Asia-Pacific region with world class quality standards. Fire resistant cable manufactured by UCMB provide flexibility, resistance to high temperature and resistance to combustion with low toxicity, low smoke and low acid gas generation.

This catalogue serves as a guide to UCMB's manufacturing processes and standards in the manufacturing of Fire Resistant cable.



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FIRE RESISTANT CABLE

In all fire disasters, fire smoke, heat and toxic fumes are the main obstacles to safe evacuation of a building or area. A major contribution towards overcoming these hazards is the use of fire resistant and non-halogenated cables. These cables provided the following features :

- Fire resistance
- Long-term circuit integrity in a fire
- Low smoke and toxic gas emissions
- Flame retardant properties
- Zero halogen gases
- Ease and low cost of installation

Fire Resistant cables are used, where required by local fire codes, in the wiring of:

- Fire resistant safety circuits
- Public address and emergency voice communication system in high-rise buildings
- Control and instrumentation services in industrial, commercial and residential complexes
- High-temperature installation conditions

CONSTRUCTION OF CABLES

UCMB's Fire Resistant cable have been developed to maintain circuit integrity in a fire and to ensure maximum safe evacuation of personnel with no detrimental effects like toxic gases or smoke.

The Fire Resistant cable are constructed in the following typical format :

- Stranded Annealed Copper Conductor
- Mica Tape Fire Resisting Barrier
- XLEVA-MI/XLPE/EPR/LSOH/PE/PVC as Primary Insulation Material.
- Flame Retardant LSOH, PVC as Bedding or Sheathing Material.

Fire Resistant cable may be single-core or multi-core constructions. The cable may be unarmoured, armoured, braided, with or without metallic screened depending on our customer's specific application.

INTERNATIONAL STANDARD COMPLIANCE

The Fire Resistant cables manufactured by UCMB complied with either one or combination of the specification as below :

- Fire resistant : EC 60331; BS 6387; SS 299
- Flame retardant : IEC 60332; BS 4066; BS EN 50266; IEEE 383
- Smoke emission : IEC 61034 ; BS 7622 ; BS EN 50268
- Acid gas emission : IEC 60754 ; BS 6425 ; BS EN 50267
- Oxygen index : ASTM D 2863

The Fire Resistant cable may categorized by a letter symbol (e.g.A) or series of symbols (e.g.CWZ) in according to the requirements for fire resistance characteristics which they meet, the test temperature selected and the duration of the test for resistance to fire alone in according to BS 6387 as below :

Requirement	Symbol
(1) Resistance to fire alone	
650°C for 3 hours	A
750°C for 3 hours	B
950°C for 3 hours	C
950°C for 20 minutes (short duration)	S
(2) Resistance to fire with water	W
(3) Resistance to fire with mechanical shock	
650°C	X
750°C	Y
950°C	Z

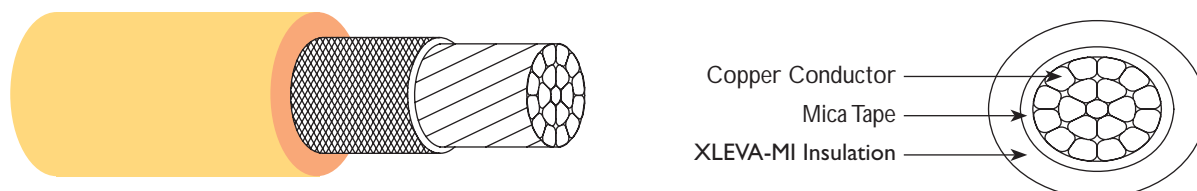
The following certifications / type test approvals obtained by UCMB :

- 1) American Bureau of Shipping (ABS)
- 2) Bureau Veritas (BV)
- 3) Jabatan Bomba Dan Penyelamat Malaysia
- 4) Jabatan Kerja Raya Malaysia (JKR)
- 5) Lloyd's Register Asia (LR)
- 6) Sirim QAS Sdn Bhd
- 7) TUV - SUV (PSB Corporations Pte Ltd)

MINERAL INSULATED FIRE RESISTANT (FR) AND FLAME RETARDANT CABLE

CU/MICA/XLEVA-MI CABLE

0.6/1(1.2)kV



DESCRIPTION

Single core with copper conductor, mica tape and XLEVA-MI compound. Cable are rated at 0.6 / 1 (1.2) kV.

CONSTRUCTION

Conductor

Plain circular or compacted stranded copper conductor, conform to IEC 60228 class 2.

Fire proof layer

Mica tape.

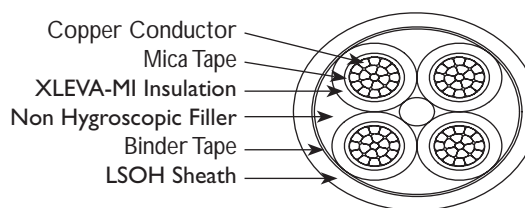
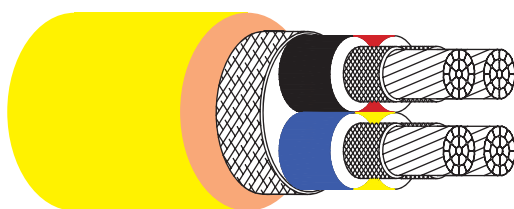
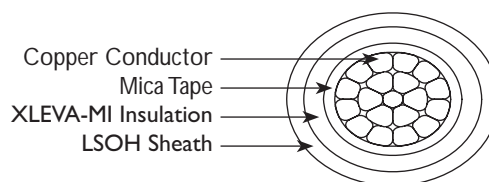
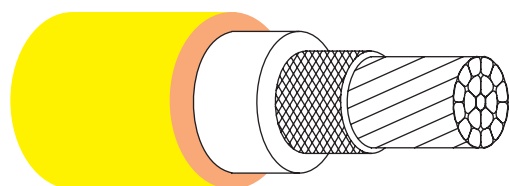
Insulation

Flame retardant Cross-linked low smoke zero halogen mineral insulated (XLEVA-MI) compound, colour orange.

Nominal cross-sectional area	Conductor Shape	Nominal thickness of insulation	Approx. overall diameter	Approx. cable weight	Current Rating	Voltage Drop
mm ²		mm	mm	Kg / Km	A	mV/A/m
1.5	r.m.	0.8	3.7	30	25	27
2.5	r.m.	0.8	4.1	40	33	16
4	r.m.	1.0	5.1	60	44	10
6	r.m.	1.0	5.6	80	56	6.8
10	r.m.	1.0	6.6	120	77	4.0
16	c.c.	1.0	7.4	180	102	2.5
25	c.c.	1.2	9.1	290	135	1.62
35	c.c.	1.2	10.2	380	169	1.18
50	c.c.	1.4	11.8	510	207	0.87
70	c.c.	1.4	13.5	720	268	0.62
95	c.c.	1.6	15.7	990	328	0.47
120	c.c.	1.6	17.2	1240	383	0.39
150	c.c.	1.8	19.0	1560	444	0.33
185	c.c.	2.0	21.2	1890	510	0.28
240	c.c.	2.2	24.0	2470	607	0.24
300	c.c.	2.4	27.0	3100	703	0.21
400	c.c.	2.6	30.1	3960	823	0.195
500	c.c.	2.8	33.5	4980	946	0.180
630	c.c.	2.8	37.2	6340	1069	0.170
800	c.c.	2.8	40.2	8020	1214	0.165
1000	r.m.	3.0	48.4	10160	1349	0.155

Note : r.m. - circular stranded, c.c. - compacted circular stranded.

MINERAL INSULATED UNARMoured LSOH SHEATHED FIRE RESISTANT (FR) AND FLAME RETARDANT CABLE CU/MICA/XLEVA-MI/LSOH CABLE 0.6/1(1.2) kV



DESCRIPTION

Single core and multi-core cable with copper conductor, mica tape, XLEVA-MI compound and LSOH sheathed. Cable are rated at 0.6 / 1 (1.2) kV.

CONSTRUCTION

Conductor

Plain circular or compacted stranded copper conductor, conform to IEC 60228 class 2.

Fire proof layer

Mica tape.

Insulation

Flame retardant Cross-linked low smoke zero halogen mineral insulated (XLEVA-MI) compound.

Colours for core identification

Single core	natural
Two core	red, black
Three core	red, yellow and blue
Four core	red, yellow, blue and black

OR

New core colours

Single core	brown or blue
Two core	brown, blue
Three core	brown, black, grey
Four core	brown, black, grey, blue

Assembly

Two, three or four insulated cores are laid up together, if necessary filled with non-hygroscopic material compatible with the insulation.

Sheath

Flame retardant low smoke zero halogen (LSOH) compound, colour orange

**MINERAL INSULATED UNARMoured LSOH SHEATHED FIRE RESISTANT (FR) AND FLAME RETARDANT CABLE - SINGLE CORE CU/MICA/XLEVA-MI/LSOH CABLE
0.6 / I (1.2) kV**

Nominal cross-sectional area	Conductor Shape	Nominal thickness of insulation	Nominal thickness of sheath	Approx. overall diameter	Approx. cable weight	Current Rating	Voltage Drop
mm ²		mm	mm	mm	Kg / Km	A	mV/A/m
1.5	r.m.	0.7	1.4	6.3	60	25	27
2.5	r.m.	0.7	1.4	6.7	70	33	16
4	r.m.	0.7	1.4	7.3	90	44	10
6	r.m.	0.7	1.4	7.8	120	56	6.8
10	r.m.	0.7	1.4	8.8	170	77	4.0
16	c.c.	0.7	1.4	9.6	230	102	2.5
25	c.c.	0.9	1.4	11.3	340	135	1.62
35	c.c.	0.9	1.4	12.4	440	169	1.18
50	c.c.	1.0	1.4	13.8	580	207	0.87
70	c.c.	1.1	1.4	15.7	800	268	0.62
95	c.c.	1.1	1.5	17.7	1070	328	0.47
120	c.c.	1.2	1.5	19.4	1330	383	0.39
150	c.c.	1.4	1.6	21.4	1680	444	0.33
185	c.c.	1.6	1.6	23.6	2020	510	0.28
240	c.c.	1.7	1.7	26.4	2610	607	0.24
300	c.c.	1.8	1.8	29.4	3270	703	0.21
400	c.c.	2.0	1.9	32.7	4160	823	0.195
500	c.c.	2.2	2.0	36.3	5220	946	0.180
630	c.c.	2.4	2.2	40.8	6680	1069	0.170
800	c.c.	2.6	2.3	44.4	8440	1214	0.165
1000	r.m.	2.8	2.4	52.8	10700	1349	0.155

**MINERAL INSULATED UNARMoured LSOH SHEATHED FIRE RESISTANT (FR) AND FLAME RETARDANT CABLE - TWO CORES CU/MICA/XLEVA-MI/LSOH CABLE
0.6 / I (1.2) kV**

Nominal cross-sectional area	Conductor Shape	Nominal thickness of insulation	Nominal thickness of sheath	Approx. overall diameter	Approx. cable weight	Current Rating	Voltage Drop
mm ²		mm	mm	mm	Kg / Km	A	mV/A/m
1.5	r.m.	0.7	1.8	10.7	150	26	31
2.5	r.m.	0.7	1.8	11.6	180	36	19
4	r.m.	0.7	1.8	12.6	220	49	12
6	r.m.	0.7	1.8	13.8	280	63	7.9
10	r.m.	0.7	1.8	15.6	390	86	4.7
16	c.c.	0.7	1.8	17.7	540	115	2.9
25	c.c.	0.9	1.8	21.0	800	149	1.9
35	c.c.	0.9	1.8	23.3	1030	185	1.35
50	c.c.	1.0	1.8	26.1	1340	225	1.00
70	c.c.	1.1	1.8	29.9	1840	289	0.69
95	c.c.	1.1	1.9	33.6	2450	352	0.52
120	c.c.	1.2	2.0	37.2	3060	410	0.42
150	c.c.	1.4	2.2	41.4	3850	473	0.35
185	c.c.	1.6	2.3	45.9	4660	542	0.29
240	c.c.	1.7	2.5	51.6	6020	641	0.24
300	c.c.	1.8	2.6	57.2	7500	741	0.21
400	c.c.	2.0	2.9	64.2	9560	865	0.19

Note : r.m. - circular stranded, c.c. - compacted circular stranded.

**MINERAL INSULATED UNARMoured LSOH SHEATHED FIRE RESISTANT (FR) AND FLAME RETARDANT CABLE - THREE CORES CU/MICA/XLEVA-MI/LSOH CABLE
0.6 / 1 (1.2) kV**

Nominal cross-sectional area	Conductor Shape	Nominal thickness of insulation	Nominal thickness of sheath	Approx. overall diameter	Approx. cable weight	Current Rating	Voltage Drop
mm ²		mm	mm	mm	Kg / Km	A	mV/A/m
1.5	r.m.	0.7	1.8	11.3	180	23	27
2.5	r.m.	0.7	1.8	12.2	220	32	16
4	r.m.	0.7	1.8	13.3	280	42	10
6	r.m.	0.7	1.8	14.6	360	54	6.8
10	r.m.	0.7	1.8	16.6	510	75	4.0
16	c.c.	0.7	1.8	18.8	720	100	2.5
25	c.c.	0.9	1.8	22.3	1070	127	1.65
35	c.c.	0.9	1.8	24.8	1400	158	1.15
50	c.c.	1.0	1.8	27.8	1830	192	0.87
70	c.c.	1.1	1.9	32.1	2560	246	0.60
95	c.c.	1.1	2.0	36.1	3420	298	0.45
120	c.c.	1.2	2.1	40.0	4280	346	0.37
150	c.c.	1.4	2.3	44.4	5400	399	0.30
185	c.c.	1.6	2.4	49.3	6520	456	0.26
240	c.c.	1.7	2.6	55.4	8450	538	0.21
300	c.c.	1.8	2.7	61.4	10540	621	0.185
400	c.c.	2.0	3.0	68.9	13450	741	0.165

**MINERAL INSULATED UNARMoured LSOH SHEATHED FIRE RESISTANT (FR) AND FLAME RETARDANT CABLE - FOUR CORES CU/MICA/XLEVA-MI/LSOH CABLE
0.6 / 1 (1.2) kV**

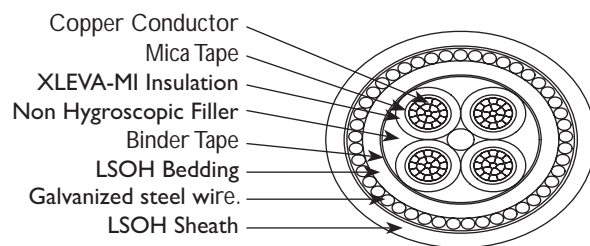
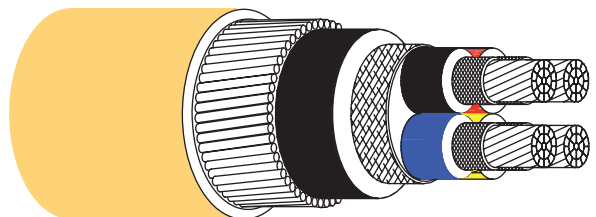
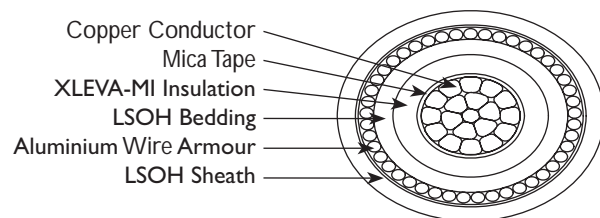
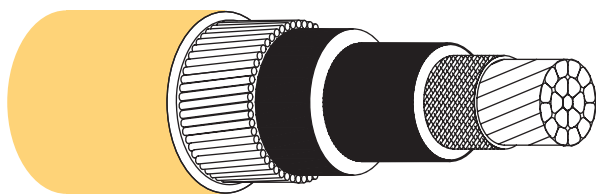
Nominal cross-sectional area	Conductor Shape	Nominal thickness of insulation	Nominal thickness of sheath	Approx. overall diameter	Approx. cable weight	Current Rating	Voltage Drop
mm ²		mm	mm	mm	Kg / Km	A	mV/A/m
1.5	r.m.	0.7	1.8	12.2	210	23	27
2.5	r.m.	0.7	1.8	13.2	270	32	16
4	r.m.	0.7	1.8	14.5	350	42	10
6	r.m.	0.7	1.8	15.9	450	54	6.8
10	r.m.	0.7	1.8	18.1	650	75	4.0
16	c.c.	0.7	1.8	20.5	920	100	2.5
25	c.c.	0.9	1.8	24.5	1390	127	1.65
35	c.c.	0.9	1.8	27.3	1820	158	1.15
50	c.c.	1.0	1.8	30.6	2380	192	0.87
70	c.c.	1.1	2.0	35.6	3350	246	0.60
95	c.c.	1.1	2.1	40.1	4490	298	0.45
120	c.c.	1.2	2.3	44.6	5640	346	0.37
150	c.c.	1.4	2.4	49.3	7100	399	0.30
185	c.c.	1.6	2.6	54.9	8600	456	0.26
240	c.c.	1.7	2.8	61.7	11140	538	0.21
300	c.c.	1.8	3.0	68.7	13940	621	0.185
400	c.c.	2.0	3.3	77.0	17780	741	0.165

Note : r.m. - circular stranded, c.c. - compacted circular stranded.

MINERAL INSULATED ARMoured LSOH SHEATHED FIRE RESISTANT (FR) AND FLAME RETARDANT CABLE

1) CU/MICA/XLEVA-MI/LSOH/AWA/LSOH CABLE

2) CU/MICA/XLEVA-MI/LSOH/SWA/LSOH CABLE 0.6 / I (1.2) kV



DESCRIPTION

Single core and multi-core cable with copper conductor; mica tape, XLEVA-MI insulation, LSOH bedding, aluminium or galvanized steel wire armoured and LSOH sheathed. Cable are rated at 0.6 / I (1.2) kV.

CONSTRUCTION

Conductor

Plain circular or compacted stranded copper conductor; conform to IEC 60228 class 2.

Fire proof layer

Mica tape.

Insulation

Flame retardant Cross-linked low smoke zero halogen mineral insulated (XLEVA-MI) compound.

Colours for core identification

Single core	natural
Two core	red, black
Three core	red, yellow and blue
Four core	red, yellow, blue and black

OR

New core colours

Single core	brown or blue
Two core	brown, blue
Three core	brown, black, grey
Four core	brown, black, grey, blue

Assembly

Two, three or four insulated conductors are laid up together, if necessary filled with non-hygroscopic material compatible with the insulation.

Bedding

Flame retardant low smoke zero halogen (LSOH) compound.

Armour

Single Core -- Aluminium wire.
Multi Cores -- Galvanized steel wire.

Sheath

Flame retardant low smoke zero halogen (LSOH) compound, colour orange

MINERAL INSULATED ARMoured LSOH SHEATHED FIRE RESISTANT (FR) AND FLAME RETARDANT CABLE - SINGLE CORE CU/MICA/XLEVA-MI/LSOH/AWA/LSOH CABLE **0.6 / 1 (1.2) kV**

Nominal cross-sectional area	Conductor Shape	Nominal thickness of insulation	Approx. bedding diameter	Nominal diameter of aluminium	Nominal thickness of sheath	Approx. overall diameter	Approx. cable weight	Current Rating	Voltage Drop
mm ²		mm	mm	mm	mm	mm	Kg / Km	A	mV/A/m
1.5	r.m.	0.7	5.5	0.9	1.8	10.9	170	28	27
2.5	r.m.	0.7	5.9	0.9	1.8	11.3	190	37	16
4	r.m.	0.7	6.5	0.9	1.8	11.9	220	48	10
6	r.m.	0.7	7.0	0.9	1.8	12.4	250	60	6.8
10	r.m.	0.7	8.0	0.9	1.8	13.4	310	82	4.0
16	c.c.	0.7	8.8	0.9	1.8	14.2	380	106	2.5
25	c.c.	0.9	10.5	0.9	1.8	15.9	520	140	1.62
35	c.c.	0.9	11.6	0.9	1.8	17.0	630	170	1.18
50	c.c.	1.0	13.0	1.25	1.8	19.1	830	222	0.87
70	c.c.	1.1	14.9	1.25	1.8	21.0	1080	285	0.62
95	c.c.	1.1	16.7	1.25	1.8	22.8	1380	346	0.47
120	c.c.	1.2	18.4	1.6	1.8	25.2	1730	402	0.39
150	c.c.	1.4	20.2	1.6	1.8	27.0	2090	463	0.33
185	c.c.	1.6	22.4	1.6	1.8	29.2	2470	529	0.28
240	c.c.	1.7	25.0	1.6	1.9	32.0	3110	625	0.24
300	c.c.	1.8	27.8	1.6	1.9	34.8	3800	720	0.21
400	c.c.	2.0	31.3	2.0	2.1	39.5	4910	815	0.195
500	c.c.	2.2	34.7	2.0	2.2	43.1	6050	918	0.180
630	c.c.	2.4	38.8	2.0	2.3	47.4	7580	1027	0.170
800	c.c.	2.6	42.6	2.5	2.5	53.1	9640	1119	0.165
1000	r.m.	2.8	50.8	2.5	2.7	61.7	12120	1214	0.155

MINERAL INSULATED ARMoured LSOH SHEATHED FIRE RESISTANT (FR) AND FLAME RETARDANT CABLE - TWO CORES CU/MICA/XLEVA-MI/LSOH/SWA/LSOH CABLE **0.6 / 1 (1.2) kV**

Nominal cross-sectional area	Conductor Shape	Nominal thickness of insulation	Approx. bedding diameter	Nominal diameter of steel wire	Nominal thickness of sheath	Approx. overall diameter	Approx. cable weight	Current Rating	Voltage Drop
mm ²		mm	mm	mm	mm	mm	Kg / Km	A	mV/A/m
1.5	r.m.	0.7	9.1	0.9	1.8	14.5	400	29	31
2.5	r.m.	0.7	10.0	0.9	1.8	15.4	450	39	19
4	r.m.	0.7	11.0	0.9	1.8	16.4	520	52	12
6	r.m.	0.7	12.2	0.9	1.8	17.6	600	66	7.9
10	r.m.	0.7	14.0	1.25	1.8	20.1	870	90	4.7
16	c.c.	0.7	16.1	1.25	1.8	22.2	1090	115	2.9
25	c.c.	0.9	19.4	1.6	1.8	26.2	1600	152	1.9
35	c.c.	0.9	21.7	1.6	1.8	28.5	1910	188	1.35
50	c.c.	1.0	24.5	1.6	1.8	31.3	2330	228	1.00
70	c.c.	1.1	28.3	1.6	2.0	35.5	3000	291	0.69
95	c.c.	1.1	32.2	2.0	2.1	40.4	4060	354	0.52
120	c.c.	1.2	35.6	2.0	2.2	44.0	4840	410	0.42
150	c.c.	1.4	39.4	2.0	2.3	48.0	5810	472	0.35
185	c.c.	1.6	44.1	2.5	2.5	54.6	7350	539	0.29
240	c.c.	1.7	49.4	2.5	2.7	60.3	9010	636	0.24
300	c.c.	1.8	55.2	2.5	2.8	66.3	10850	732	0.21
400	c.c.	2.0	61.6	2.5	3.1	73.3	13320	847	0.19

Note : r.m. - circular stranded, c.c. - compacted circular stranded

MINERAL INSULATED ARMoured LSOH SHEATHED FIRE RESISTANT (FR) AND FLAME RETARDANT CABLE - THREE CORES CU/MICA/XLEVA-MI/LSOH/SWA/LSOH CABLE **0.6 / 1 (1.2) kV**

Nominal cross-sectional area	Conductor Shape	Nominal thickness of insulation	Approx. bedding diameter	Nominal diameter of steel wire	Nominal thickness of sheath	Approx. overall diameter	Approx. cable weight	Current Rating	Voltage Drop
mm ²		mm	mm	mm	mm	mm	Kg / Km	A	mV/A/m
1.5	r.m.	0.7	9.7	0.9	1.8	15.1	440	25	27
2.5	r.m.	0.7	10.6	0.9	1.8	16.0	500	33	16
4	r.m.	0.7	11.7	0.9	1.8	17.1	590	44	10
6	r.m.	0.7	13.0	0.9	1.8	18.4	700	56	6.8
10	r.m.	0.7	15.0	1.25	1.8	21.1	1020	78	4.0
16	c.c.	0.7	17.2	1.25	1.8	23.3	1290	99	2.5
25	c.c.	0.9	20.7	1.6	1.8	27.5	1920	131	1.65
35	c.c.	0.9	23.2	1.6	1.8	30.0	2340	162	1.15
50	c.c.	1.0	26.2	1.6	1.9	33.2	2900	197	0.87
70	c.c.	1.1	30.7	2.0	2.0	38.7	4090	251	0.60
95	c.c.	1.1	34.5	2.0	2.2	42.9	5160	304	0.45
120	c.c.	1.2	38.2	2.0	2.3	46.8	6190	353	0.37
150	c.c.	1.4	42.6	2.5	2.5	53.1	7990	406	0.30
185	c.c.	1.6	47.3	2.5	2.6	58.0	9370	463	0.26
240	c.c.	1.7	53.4	2.5	2.8	64.5	11700	546	0.21
300	c.c.	1.8	59.2	2.5	3.0	70.7	14180	628	0.185
400	c.c.	2.0	66.1	2.5	3.2	78.0	17470	728	0.165

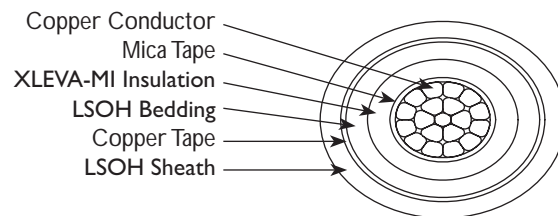
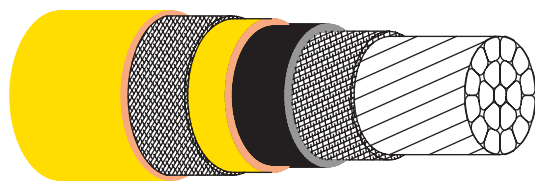
MINERAL INSULATED ARMoured LSOH SHEATHED FIRE RESISTANT (FR) AND FLAME RETARDANT CABLE - FOUR CORES CU/MICA/XLEVA-MI/LSOH/SWA/LSOH CABLE **0.6 / 1 (1.2) kV**

Nominal cross-sectional area	Conductor Shape	Nominal thickness of insulation	Approx. bedding diameter	Nominal diameter of steel wire	Nominal thickness of sheath	Approx. overall diameter	Approx. cable weight	Current Rating	Voltage Drop
mm ²		mm	mm	mm	mm	mm	Kg / Km	A	mV/A/m
1.5	r.m.	0.7	10.6	0.9	1.8	16.0	500	25	27
2.5	r.m.	0.7	11.6	0.9	1.8	17.0	570	33	16
4	r.m.	0.7	12.9	0.9	1.8	18.3	690	44	10
6	r.m.	0.7	14.3	1.25	1.8	20.4	940	56	6.8
10	r.m.	0.7	16.5	1.25	1.8	22.6	1200	78	4.0
16	c.c.	0.7	18.9	1.6	1.8	25.7	1700	99	2.5
25	c.c.	0.9	22.9	1.6	1.8	29.7	2310	131	1.65
35	c.c.	0.9	25.7	1.6	1.9	32.7	2860	162	1.15
50	c.c.	1.0	29.0	1.6	2.0	36.2	3570	197	0.87
70	c.c.	1.1	34.0	2.0	2.2	42.4	5060	251	0.60
95	c.c.	1.1	38.3	2.0	2.3	46.9	6400	304	0.45
120	c.c.	1.2	42.8	2.5	2.5	53.3	8240	353	0.37
150	c.c.	1.4	47.3	2.5	2.6	58.0	9940	406	0.30
185	c.c.	1.6	52.5	2.5	2.8	63.6	11750	463	0.26
240	c.c.	1.7	59.3	2.5	3.0	70.8	14750	546	0.21
300	c.c.	1.8	65.9	2.5	3.2	77.8	17960	628	0.185
400	c.c.	2.0	74.0	3.15	3.5	87.3	23410	728	0.165

Note : r.m. - circular stranded, c.c. - compacted circular stranded

MINERAL INSULATED SCREENED UNARMoured LSOH SHEATHED FIRE RESISTANT (FR) AND FLAME RETARDANT CABLE

CU/MICA/XLEVA-MI/LSOH/SCT/ LSOH CABLE 0.6 / 1 (1.2) kV



DESCRIPTION

Single core and multi-core cable with copper conductor, mica tape, XLEVA-MI compound, copper tape screen and LSOH sheathed. Cable are rated at 0.6 / 1 (1.2) Kv.

CONSTRUCTION

Conductor

Plain circular or compacted stranded copper conductor, conform to IEC 60228 class 2.

Fire proof layer

Mica tape.

Insulation

Flame retardant low smoke zero halogen Cross-linked mineral insulated (XLEVA-MI) compound.

Bedding

Flame retardant low smoke zero halogen (LSOH) compound.

Metallic Screen

Copper Tape Screen (SCT)

Sheath

Flame retardant low smoke zero halogen (LSOH) compound, colour orange

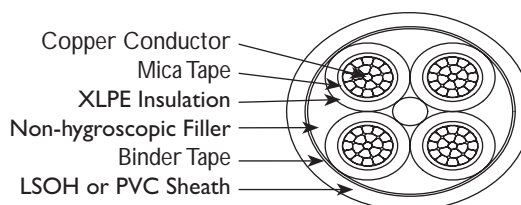
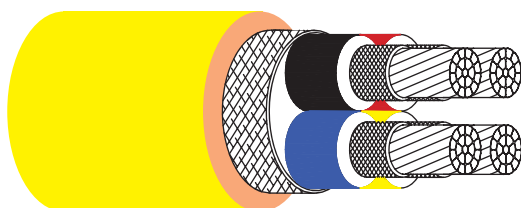
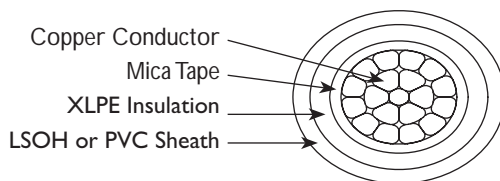
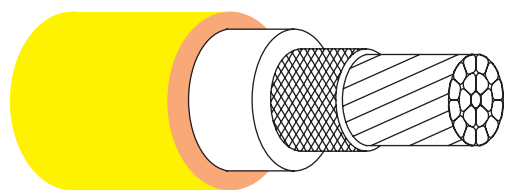
Nominal cross-sectional area	Conductor Shape	Nominal thickness of insulation	Approx. bedding diameter	Nominal thickness of sheath	Approx. overall diameter	Approx. cable weight	Current Rating	Voltage Drop
mm ²		mm	mm	mm	mm	Kg / Km	A	mV/A/m
1.5	r.m	0.7	5.5	1.8	9.5	130	28	27
2.5	r.m	0.7	5.9	1.8	9.9	150	37	16
4	r.m	0.7	6.5	1.8	10.5	170	48	10
6	r.m	0.7	7.0	1.8	11.0	200	60	6.8
10	r.m	0.7	8.0	1.8	12.0	260	82	4.0
16	c.c.	0.7	8.8	1.8	13.0	350	106	2.5
25	c.c.	0.9	10.5	1.8	14.7	480	140	1.62
35	c.c.	0.9	11.6	1.8	15.8	600	170	1.18
50	c.c.	1.0	13.0	1.8	17.2	750	222	0.87
70	c.c.	1.1	14.9	1.8	19.1	990	285	0.62
95	c.c.	1.1	16.7	1.8	20.9	1280	346	0.47
120	c.c.	1.2	18.4	1.8	22.6	1560	402	0.39
150	c.c.	1.4	20.2	1.8	24.4	1920	463	0.33
185	c.c.	1.6	22.4	1.8	26.6	2280	529	0.28
240	c.c.	1.7	25.0	1.8	29.2	2890	625	0.24
300	c.c.	1.8	27.8	1.9	32.2	3570	720	0.21
400	c.c.	2.0	31.3	2.0	35.9	4530	815	0.195
500	c.c.	2.2	34.7	2.1	39.5	5630	918	0.180
630	c.c.	2.4	38.8	2.2	43.8	7120	1027	0.170
800	c.c.	2.6	42.6	2.4	48.0	8990	1119	0.165
1000	r.m.	2.8	50.8	2.5	56.4	11340	1214	0.155

Note : r.m. - circular stranded, c.c. - compacted circular stranded

FIRE RESISTANT (FR) AND FLAME RETARDANT UNARMoured LSOH OR PVC SHEATHED CABLE

CU/MICA/XLPE/LSOH OR CU/MICA/XLPE/PVC CABLE

0.6 / 1 (1.2) kV



DESCRIPTION

Single core and multi-core cable with copper conductor, mica tape, XLPE compound and LSOH or PVC sheathed. Cable are rated at 0.6 / 1 (1.2) kV.

CONSTRUCTION

Conductor

Plain circular or compacted stranded copper conductor, conform to IEC 60228 class 2.

Fire proof layer

Mica tape.

Insulation

Cross-linked Polyethylene (XLPE) compound.

Colours for core identification

Single core	natural
Two core	red, black
Three core	red, yellow and blue
Four core	red, yellow, blue and black

OR

New core colours

Single core	brown or blue
Two core	brown, blue
Three core	brown, black, grey
Four core	brown, black, grey, blue

Assembly

Two, three or four insulated cores are laid up together, if necessary filled with non-hygroscopic material compatible with the insulation.

Sheath

Flame retardant low smoke zero halogen (LSOH) compound or flame retardant PVC compound, colour orange

FIRE RESISTANT (FR) AND FLAME RETARDANT UNARMoured LSOH OR PVC SHEATHED CABLE - SINGLE CORE CU/MICA/XLPE/LSOH OR CU/MICA/XLPE/PVC CABLE **0.6 / 1 (1.2) kV**

Nominal cross-sectional area	Conductor Shape	Nominal thickness of insulation	Nominal thickness of sheath	Approx. overall diameter	Approx. cable weight	Current Rating	Voltage Drop
mm ²		mm	mm	mm	Kg / Km	A	mV/A/m
1.5	r.m.	0.7	1.4	6.3	50	25	27
2.5	r.m.	0.7	1.4	6.7	70	33	16
4	r.m.	0.7	1.4	7.3	80	44	10
6	r.m.	0.7	1.4	7.8	110	56	6.8
10	r.m.	0.7	1.4	8.8	150	77	4.0
16	c.c.	0.7	1.4	9.6	220	102	2.5
25	c.c.	0.9	1.4	11.3	320	135	1.62
35	c.c.	0.9	1.4	12.4	420	169	1.18
50	c.c.	1.0	1.4	13.8	550	207	0.87
70	c.c.	1.1	1.4	15.7	770	268	0.62
95	c.c.	1.1	1.5	17.7	1040	328	0.47
120	c.c.	1.2	1.5	19.4	1300	383	0.39
150	c.c.	1.4	1.6	21.4	1630	444	0.33
185	c.c.	1.6	1.6	23.6	1960	510	0.28
240	c.c.	1.7	1.7	26.4	2540	607	0.24
300	c.c.	1.8	1.8	29.4	3130	703	0.21
400	c.c.	2.0	1.9	32.7	3960	823	0.195
500	c.c.	2.2	2.0	36.3	4950	946	0.180
630	c.c.	2.4	2.2	40.8	6320	1069	0.170
800	c.c.	2.6	2.3	44.4	7940	1214	0.165
1000	r.m.	2.8	2.4	52.8	9950	1349	0.155

FIRE RESISTANT (FR) AND FLAME RETARDANT UNARMoured LSOH OR PVC SHEATHED CABLE - TWO CORES CU/MICA/XLPE/LSOH OR CU/MICA/XLPE/PVC CABLE **0.6 / 1 (1.2) kV**

Nominal cross-sectional area	Conductor Shape	Nominal thickness of insulation	Nominal thickness of sheath	Approx. overall diameter	Approx. cable weight	Current Rating	Voltage Drop
mm ²		mm	mm	mm	Kg / Km	A	mV/A/m
1.5	r.m.	0.7	1.8	10.7	130	26	31
2.5	r.m.	0.7	1.8	11.6	160	36	19
4	r.m.	0.7	1.8	12.6	210	49	12
6	r.m.	0.7	1.8	13.8	270	63	7.9
10	r.m.	0.7	1.8	15.6	370	86	4.7
16	c.c.	0.7	1.8	17.3	510	115	2.9
25	c.c.	0.9	1.8	20.6	760	149	1.9
35	c.c.	0.9	1.8	22.9	990	185	1.35
50	c.c.	1.0	1.8	26.1	1300	225	1.00
70	c.c.	1.1	1.8	29.9	1790	289	0.69
95	c.c.	1.1	1.9	33.6	2390	352	0.52
120	c.c.	1.2	2.0	37.2	2980	410	0.42
150	c.c.	1.4	2.2	41.4	3760	473	0.35
185	c.c.	1.6	2.3	45.9	4540	542	0.29
240	c.c.	1.7	2.5	51.6	5870	641	0.24
300	c.c.	1.8	2.6	57.2	7330	741	0.21
400	c.c.	2.0	2.9	64.2	9350	865	0.19

Note : r.m. - circular stranded, c.c. - compacted circular stranded.

FIRE RESISTANT (FR) AND FLAME RETARDANT UNARMoured LSOH OR PVC SHEATHED CABLE - THREE CORES CU/MICA/XLPE/LSOH OR CU/MICA/XLPE/PVC CABLE **0.6 / 1 (1.2) kV**

Nominal cross-sectional area	Conductor Shape	Nominal thickness of insulation	Nominal thickness of sheath	Approx. overall diameter	Approx. cable weight	Current Rating	Voltage Drop
mm ²		mm	mm	mm	Kg / Km	A	mV/A/m
1.5	r.m.	0.7	1.8	11.3	150	23	27
2.5	r.m.	0.7	1.8	12.2	190	32	16
4	r.m.	0.7	1.8	13.3	260	42	10
6	r.m.	0.7	1.8	14.6	340	54	6.8
10	r.m.	0.7	1.8	16.6	490	75	4.0
16	c.c.	0.7	1.8	18.4	680	100	2.5
25	c.c.	0.9	1.8	21.9	1020	127	1.65
35	c.c.	0.9	1.8	24.4	1340	158	1.15
50	c.c.	1.0	1.8	27.8	1770	192	0.87
70	c.c.	1.1	1.9	32.1	2480	246	0.60
95	c.c.	1.1	2.0	36.1	3330	298	0.45
120	c.c.	1.2	2.1	40.0	4170	346	0.37
150	c.c.	1.4	2.3	44.4	5260	399	0.30
185	c.c.	1.6	2.4	49.3	6340	456	0.26
240	c.c.	1.7	2.6	55.4	8230	538	0.21
300	c.c.	1.8	2.7	61.4	10290	621	0.185
400	c.c.	2.0	3.0	68.9	13140	741	0.165

FIRE RESISTANT (FR) AND FLAME RETARDANT UNARMoured LSOH OR PVC SHEATHED CABLE - FOUR CORES CU/MICA/XLPE/LSOH OR CU/MICA/XLPE/PVC CABLE **0.6 / 1 (1.2) kV**

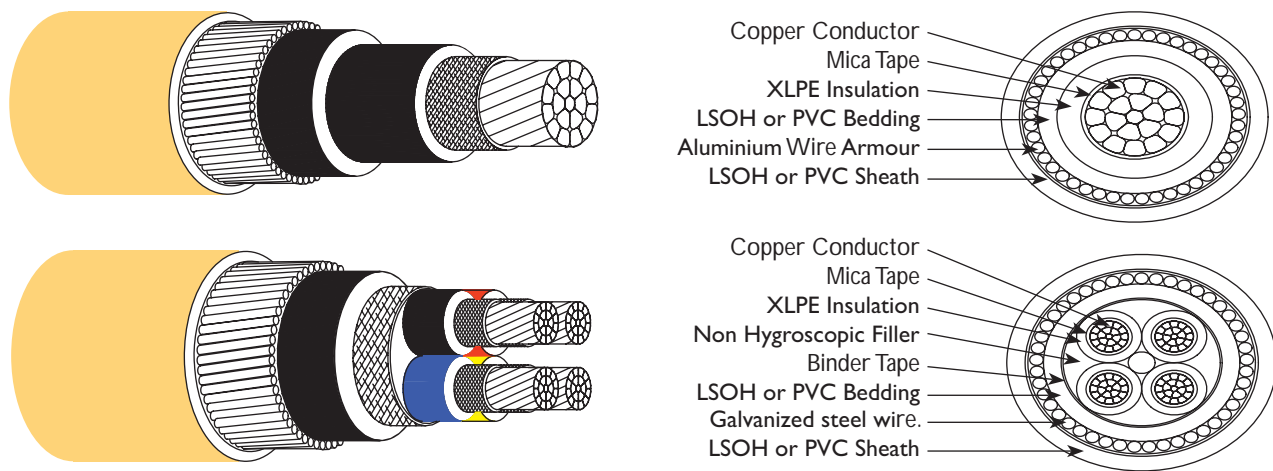
Nominal cross-sectional area	Conductor Shape	Nominal thickness of insulation	Nominal thickness of sheath	Approx. overall diameter	Approx. cable weight	Current Rating	Voltage Drop
mm ²		mm	mm	mm	Kg / Km	A	mV/A/m
1.5	r.m.	0.7	1.8	12.2	190	23	27
2.5	r.m.	0.7	1.8	13.2	240	32	16
4	r.m.	0.7	1.8	14.5	320	42	10
6	r.m.	0.7	1.8	15.9	420	54	6.8
10	r.m.	0.7	1.8	18.1	620	75	4.0
16	c.c.	0.7	1.8	20.1	880	100	2.5
25	c.c.	0.9	1.8	24.1	1320	127	1.65
35	c.c.	0.9	1.8	26.9	1740	158	1.15
50	c.c.	1.0	1.8	30.6	2300	192	0.87
70	c.c.	1.1	2.0	35.6	3240	246	0.60
95	c.c.	1.1	2.1	40.1	4370	298	0.45
120	c.c.	1.2	2.3	44.6	5500	346	0.37
150	c.c.	1.4	2.4	49.3	6910	399	0.30
185	c.c.	1.6	2.6	54.9	8330	456	0.26
240	c.c.	1.7	2.8	61.7	10820	538	0.21
300	c.c.	1.8	3.0	68.7	13560	621	0.185
400	c.c.	2.0	3.3	77.0	17300	741	0.165

Note : r.m. - circular stranded conductor, c.c. - compacted circular stranded

FIRE RESISTANT (FR) AND FLAME RETARDANT ARMOURED LSOH OR PVC SHEATHED CABLE

- 1) CU/MICA/XLPE/LSOH/AWA/LSOH CABLE
- 2) CU/MICA/XLPE/PVC/AWA/PVC CABLE
- 3) CU/MICA/XLPE/LSOH/SWA/LSOH CABLE
- 4) CU/MICA/XLPE/PVC/SWA/PVC CABLE

0.6 / 1 (1.2) kV



DESCRIPTION

Single core and multi-core cable with copper conductor, mica tape, XLPE insulation, LSOH or PVC bedding, aluminium or galvanised steel wire armoured and LSOH or PVC sheathed. Cable are rated at 0.6 / 1 (1.2) kV.

CONSTRUCTION

Conductor

Plain circular or compacted stranded copper conductor, conform to IEC 60228 class 2.

Fire proof layer

Mica tape.

Insulation

Cross-linked Polyethylene (XLPE) compound.

Colours for core identification

Single core	natural
Two core	red, black
Three core	red, yellow and blue
Four core	red, yellow, blue and black

OR

New core colours

Single core	brown or blue
Two core	brown, blue
Three core	brown, black, grey
Four core	brown, black, grey, blue

Assembly

Two, three or four insulated conductors are laid up together, if necessary filled with non-hygroscopic material compatible with the insulation.

Bedding

Flame retardant low smoke zero halogen (LSOH) or PVC compound.

Armour

Single Core -- Aluminium wire.
Multi Cores -- Galvanized steel wire.

Sheath

Flame retardant low smoke zero halogen (LSOH) compound or flame retardant PVC compound, colour orange

**FIRE RESISTANT (FR) AND FLAME RETARDANT ARMoured LSOH
OR PVC SHEATHED CABLE - SINGLE CORE
CU/MICA/XLPE/LSOH/AWA/LSOH CABLE OR
CU/MICA/XLPE/PVC/AWA/PVC CABLE**

0.6 / 1 (1.2) kV

Nominal cross-sectional area	Conductor Shape	Nominal thickness of insulation	Approx. bedding diameter	Nominal diameter of aluminium	Nominal thickness of sheath	Approx. overall diameter	Approx. cable weight	Current Rating	Voltage Drop
mm ²		mm	mm	mm	mm	mm	Kg / Km	A	mV/A/m
1.5	r.m.	0.7	5.5	0.9	1.8	10.9	160	28	27
2.5	r.m.	0.7	5.9	0.9	1.8	11.3	180	37	16
4	r.m.	0.7	6.5	0.9	1.8	11.9	210	48	10
6	r.m.	0.7	7.0	0.9	1.8	12.4	240	60	6.8
10	r.m.	0.7	8.0	0.9	1.8	13.4	300	82	4.0
16	c.c.	0.7	8.8	0.9	1.8	14.2	370	106	2.5
25	c.c.	0.9	10.5	0.9	1.8	15.9	500	140	1.62
35	c.c.	0.9	11.6	0.9	1.8	17.0	620	170	1.18
50	c.c.	1.0	13.0	1.25	1.8	19.1	810	222	0.87
70	c.c.	1.1	14.9	1.25	1.8	21.0	1050	285	0.62
95	c.c.	1.1	16.7	1.25	1.8	22.8	1340	346	0.47
120	c.c.	1.2	18.4	1.6	1.8	25.7	1680	402	0.39
150	c.c.	1.4	20.2	1.6	1.8	27.5	1990	463	0.33
185	c.c.	1.6	22.4	1.6	1.8	29.7	2400	529	0.28
240	c.c.	1.7	25.0	1.6	1.9	32.5	3030	625	0.24
300	c.c.	1.8	27.8	1.6	1.9	35.3	3710	720	0.21
400	c.c.	2.0	31.3	2.0	2.1	40.0	4790	815	0.195
500	c.c.	2.2	34.7	2.0	2.2	43.6	5900	918	0.180
630	c.c.	2.4	38.8	2.0	2.3	47.9	7400	1027	0.170
800	c.c.	2.6	42.6	2.5	2.5	53.1	9450	1119	0.165
1000	r.m.	2.8	50.8	2.5	2.7	61.7	11880	1214	0.155

**FIRE RESISTANT (FR) AND FLAME RETARDANT ARMoured LSOH
OR PVC SHEATHED CABLE - TWO CORES
CU/MICA/XLPE/LSOH/SWA/LSOH CABLE OR
CU/MICA/XLPE/PVC/SWA/PVC CABLE**

0.6 / 1 (1.2) kV

Nominal cross-sectional area	Conductor Shape	Nominal thickness of insulation	Approx. bedding diameter	Nominal diameter of steel wire	Nominal thickness of sheath	Approx. overall diameter	Approx. cable weight	Current Rating	Voltage Drop
mm ²		mm	mm	mm	mm	mm	Kg / Km	A	mV/A/m
1.5	r.m.	0.7	9.1	0.9	1.8	14.5	390	29	31
2.5	r.m.	0.7	10.0	0.9	1.8	15.4	440	39	19
4	r.m.	0.7	11.0	0.9	1.8	16.4	500	52	12
6	r.m.	0.7	12.2	0.9	1.8	17.6	590	66	7.9
10	r.m.	0.7	14.0	1.25	1.8	20.1	850	90	4.7
16	c.c.	0.7	15.7	1.25	1.8	21.8	1050	115	2.9
25	c.c.	0.9	19.0	1.6	1.8	25.8	1550	152	1.9
35	c.c.	0.9	21.3	1.6	1.8	28.1	1860	188	1.35
50	c.c.	1.0	24.5	1.6	1.8	31.3	2280	228	1.00
70	c.c.	1.1	28.3	1.6	2.0	35.5	2940	291	0.69
95	c.c.	1.1	32.2	2.0	2.1	40.4	4000	354	0.52
120	c.c.	1.2	35.6	2.0	2.2	44.0	4760	410	0.42
150	c.c.	1.4	39.4	2.0	2.3	48.0	5610	472	0.35
185	c.c.	1.6	44.1	2.5	2.5	55.1	7250	539	0.29
240	c.c.	1.7	49.4	2.5	2.7	60.8	8900	636	0.24
300	c.c.	1.8	55.2	2.5	2.8	66.8	10710	732	0.21
400	c.c.	2.0	61.6	2.5	3.1	73.8	13140	847	0.19

Note : r.m. - circular stranded, c.c. - compacted circular stranded

**FIRE RESISTANT (FR) AND FLAME RETARDANT ARMoured LSOH
OR PVC SHEATHED CABLE - THREE CORES
CU/MICA/XLPE/LSOH/SWA/LSOH CABLE OR
CU/MICA/XLPE/PVC/SWA/PVC CABLE**

0.6 / 1 (1.2) kV

Nominal cross-sectional area	Conductor Shape	Nominal thickness of insulation	Approx. bedding diameter	Nominal diameter of steel wire	Nominal thickness of sheath	Approx. overall diameter	Approx. cable weight	Current Rating	Voltage Drop
mm ²		mm	mm	mm	mm	mm	Kg / Km	A	mV/A/m
1.5	r.m.	0.7	9.7	0.9	1.8	15.1	410	25	27
2.5	r.m.	0.7	10.6	0.9	1.8	16.0	470	33	16
4	r.m.	0.7	11.7	0.9	1.8	17.1	570	44	10
6	r.m.	0.7	13.0	0.9	1.8	18.4	680	56	6.8
10	r.m.	0.7	15.0	1.25	1.8	21.1	1000	78	4.0
16	c.c.	0.7	16.8	1.25	1.8	22.9	1250	99	2.5
25	c.c.	0.9	20.3	1.6	1.8	27.1	1860	131	1.65
35	c.c.	0.9	22.8	1.6	1.8	29.6	2270	162	1.15
50	c.c.	1.0	26.2	1.6	1.9	33.2	2840	197	0.87
70	c.c.	1.1	30.7	2.0	2.0	38.7	4010	251	0.60
95	c.c.	1.1	34.5	2.0	2.2	42.9	5070	304	0.45
120	c.c.	1.2	38.2	2.0	2.3	46.8	6080	353	0.37
150	c.c.	1.4	42.6	2.5	2.5	53.6	7720	406	0.30
185	c.c.	1.6	47.3	2.5	2.6	58.5	9220	463	0.26
240	c.c.	1.7	53.4	2.5	2.8	65.0	11520	546	0.21
300	c.c.	1.8	59.2	2.5	3.0	71.2	13960	628	0.185
400	c.c.	2.0	66.1	2.5	3.2	78.5	17190	728	0.165

**FIRE RESISTANT (FR) AND FLAME RETARDANT ARMoured LSOH
OR PVC SHEATHED CABLE - FOUR CORES
CU/MICA/XLPE/LSOH/SWA/LSOH CABLE OR
CU/MICA/XLPE/PVC/SWA/PVC CABLE**

0.6 / 1 (1.2) kV

Nominal cross-sectional area	Conductor Shape	Nominal thickness of insulation	Approx. bedding diameter	Nominal diameter of steel wire	Nominal thickness of sheath	Approx. overall diameter	Approx. cable weight	Current Rating	Voltage Drop
mm ²		mm	mm	mm	mm	mm	Kg / Km	A	mV/A/m
1.5	r.m.	0.7	10.6	0.9	1.8	16.0	470	25	27
2.5	r.m.	0.7	11.5	0.9	1.8	16.9	540	33	16
4	r.m.	0.7	12.9	0.9	1.8	18.3	640	44	10
6	r.m.	0.7	14.3	1.25	1.8	20.4	910	56	6.8
10	r.m.	0.7	16.5	1.25	1.8	22.6	1170	78	4.0
16	c.c.	0.7	18.5	1.6	1.8	25.3	1640	99	2.5
25	c.c.	0.9	22.5	1.6	1.8	29.3	2230	131	1.65
35	c.c.	0.9	25.3	1.6	1.9	32.3	2780	162	1.15
50	c.c.	1.0	29.0	1.6	2.0	36.2	3490	197	0.87
70	c.c.	1.1	34.0	2.0	2.2	42.4	4960	251	0.60
95	c.c.	1.1	38.3	2.0	2.3	46.9	6280	304	0.45
120	c.c.	1.2	42.8	2.5	2.5	53.8	8120	353	0.37
150	c.c.	1.4	47.3	2.5	2.6	58.5	9570	406	0.30
185	c.c.	1.6	52.5	2.5	2.8	64.1	11510	463	0.26
240	c.c.	1.7	59.3	2.5	3.0	71.3	14460	546	0.21
300	c.c.	1.8	65.9	2.5	3.2	78.3	17610	628	0.185
400	c.c.	2.0	74.0	3.15	3.5	88.5	22910	728	0.165

Note : r.m. - circular stranded, c.c. - compacted circular stranded

APPENDIX : TECHNICAL DATA

CURRENT CARRYING CAPACITY

The Current Carrying Capacity given in the previous tables are based on the assumption shown below :

- 1) Maximum Conductor Temperature :----- 90°C
- 2) Ambient Temperature :----- 30°C
- 3) For Other Conditions, the rating factor included should be applied.

Table 1 RATING FACTORS FOR CABLE IN FREE AIR

Ambient Air Temperature	20°C	25°C	30°C	35°C	40°C	45°C	50°C
Rating Factor	1.09	1.04	1.00	0.96	0.91	0.87	0.82

All the ratings for cables run in air are based upon the assumption that they are shielded from direct sunlight and without restriction of ventilation.

Effect of grouping cables : No reduction in rating is necessary where there is free circulation of air around the circuits provided that :

1. The horizontal clearance between circuits is not less than twice the overall diameter of an individual cable.
2. The vertical clearance between circuits is not less than four times the diameter of an individual cable.
3. If the number of circuits exceeds three, they are installed in a horizontal plane.

Table 2 GROUP RATING FACTORS FOR CIRCUITS OF THREE SINGLE CORE CABLE, IN TREFOIL AND LAID FLAT TOUCHING, HORIZONTAL FORMATION

Cable voltage (kV)	Number of circuits	Spacing of circuits (between centres of cable groups)					
		Touching		0.15m*	0.3m	0.45m	0.6m
		Trefoil	Laid flat				
0.6 / 1	2	0.77	0.80	0.82	0.88	0.90	0.93
	3	0.65	0.68	0.72	0.79	0.83	0.87
	4	0.59	0.63	0.67	0.75	0.81	0.85
	5	0.55	0.58	0.63	0.72	0.78	0.83
	6	0.52	0.56	0.60	0.70	0.77	0.82
	7	0.50	0.54	0.58	0.68	0.76	0.81
	8	0.48	0.52	0.56	0.66	0.75	0.79
	9	0.46	0.50	0.54	0.64	0.74	0.78
	10	0.44	0.48	0.52	0.62	0.73	0.77

*This spacing will not be possible for some of the larger diameter cable

Table 3 GROUP RATING FACTORS FOR MULTICORE CABLE IN HORIZONTAL FORMATION

Cable voltage (kV)	Number of circuits	Spacing of circuits (between centres of cable groups)				
		Touching	0.15m*	0.3m	0.45m	0.6m
0.6 / 1	2	0.81	0.87	0.91	0.93	0.94
	3	0.70	0.78	0.84	0.87	0.90
	4	0.63	0.74	0.81	0.86	0.89
	5	0.59	0.70	0.78	0.83	0.87
	6	0.55	0.67	0.76	0.82	0.86
	7	0.52	0.64	0.74	0.79	0.83
	8	0.50	0.62	0.72	0.77	0.81
	9	0.48	0.60	0.70	0.75	0.79
	10	0.46	0.58	0.68	0.73	0.77

Table 4 ELECTRICAL CHARACTERISTICS

Conductor size	Single core cable*					Multicore cable		
	Resistance (R)		Short circuit rating at 1 second	Reactance (50Hz)		Resistance (R)		Reactance (50Hz)
	at 20°C (DC)	at 90°C (AC)		Trefoil	Flat#	at 20°C (DC)	at 90°C (AC)	
mm ²	Ohm/km	Ohm/km	kA	Ohm/km	Ohm/km	Ohm/km	Ohm/km	Ohm/km
1.5	12.1	15.4	0.21	0.182	0.271	12.1	15.4	0.103
2.5	7.41	9.45	0.36	0.169	0.252	7.41	9.45	0.097
4	4.61	5.88	0.57	0.158	0.236	4.61	5.88	0.091
6	3.08	3.93	0.86	0.148	0.222	3.08	3.93	0.087
10	1.83	2.33	1.43	0.137	0.206	1.83	2.33	0.082
16	1.15	1.47	2.29	0.129	0.196	1.15	1.47	0.081
25	0.727	0.927	3.58	0.122	0.185	0.727	0.927	0.079
35	0.524	0.668	5.01	0.116	0.175	0.524	0.668	0.077
50	0.387	0.494	7.15	0.106	0.164	0.387	0.494	0.076
70	0.268	0.342	10.02	0.103	0.161	0.268	0.342	0.075
95	0.193	0.247	13.59	0.098	0.156	0.193	0.247	0.073
120	0.153	0.197	17.17	0.096	0.154	0.153	0.197	0.073
150	0.124	0.160	21.46	0.096	0.154	0.124	0.160	0.073
185	0.0991	0.128	26.47	0.096	0.154	0.0991	0.128	0.073
240	0.0754	0.0989	34.34	0.092	0.150	0.0754	0.0989	0.072
300	0.0601	0.0802	42.92	0.090	0.148	0.0601	0.0802	0.072
400	0.0470	0.0640	57.23	0.090	0.148	0.0470	0.0640	0.069
500	0.0366	0.0515	71.54	0.089	0.146	-	-	-
630	0.0283	0.0420	90.14	0.086	0.144	-	-	-
800	0.0221	0.0363	114.46	0.086	0.144	-	-	-
1000	0.0176	0.0316	143.08	0.084	0.142	-	-	-

Table 5 BENDING RADIUS

MINIMUM BENDING RADIUS		
Type	During installation	Fixed installation
Unarmoured cable	10D	8D
Armoured cable	10D	8D

Note : * D is overall cable diameter

Table 6 SIDE WALL PRESSURE

Permissible maximum side wall pressure to the cable at bending point during installation is 5 000 N/m.

$$\text{Side wall pressure to cable} = \frac{\text{Pulling force (N)}}{\text{Bending radius (m)}} = \frac{P}{R}$$

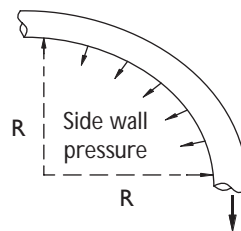


Table 7 PERMISSIBLE MAXIMUM PULLING FORCE (P)

Means of pulling	Type of cable	Formula	Factor
With pulling eye attached to the conductor	All types of cables	$P = \sigma .A$	$\sigma = 70\text{N/mm}^2$
With pulling stocking	Un-armoured cables*	$P = \sigma .A$	$\sigma = 50\text{N/mm}^2$
	Armoured cables**	$P = k . d^2$	$k = 9\text{N/mm}^2$

* When pulling 3 single core cables simultaneously with a common pulling stocking, the same maximum pulling force applies, whereas the pulling force 3 laid-up single core cables is 3 times that of a single core and for 3 non-laid-up single core cables is 2 times that of a single core

** Not applicable for high voltage cables

P = Permissible maximum pulling force in N

A = Total cross sectional area in mm² of all conductors (but not screen or concentric conductor)

d = Outside diameter of cable in mm

σ = Permissible tensile stress of conductor in N/mm²

k = Empirically derived factor in N/mm²

Table 8 PERMISSIBLE RADIAL LOAD

Permissible radial loads for pulling through pipes	
Non-Armoured Cables	10000N/m
Cables with Single Armour	15000N/m
Maximum permissible loads on rollers fitted on bends	
Non-Armoured Cables	1500N/m
Cables with Single Armour	2500N/m
When using roller chain (5 rollers / m)	
Non-Armoured Cables	7500N/m
Cables with Single Armour	12500N/m
When only 3 rollers / m are fitted	
Non-Armoured Cables	4500N/m
Cables with Single Armour	7500N/m

Table 9 TEMPERATURE CORRECTION FACTORS FOR CONDUCTOR RESISTANCE

Temperature of conductor (°C)	Factor to convert to 20°C	Reciprocal to convert from 20°C
5	1.064	0.940
6	1.059	0.944
7	1.055	0.948
8	1.050	0.952
9	1.046	0.956
10	1.042	0.960
11	1.037	0.964
12	1.033	0.968
13	1.029	0.972
14	1.025	0.976
15	1.020	0.980
16	1.016	0.984
17	1.012	0.988
18	1.008	0.992
19	1.004	0.996
20	1.000	1.000
21	0.996	1.004
22	0.992	1.008
23	0.988	1.012
24	0.984	1.016
25	0.980	1.020
26	0.977	1.024
27	0.973	1.028
28	0.969	1.032
29	0.965	1.036
30	0.962	1.040
31	0.958	1.044
32	0.954	1.048
33	0.951	1.052
34	0.947	1.056
35	0.943	1.060
40	0.926	1.080
45	0.909	1.100
50	0.893	1.120
55	0.877	1.140
60	0.862	1.160
65	0.847	1.180
70	0.833	1.200
75	0.820	1.220
80	0.806	1.240
85	0.794	1.260
90	0.781	1.280

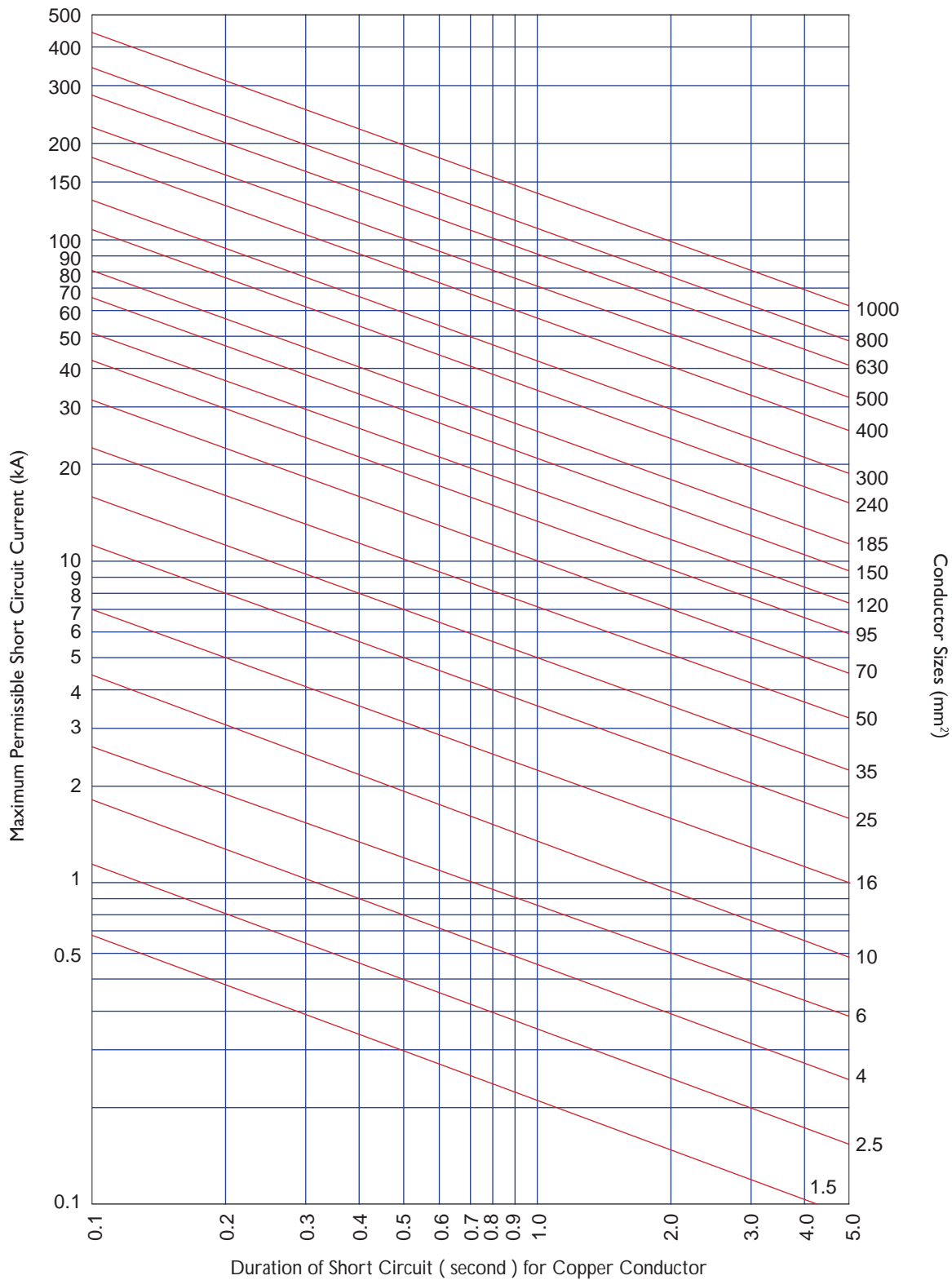
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SHORT CIRCUIT CURRENT

Curves are based on :

* Cables was at maximum operating temperature of 90°C at the start of short-circuit.

* Final conductor temperature of 250°C



Conductor size	Short circuit current (1s)
(mm ²)	(kA)
1.5	0.21
2.5	0.36
4	0.57
6	0.86
10	1.43
16	2.29
25	3.58
35	5.01
50	7.15
70	10.02
95	13.59
120	17.17
150	21.46
185	26.47
240	34.34
300	42.92
400	57.23
500	71.54
630	90.14
800	114.46
1000	143.08

Note: For any other duration 't' seconds, please divide the given value by \sqrt{t}

PUBLICATIONS REFERRED TO

ASTM D 2863	Standard Test Method For Measuring The Minimum Oxygen Concentration To Support Candle-like Combustion Of Plastic (Oxygen Index)
BS 4066	Tests On Electric Cables Under Fire Conditions
BS 6387	Performance requirements For Cables Required To Maintain Circuit Integrity Under Fire Conditions
BS 6425	Test On Gases Evolved During The Combustion Of Materials From Cables
BS 7622	Measurement Of Smoke Density Of Electric Cables Burning Under Defined Conditions
BS EN 50266	Common Test Methods For Cables Under Fire Conditions - Test For Vertical Flame Spread Of Vertically Mounted Bunched Wires Or Cables
BS EN 50267	Common Test Methods For Cables Under Fire Conditions - Tests On Gases Evolved During Combustions Of Materials From Cables
BS EN 50268	Common Test Methods for Cables Under Fire Conditions - Measurement of Smoke Density Of Cables Burning Under Defined Conditions
IEC 60331	Test For Electric Cables Under Fire Conditions - Circuit Integrity
IEC 60332	Test On Electric Cables Under Fire Conditions
IEC 60754	Test On Gases Evolved During Combustion Of Electric Cables
IEC 61034	Measurement Of Smoke Density Of Cables Burning Under Defined Conditions
IEEE 383	IEEE Standard For Type Test Of Class IE Electric Cables, Field Splices and Connections For Nuclear Power Generating Stations
SS 299	Fire Resistant Cables - Performance Requirements For Cables Required To Maintain Circuit Integrity Under Fire Conditions