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LT XLPE CABLES

LOW TENSION CROSS-LINKED
POLYETHYLENE CABLE

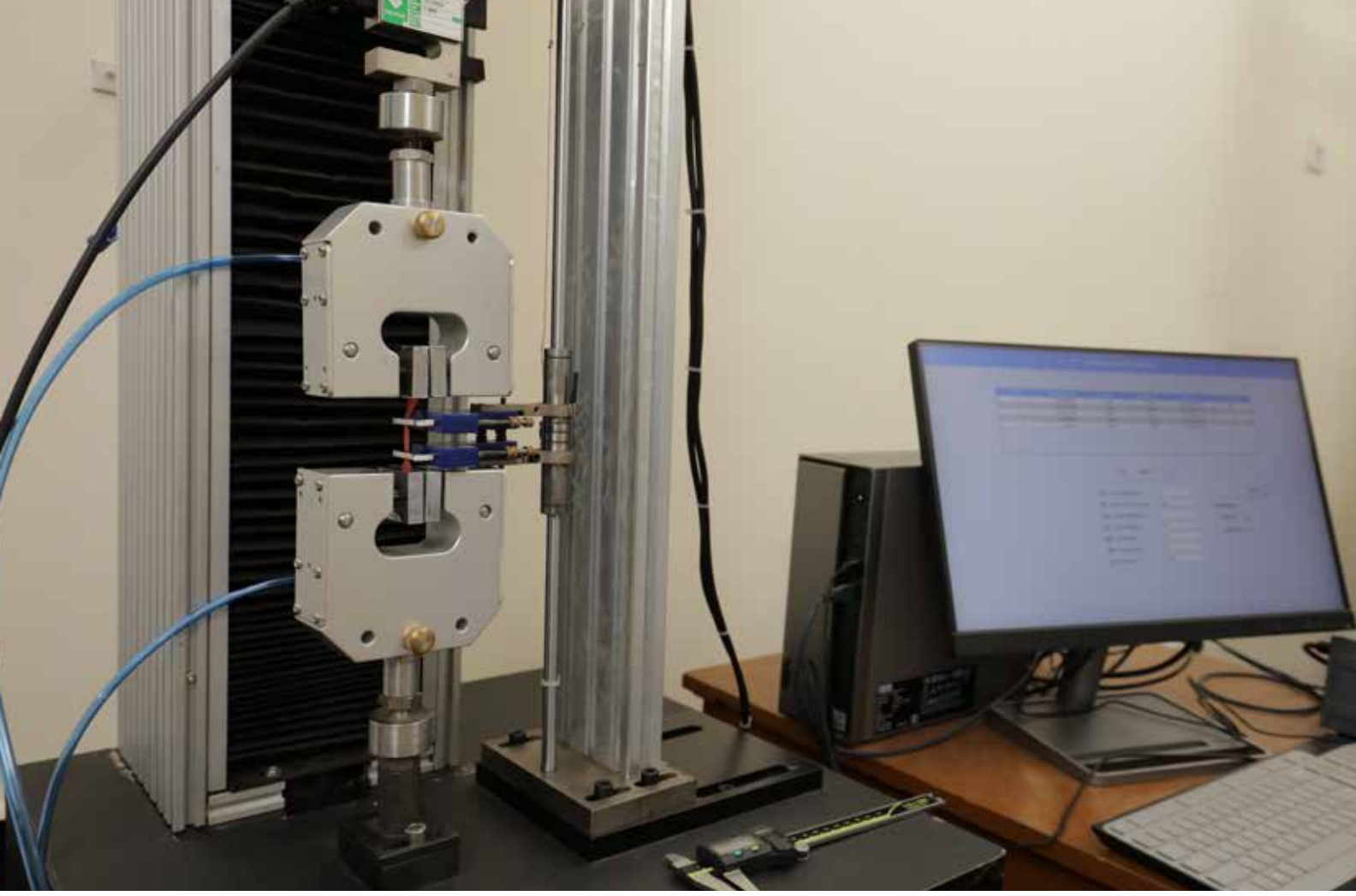
FGI

Since 1958

POWERING INNOVATION

Fort Gloster Industries Limited

From the house of Bangurs



Cable Construction

Conductor

FGIL cables are made with both aluminium and copper conductors. The conductors are made from electrolytic-grade, high-purity aluminium and copper, conforming to IS 8130, and are available in Solid circular,Compacted circular, non-compacted circular and compacted shaped.

Insulation

FGIL XLPE cables are specially manufactured with high dielectric grade cross-linked polyethylene insulation, which is applied through an extrusion process.

FGIL XLPE cables are manufactured using an XLPE compound formulated with antioxidants to enhance thermal and oxidative stability.

XLPE insulated cables are designed to operate continuously at temperatures up to 90°C and can withstand short circuit temperatures of up to 250°C for short durations.

Core Identification

The cores are identified by different colours :	
Single core	Red, Yellow, Blue, Black or Natural
Two core	Red & Black
Three core	Red, Yellow & Blue
Four core	Red, Yellow, Blue & Black
Three and half core	Red, Yellow, Blue for Phase Core and Black for Reduced Neutral Core
Five Core	Red, Yellow, Blue, Black & Grey
Six Core & Above	All core Grey with Black numbering

Laying Up

In multicore cables, the cores are laid up according to the above colour scheme.

Inner Sheath

Laid-up cores are provided with a bedding of thermoplastic material to protect against mechanical damage.

Armouring

Armouring is applied over the inner sheath to provide protection against mechanical damage. Typically, the armouring consists of galvanized steel wires or strips. For single-core cables used in AC systems, non-magnetic hard-drawn aluminium wires or strips are employed as armouring material.

For cables with a calculated diameter under armouring not exceeding 13 mm, armouring shall consist of round wires.

For cables with a calculated diameter under armouring greater than 13 mm, armouring may consist of either round wires or strips.

For Single Core cables used in AC circuits Aluminium Round Wire or Flat Strip armour is provided to avoid magnetic hysteresis losses.

Outer Sheath

All FGIL Cables are provided with PVC outer sheath. FGIL cables are manufactured with various characteristic of sheathing compounds.

Heat Resistant compound for sheath	ST2
Flame retardant Compound	FR
Flame retardant Low Smoke & Halogen	FR-LSH
Low Smoke Halogen Free	LSHF

UV radiation Resistance compound

Anti Rodent and Anti Termite Compound.

PVC compounds used for FGIL cables are available in various grades to meet the specifications of IS 5831.

Product Code

As per IS 7098 (Part I) 1988, the codes are :

Constituent	Code
Aluminium conductor	A
XLPE insulation	2X
Steel round wire armour	W
Non-magnetic round wire armour	Wa
Steel strip armour	F
Non-magnetic strip armour	Fa
Double steel strip armour	FF
Double steel round wire armour	WW
PVC Outer sheath	Y
Polyethylene outer sheath	2Y
LSHF Outer sheath	Z

Advantages of XLPE Cables

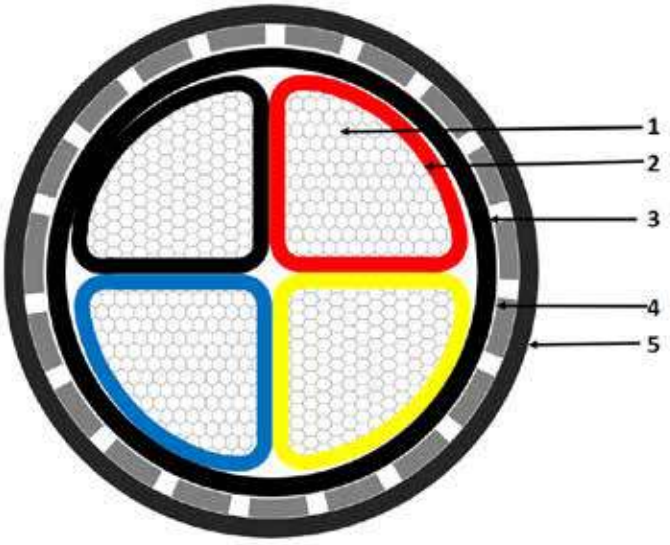
- Higher Current Rating.
- Higher Short Circuit Rating.
- For a short time it can withstand maximum 130˚C and is favourable to endure short circuit stresses.
- The low dielectric loss is a significant advantage.
- The excellent mechanical features of the insulation improves the protection against external effects.
- The resistance of the XLPE to acids, alkalies is outstanding and is often compensating the adverse environmental influences.
- Longer Service Life.
- Light in weight.
- Has better resistance to most chemicals, oils, acids, etc.
- Can be installed along cable routes without elevation limitations.

Application

The cables are suitable for used on AC Single phase or Three phase (Earthed or Unearthed) syatem for rated voltage upto and including 1100 Volts. These cables can be used on DC systems for rated voltage upto and including 1500 Volts to earth.

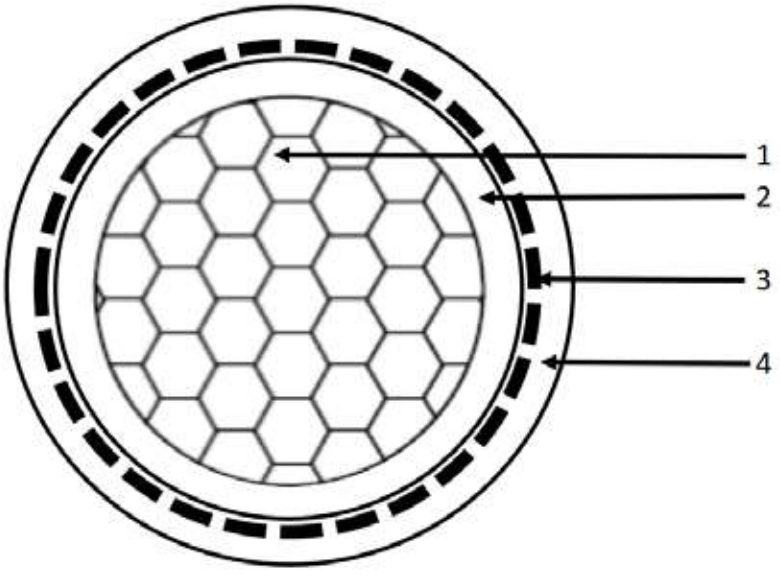
Cross Sectional Drawing

For Multi Core Armoured Cable



1 - Stranded Compacted Shaped Aluminium/Copper as per Class-2 of IS 8130
2 - XLPE Insulation as per IS:7098 (P-1)
3 - PVC Type ST2 as per IS 5831/Thermoplastic Tape/PE/LSHF
4 - Single Layer of Galvanized Steel Flat strip / Round Wire armour as per IS 3975
5 - PVC Type ST2/PE/LSHF

For Single Core Armoured Cable



1 - Stranded Compacted Shaped Aluminium/Copper as per Class-2 of IS 8130
2 - XLPE Insulation as per IS:7098 (P-1)
3 - Single Layer of Aluminium Flat strip / Round Wire armour
4 - PVC Type ST2/PE/LSHF

Quality Assurance

Fort Gloster always aim to achieve satisfaction of customer, For that Fort Gloster has up to date laboratory facillities. In the manufacture of cables, intelligent efforts are incorporated to achive quality. For a quality end product, Control starts from proper design of the product. All raw materials are selected carefully and only materials of high quality are used in Fort gloster product.

Test

Fort Gloster is self sufficient to carry out all Routine, Acceptance & Type Tests in its own laboratory. It has world class Testing facilities for Routine, Acceptance & Type Tests.

Routine Test:

(i) Partial Discharge Test (For HT Screen cables).
(ii) High Voltage Test.
(iii) Conductor Resistance Test.

Type Tests:

The cable samples are type tested in-house to ensure conformance as to various standards.
(i) Electrical Tests.
(ii) Physical and mechanical Tests.
(iii) Special Tests.
(iv) Chemical & Fire Tests.

Short Circuit Current Ratings For XLPE Cables

Short Circuit Rating for 1 second duration for XLPE Insulated Cables with Copper and Aluminium Conductor (Isc Current in kAmps)

Nominal Size of Conductor	XLPE Insulated (90°C)	
Sq.mm	COPPER	ALUMINIUM
1	0.14	0.09
1.5	0.21	0.14
2.5	0.36	0.24
4	0.57	0.38
6	0.86	0.56
10	1.43	0.94
16	2.29	1.50
25	3.58	2.35
35	5.01	3.29
50	7.15	4.70
70	10.01	6.58
95	13.59	8.93
120	17.16	11.28
150	21.45	14.10
185	26.46	17.39
240	34.32	22.56
300	42.90	28.20
400	57.20	37.60
500	71.50	47.00
630	90.09	59.22
800	114.40	75.20
1000	143.00	94.00

Rating for any other duration :

1) Max. Initial Conductor Temperature during

Operation : XLPE
90°C

2)Max. Final Conductor Temperature during short

Operation : XLPE
250°C

Formula relating short Circuit Rating with duration

$$Isc = \frac{AK}{\sqrt{t}} \text{ KA}$$

Where,

A = Area of cross section
Isc = Short circuit rating for 1 second
t = duration in seconds.
K = a constant depends on Conductor & Insulation material
K = 0.094 for Al conductor & XLPE Insulation
K = 0.143 for Cu conductor & XLPE Insulation

Maximum DC & AC resistance of conductor as per IS : 8130

Nominal Size of Conductor	Maximum DC resistance of conductor at 20 °C (Ω/Km)		Approx. AC resistance of conductor at 90°C (Ω/Km)	
Sq.mm	COPPER	ALUMINIUM	COPPER	ALUMINIUM
1.5	12.10	18.10	15.50	23.70
2.5	7.41	12.10	9.48	15.50
4	4.61	7.41	5.878	9.50
6	3.08	4.61	3.927	5.91
10	1.83	3.08	2.333	3.949
16	1.15	1.91	1.466	2.449
25	0.727	1.20	0.927	1.539
35	0.524	0.868	0.668	1.113
50	0.387	0.641	0.494	0.822
70	0.268	0.443	0.342	0.568
95	0.193	0.320	0.247	0.411
120	0.153	0.253	0.196	0.325
150	0.124	0.206	0.159	0.264
185	0.0991	0.164	0.127	0.211
240	0.0754	0.125	0.097	0.161
300	0.0601	0.100	0.078	0.129
400	0.0470	0.0778	0.061	0.101
500	0.0366	0.0605	0.049	0.079
630	0.0283	0.0469	0.038	0.062
800	0.0221	0.0367	0.0283	0.050
1000	0.0176	0.0291	0.0225	0.041

Table 1 : 1100 V, Single Core Aluminium/Copper Conductor, XLPE Insulated, Unarmoured & Armoured cables conforming to IS:7098 Part 1/Latest

Nominal size of conductor (sq.mm)	Nominal Thickness of Insulation for Unarmoured Cable (mm)	Unarmoured Cables				Nominal Thickness of Insulation for Armoured Cable (mm)	Aluminium Flat Strip Armoured Cable					Aluminium Round Wire Armoured Cable					Current Carrying Capacity					
		Nominal Thickness of PVC outer sheath (mm)	Approx. overall diameter of cable (mm)	Approx. Weight of cable (kg/km)			Nominal Dimension of Strip (mm)	Minimum Thickness of PVC Outer Sheath (mm)	Approx. overall diameter of Cable (mm)	Approx. Weight of Cable (kg/km)		Nominal size of Armour (mm)	Minimum Thickness of PVC Outer Sheath (mm)	Approx. Overall Diameter of Cable (mm)	Approx. Weight of Cable (kg/km)		In Ground at 30° C (A)		In Duct at 30° C (A)		In Air at 40° C (A)	
				Aluminium	Copper					Aluminium	Copper				Aluminium	Copper	Aluminium	Copper	Aluminium	Copper	Aluminium	Copper
4	0.7	1.8	7.5	80	100	-	-	-	-	-	-	-	-	-	-	-	37	47	34	43	33	41
6	0.7	1.8	8.0	93	124	-	-	-	-	-	-	-	-	-	-	-	47	58	43	52	43	53
10	0.7	1.8	8.5	110	170	1.00	-	-	-	-	-	1.40	1.24	10.5	165	225	59	77	54	70	55	71
16	0.7	1.8	9.5	130	230	1.00	-	-	-	-	-	1.40	1.24	11.5	190	295	76	98	69	89	72	94
25	0.9	1.8	11.0	175	325	1.20	-	-	-	-	-	1.40	1.24	13.0	250	400	98	126	89	114	98	126
35	0.9	1.8	12.0	215	425	1.20	-	-	-	-	-	1.40	1.24	14.0	290	500	116	150	106	136	119	154
50	1.0	1.8	13.5	265	545	1.30	-	-	-	-	-	1.40	1.24	15.5	355	635	137	177	124	160	145	187
70	1.1	1.8	15.0	345	750	1.40	-	-	-	-	-	1.40	1.24	17.0	440	845	168	216	151	195	185	238
95	1.1	1.8	17.0	435	995	1.4	4 X 0.8	1.40	18.5	520	1080	1.60	1.40	20.0	580	1140	202	2060	181	233	235	303
120	1.2	1.8	18.5	520	1225	1.5	4 X 0.8	1.40	19.5	610	1320	1.60	1.40	21.0	675	1380	230	295	206	264	276	354
150	1.4	2.0	20.5	640	1525	1.7	4 X 0.8	1.40	21.5	720	1600	1.60	1.40	23.0	790	1675	256	329	229	294	314	403
185	1.6	2.0	22.5	780	1870	1.9	4 X 0.8	1.40	23.5	865	1955	1.60	1.40	25.0	945	2040	290	371	258	330	366	468
240	1.7	2.0	25.0	970	2400	2.0	4 X 0.8	1.40	26.0	1065	2495	1.60	1.40	27.5	1155	2580	335	427	298	379	434	553
300	1.8	2.0	27.0	1150	2970	2.1	4 X 0.8	1.56	28.0	1275	3090	1.60	1.56	30.0	1375	3190	376	477	333	422	500	634
400	2.0	2.2	31.0	1480	3800	2.4	4 X 0.8	1.56	32.0	1605	3925	2.00	1.56	34.5	1785	4110	429	537	378	473	589	737
500	2.2	2.2	34.0	1825	4810	2.6	4 X 0.8	1.56	35.0	1950	4945	2.00	1.56	37.5	2150	5155	485	598	426	525	685	844
630	2.4	2.2	38.0	2290	6120	2.8	4 X 0.8	1.72	39.5	2470	6310	2.00	1.72	42.0	2700	6535	546	661	477	578	793	961
800	2.6	2.4	44.0	2890	7810	3.1	4 X 0.8	1.72	45.0	3070	7990	2.00	1.88	48.0	3365	8280	608	721	508	626	907	1077
1000	2.8	2.6	48.5	3595	9755	3.3	4 X 0.8	1.88	49.5	3780	9945	2.50	2.04	53.0	4255	10415	665	772	575	668	1022	1188

Table 2 : 1100 V, Two Core Aluminium/Copper Conductor, XLPE Insulated, Unarmoured & Armoured cables conforming to IS:7098 Part 1/Latest

Nominal size of conductor (sq.mm)	Nominal Thickness of Insulation (mm)	Minimum thickness of inner sheath (mm)	Unarmoured Cables				Galvanized steel Flat Strip Armoured Cable					Galvanized steel Round Wire Armoured Cable					Current Carrying Capacity					
			Nominal Thickness of PVC outer sheath (mm)	Approx. overall diameter of cable (mm)	Approx. Weight of cable (kg/km)		Nominal Dimension of Strip (mm)	Minimum Thickness of PVC Outer Sheath (mm)	Approx. overall diameter of Cable (mm)	Approx. Weight of Cable (kg/km)		Nominal size of Armour (mm)	Minimum Thickness of PVC Outer Sheath (mm)	Approx. Overall Diameter of Cable (mm)	Approx. Weight of Cable (kg/km)		In Ground at 30° C (A)		In Duct at 30° C (A)		In Air at 40° C (A)	
					Aluminium	Copper				Aluminium	Copper				Aluminium	Copper	Aluminium	Copper	Aluminium	Copper	Aluminium	Copper
4	0.70	0.30	1.80	13.0	175	210	-	-	-	-	-	1.40	1.24	14.5	405	430	42	54	36	45	38	48
6	0.70	0.30	1.80	14.5	205	265	-	-	-	-	-	1.40	1.24	16.0	475	505	55	67	46	56	50	61
10	0.70	0.30	1.80	15.0	235	355	-	-	-	-	-	1.40	1.24	17.0	525	645	68	89	57	75	64	83
16	0.70	0.30	1.80	14.0	255	450	-	-	-	-	-	1.40	1.40	16.0	525	720	89	115	74	96	83	108
25	0.90	0.30	2.00	16.5	365	665	4.0 X 0.8	1.40	17.0	545	840	1.60	1.40	19.0	730	1030	114	147	95	122	109	140
35	0.90	0.30	2.00	18.5	440	855	4.0 X 0.8	1.40	18.5	640	1055	1.60	1.40	20.5	835	1255	136	176	113	146	133	172
50	1.00	0.30	2.00	20.5	550	1105	4.0 X 0.8	1.40	21.0	785	1345	1.60	1.40	22.5	1005	1565	161	208	134	173	162	208
70	1.10	0.30	2.00	23.0	705	1515	4.0 X 0.8	1.56	24.0	980	1790	1.60	1.56	25.5	1245	2055	197	253	164	211	204	262
95	1.10	0.40	2.20	26.0	925	2050	4.0 X 0.8	1.56	26.0	1210	2335	2.00	1.56	28.5	1640	2765	235	302	196	252	251	322
120	1.20	0.40	2.20	29.5	1125	2545	4.0 X 0.8	1.56	29.5	1445	2865	2.00	1.56	32.0	1960	3380	266	340	222	284	287	368
150	1.40	0.40	2.20	32.0	1330	3090	4.0 X 0.8	1.72	32.5	1715	3475	2.00	1.72	35.0	2265	4020	296	379	248	317	328	419
185	1.60	0.50	2.40	36.0	1670	3855	4.0 X 0.8	1.72	36.0	2060	4245	2.00	1.88	39.0	2720	4905	335	425	281	357	379	482
240	1.70	0.50	2.60	38.5	2075	4955	4.0 X 0.8	1.88	38.5	2495	5375	2.50	2.04	42.0	3505	6385	385	486	324	409	448	566
300	1.80	0.60	2.80	43.0	2535	6180	4.0 X 0.8	2.04	43.0	2980	6625	2.50	2.20	47.0	4120	7765	432	541	364	456	513	644
400	2.00	0.60	3.00	48.0	3195	7850	4.0 X 0.8	2.36	48.0	3735	8390	2.50	2.36	51.5	4970	9625	487	602	412	508	593	734

Table 3 : 1100 V, Three Core Aluminium/Copper Conductor, XLPE Insulated, Unarmoured & Armoured cables conforming to IS:7098 Part 1/Latest

Nominal size of conductor (sq.mm)	Nominal Thickness of Insulation (mm)	Minimum thickness of inner sheath (mm)	Unarmoured Cables				Galvanized steel Flat Strip Armoured Cable					Galvanized steel Round Wire Armoured Cable					Current Carrying Capacity					
			Nominal Thickness of PVC outer sheath (mm)	Approx. overall diameter of cable (mm)	Approx. Weight of cable (kg/km)		Nominal Dimension of Strip (mm)	Minimum Thickness of PVC Outer Sheath (mm)	Approx. overall diameter of Cable (mm)	Approx. Weight of Cable (kg/km)		Nominal size of Armour (mm)	Minimum Thickness of PVC Outer Sheath (mm)	Approx. Overall Diameter of Cable (mm)	Approx. Weight of Cable (kg/km)		In Ground at 30° C (A)		In Duct at 30° C (A)		In Air at 40° C (A)	
					Aluminium	Copper				Aluminium	Copper				Aluminium	Copper	Aluminium	Copper	Aluminium	Copper	Aluminium	Copper
4	0.70	0.30	1.80	13.5	220	275	-	-	-	-	-	1.40	1.24	15.5	475	510	35	45	30	38	32	41
6	0.70	0.30	1.80	15.5	270	355	-	-	-	-	-	1.40	1.24	17.0	560	620	46	56	38	47	42	52
10	0.70	0.30	1.80	16.5	315	495	-	-	-	-	-	1.40	1.24	18.0	615	795	57	74	48	62	54	70
16	0.70	0.30	1.80	16.0	335	625	4.0 X 0.8	1.24	16.5	515	810	1.60	1.40	18.5	705	995	74	95	61	79	69	89
25	0.90	0.30	2.00	19.5	485	930	4.0 X 0.8	1.40	20.0	700	1150	1.60	1.40	21.5	910	1355	95	122	79	102	93	119
35	0.90	0.30	2.00	21.0	590	1215	4.0 X 0.8	1.40	21.5	825	1450	1.60	1.40	23.0	1060	1685	114	146	94	122	114	147
50	1.00	0.30	2.00	23.5	740	1580	4.0 X 0.8	1.40	24.0	1015	1855	1.60	1.56	26.0	1290	2130	134	173	112	144	138	179
70	1.10	0.40	2.20	27.5	1020	2230	4.0 X 0.8	1.56	28.0	1320	2535	2.00	1.56	30.5	1810	3020	164	212	137	177	175	226
95	1.10	0.40	2.20	31.0	1285	2975	4.0 X 0.8	1.56	31.0	1625	3315	2.00	1.56	33.5	2170	3860	197	254	164	212	216	279
120	1.20	0.40	2.20	33.5	1545	3675	4.0 X 0.8	1.56	33.5	1925	4055	2.00	1.72	36.5	2530	4655	223	287	187	240	249	320
150	1.40	0.50	2.40	3.8	1900	4540	4.0 X 0.8	1.72	37.5	2310	4945	2.00	1.88	40.4	3000	5640	249	321	209	269	284	365
185	1.60	0.50	2.60	42.0	2365	5645	4.0 X 0.8	1.88	41.5	2825	6100	2.50	2.04	45.5	3910	7190	282	362	238	304	329	422
240	1.70	0.60	2.80	46.5	3010	7330	4.0 X 0.8	2.04	46.5	3510	7830	2.50	2.20	50.5	4750	9070	327	418	276	352	392	500
300	1.80	0.60	3.00	52.5	3650	9110	4.0 X 0.8	2.20	52.0	4205	9670	2.50	2.36	56.0	5570	11035	369	469	312	396	452	574
400	2.00	0.70	3.20	58.0	4630	11615	4.0 X 0.8	2.52	58.5	5295	12280	3.15	2.68	62.5	7455	14445	420	528	356	447	526	662

Table 4 : 1100 V, Four Core Aluminium/Copper Conductor, XLPE Insulated, Unarmoured & Armoured cables conforming to IS:7098 Part 1/Latest

Nominal size of conductor (sq.mm)	Nominal Thickness of Insulation (mm)	Minimum thickness of inner sheath (mm)	Unarmoured Cables				Galvanized steel Flat Strip Armoured Cable					Galvanized steel Round Wire Armoured Cable					Current Carrying Capacity					
			Nominal Thickness of PVC outer sheath (mm)	Approx. overall diameter of cable (mm)	Approx. Weight of cable (kg/km)		Nominal Dimension of Strip (mm)	Minimum Thickness of PVC Outer Sheath (mm)	Approx. overall diameter of Cable (mm)	Approx. Weight of Cable (kg/km)		Nominal size of Armour (mm)	Minimum Thickness of PVC Outer Sheath (mm)	Approx. Overall Diameter of Cable (mm)	Approx. Weight of Cable (kg/km)		In Ground at 30° C (A)		In Duct at 30° C (A)		In Air at 40° C (A)	
					Aluminium	Copper				Aluminium	Copper				Aluminium	Copper	Aluminium	Copper	Aluminium	Copper	Aluminium	Copper
4	0.70	0.30	1.80	15.0	260	335	-	-	-	-	-	1.40	1.24	16.5	535	590	35	45	30	38	32	41
6	0.70	0.30	1.80	16.5	320	435	-	-	-	-	-	1.40	1.24	18.5	630	725	46	56	38	47	42	52
10	0.70	0.30	1.80	17.5	375	615	-	-	-	-	-	1.40	1.40	19.5	725	965	57	74	48	62	54	70
16	0.70	0.30	1.80	17.5	410	800	4.0 X 0.8	1.40	19.0	625	1015	1.60	1.40	20.0	820	1210	74	95	61	79	69	89
25	0.90	0.30	2.00	22.0	605	1200	4.0 X 0.8	1.40	22.0	860	1455	1.60	1.40	24.0	1090	1685	95	122	79	102	93	119
35	0.90	0.30	2.00	24.0	735	1570	4.0 X 0.8	1.40	24.0	1015	1845	1.60	1.40	26.0	1270	2100	114	146	94	122	114	147
50	1.00	0.30	2.00	27.0	935	2055	4.0 X 0.8	1.56	27.5	1270	2390	1.60	1.56	29.5	1565	2685	134	173	112	144	138	179
70	1.10	0.40	2.20	32.0	1295	2915	4.0 X 0.8	1.56	32.0	1655	3275	2.00	1.56	34.5	2205	3825	164	212	137	177	175	226
95	1.10	0.40	2.20	35.0	1635	3885	4.0 X 0.8	1.56	35.0	2030	4280	2.00	1.72	38.0	2665	4915	197	254	164	212	216	279
120	1.20	0.50	2.40	40.0	2050	4890	4.0 X 0.8	1.72	40.0	2500	5340	2.00	1.88	42.5	3225	6065	223	287	187	240	249	320
150	1.40	0.50	2.60	43.5	2480	6000	4.0 X 0.8	1.88	43.5	2955	6475	2.50	2.04	47.5	4105	7620	249	321	209	269	284	365
185	1.60	0.50	2.80	49.0	3095	7465	4.0 X 0.8	2.04	49.0	3615	7985	2.50	2.20	52.5	4915	9285	282	362	238	304	329	422
240	1.70	0.60	3.00	54.5	3940	9695	4.0 X 0.8	2.20	54.5	4535	10295	2.50	2.36	58.5	5980	11740	327	418	276	352	392	500
300	1.80	0.70	3.20	59.5	4785	12070	4.0 X 0.8	2.36	59.5	5420	12705	3.15	2.52	64.5	7685	14970	369	469	312	396	452	574
400	2.00	0.70	3.60	69.0	6160	15475	4.0 X 0.8	2.68	69.0	6875	16190	3.15	2.84	74.0	9470	18785	420	528	356	447	526	662

Table 5 : 1100 V, Three Core with Reduced Neutral Aluminium/Copper Conductor, XLPE Insulated, Unarmoured & Armoured cables conforming to IS:7098 Part 1/Latest

Nominal size of conductor (sq.mm)	Nominal Thickness of Insulation (mm)		Minimum thickness of inner sheath (mm)	Unarmoured Cables				Galvanized steel Flat Strip Armoured Cable					Galvanized steel Round Wire Armoured Cable					Current Carrying Capacity					
				Nominal Thickness of outer sheath (mm)	Approx. overall diameter of cable (mm)	Approx. Weight of cable (kg/km)		Nominal Dimension of Strip (mm)	Minimum Thickness of Outer Sheath (mm)	Approx. overall diameter of Cable (mm)	Approx. Weight of Cable (kg/km)		Nominal size of Armour (mm)	Minimum Thickness of Outer Sheath (mm)	Approx. Overall Diameter of Cable (mm)	Approx. Weight of Cable (kg/km)		In Ground at 30° C (A)		In Duct at 30° C (A)		In Air at 40° C (A)	
Phase/Neutral	Phase	Neutral				Aluminium	Copper				Aluminium	Copper				Aluminium	Copper	Aluminium	Copper	Aluminium	Copper	Aluminium	Copper
25/16	0.90	0.70	0.30	2.0	21.0	555	1100	4.0 X 0.8	1.40	21.0	795	1340	1.60	1.40	23.0	1010	1555	95	122	79	102	93	119
35/16	0.90	0.70	0.30	2.0	23.0	665	1385	4.0 X 0.8	1.40	23.0	920	1640	1.60	1.40	25.0	1165	1885	114	146	94	122	114	147
50/25	1.00	0.90	0.30	2.0	25.5	850	1840	4.0 X 0.8	1.40	26.0	1145	2135	1.60	1.56	28.0	1450	2440	134	173	112	144	138	179
70/35	1.10	0.90	0.40	2.2	30.5	1170	2595	4.0 X 0.8	1.56	30.5	1510	2935	2.00	1.56	33.0	2030	3455	164	212	137	177	175	226
95/50	1.10	1.00	0.40	2.2	33.0	1465	3435	4.0 X 0.8	1.56	33.0	1825	3790	2.00	1.56	35.5	2395	4365	197	254	164	212	216	279
120/70	1.20	1.10	0.40	2.2	36.0	1800	4335	4.0 X 0.8	1.72	36.5	2245	4780	2.00	1.72	39.0	2885	5415	223	287	187	240	249	320
150/70	1.40	1.10	0.50	2.4	41.0	2170	5215	4.0 X 0.8	1.72	41.0	2615	5655	2.00	1.88	44.0	3365	6410	249	321	209	269	284	365
185/95	1.60	1.10	0.50	2.6	44.5	2700	6540	4.0 X 0.8	1.88	44.5	3170	7010	2.50	2.04	48.5	4360	8200	282	362	238	304	329	422
240/120	1.70	1.20	0.60	2.8	50.5	3445	8470	4.0 X 0.8	2.04	50.5	3980	9010	2.50	2.20	54.5	5335	10365	327	418	276	352	392	500
300/150	1.80	1.40	0.60	3.0	56.0	4170	10515	4.0 X 0.8	2.20	56.0	4785	11125	2.50	2.36	59.0	6245	12590	369	469	312	396	452	574
400/185	2.00	1.60	0.70	3.4	63.0	5375	13455	4.0 X 0.8	2.52	63.0	6030	14110	3.15	2.68	68.0	8455	16535	420	528	356	447	526	662

Table 6 : 1100 V, 1.5 Sq.mm Multi Core Control Cable with Copper Conductor, XLPE Insulated, Unarmoured & Armoured cables conforming to IS:7098 Part 1/Latest

Number of Core	Nominal Thickness of Insulation (mm)	Minimum thickness of inner sheath (mm)	Unarmoured Cables			Galvanized steel Flat Strip Armoured Cable				Galvanized steel Round Wire Armoured Cable				Current Carrying Capacity		
			Nominal Thickness of PVC outer sheath (mm)	Approx. overall diameter of cable (mm)	Approx. Weight of cable (kg/km)	Nominal Dimension of Strip (mm)	Minimum Thickness of PVC Outer Sheath (mm)	Approx. overall diameter of Cable (mm)	Approx. Weight of Cable (kg/km)	Nominal size of Armour (mm)	Minimum Thickness of PVC Outer Sheath (mm)	Approx. Overall Diameter of Cable (mm)	Approx. Weight of Cable (kg/km)	In Ground at 30° C (A)	In Duct at 30° C (A)	In Air at 40° C (A)
2	0.7	0.3	1.8	10.5	165	-	-	-	-	1.4	1.24	12.0	345	31	27	27
3	0.7	0.3	1.8	11.0	195	-	-	-	-	1.4	1.24	12.5	385	26	22	23
4	0.7	0.3	1.8	11.5	230	-	-	-	-	1.4	1.24	13.5	440	26	22	23
5	0.7	0.3	1.8	12.5	270	-	-	-	-	1.4	1.24	14.5	490	26	22	23
6	0.7	0.3	1.8	13.5	270	-	-	-	-	1.4	1.24	15.5	510	23	20	20
7	0.7	0.3	1.8	13.5	275	-	-	-	-	1.4	1.24	15.5	515	20	18	18
8	0.7	0.3	1.8	14.5	315	-	-	-	-	1.4	1.24	16.0	580	17	15	15
9	0.7	0.3	1.8	15.5	350	-	-	-	-	1.4	1.24	17.0	640	17	15	15
10	0.7	0.3	1.8	17.0	365	-	-	-	-	1.4	1.24	18.5	675	17	15	15
12	0.7	0.3	1.8	17.5	410	-	-	-	-	1.4	1.24	19.0	730	16	14	14
14	0.7	0.3	1.8	18.0	460	-	-	-	-	1.4	1.40	20.0	820	16	14	14
16	0.7	0.3	1.8	19.0	515	4.0 X 0.8	1.4	20.0	740	1.6	1.40	21.5	955	14	12	12
19	0.7	0.3	1.8	20.0	575	4.0 X 0.8	1.4	21.0	820	1.6	1.40	22.5	1030	14	12	12
21	0.7	0.3	2.0	21.5	655	4.0 X 0.8	1.4	21.5	900	1.6	1.40	23.5	1120	12	11	11
24	0.7	0.3	2.0	23.5	730	4.0 X 0.8	1.4	24.0	990	1.6	1.40	25.5	1250	12	11	11
27	0.7	0.3	2.0	24.0	790	4.0 X 0.8	1.4	24.5	1075	1.6	1.40	26.0	1325	11	9	9
30	0.7	0.3	2.0	25.0	860	4.0 X 0.8	1.4	25.0	1140	1.6	1.40	27.0	1410	11	9	9
32	0.7	0.3	2.0	26.0	915	4.0 X 0.8	1.4	26.0	1215	1.6	1.40	28.0	1495	11	9	9
34	0.7	0.3	2.0	26.5	965	4.0 X 0.8	1.4	27.0	1260	1.6	1.40	28.5	1555	11	9	9
37	0.7	0.3	2.0	26.5	1010	4.0 X 0.8	1.4	27.0	1310	1.6	1.40	28.5	1605	11	9	9

Table 7 : 1100 V, 2.5 Sq.mm Multi Core Control Cable with Copper Conductor, XLPE Insulated, Unarmoured & Armoured cables conforming to IS:7098 Part 1/Latest

Number of Core	Nominal Thickness of Insulation (mm)	Minimum thickness of inner sheath (mm)	Unarmoured Cables			Galvanized steel Flat Strip Armoured Cable				Galvanized steel Round Wire Armoured Cable				Current Carrying Capacity		
			Nominal Thickness of PVC outer sheath (mm)	Approx. overall diameter of cable (mm)	Approx. Weight of cable (kg/km)	Nominal Dimension of Strip (mm)	Minimum Thickness of PVC Outer Sheath (mm)	Approx. overall diameter of Cable (mm)	Approx. Weight of Cable (kg/km)	Nominal size of Armour (mm)	Minimum Thickness of PVC Outer Sheath (mm)	Approx. Overall Diameter of Cable (mm)	Approx. Weight of Cable (kg/km)	In Ground at 30° C (A)	In Duct at 30° C (A)	In Air at 40° C (A)
2	0.7	0.3	1.8	11.0	205	-	-	-	-	1.4	1.24	13.0	405	41	35	36
3	0.7	0.3	1.8	12.0	245	-	-	-	-	1.4	1.24	13.5	455	34	29	30
4	0.7	0.3	1.8	12.5	290	-	-	-	-	1.4	1.24	14.5	525	34	29	30
5	0.7	0.3	1.8	13.5	345	-	-	-	-	1.4	1.24	15.5	600	34	29	30
6	0.7	0.3	1.8	15.0	350	-	-	-	-	1.4	1.24	16.5	625	31	26	27
7	0.7	0.3	1.8	15.0	360	-	-	-	-	1.4	1.24	16.5	635	27	23	23
8	0.7	0.3	1.8	16.0	415	-	-	-	-	1.4	1.24	17.5	710	23	19	20
9	0.7	0.3	1.8	17.0	465	-	-	-	-	1.4	1.40	19.0	800	23	19	20
10	0.7	0.3	1.8	18.5	485	4.0 X 0.8	1.24	19.0	700	1.6	1.40	21.0	910	23	19	20
12	0.7	0.3	1.8	19.0	550	4.0 X 0.8	1.40	20.0	775	1.6	1.40	21.5	990	20	18	18
14	0.7	0.3	1.8	20.0	625	4.0 X 0.8	1.40	20.5	870	1.6	1.40	22.5	1080	20	18	18
16	0.7	0.3	2.0	21.5	720	4.0 X 0.8	1.40	22.0	965	1.6	1.40	23.5	1185	18	16	16
19	0.7	0.3	2.0	22.5	810	4.0 X 0.8	1.40	23.0	1075	1.6	1.40	24.5	1305	18	16	16
21	0.7	0.3	2.0	23.5	895	4.0 X 0.8	1.40	24.0	1160	1.6	1.40	25.5	1420	16	14	14
24	0.7	0.3	2.0	26.0	1000	4.0 X 0.8	1.40	26.5	1300	1.6	1.40	28.0	1580	16	14	14
27	0.7	0.3	2.0	26.5	1095	4.0 X 0.8	1.40	27.0	1395	1.6	1.40	28.5	1685	14	12	13
30	0.7	0.3	2.0	27.5	1195	4.0 X 0.8	1.40	28.0	1515	1.6	1.40	29.5	1820	14	12	13
32	0.7	0.3	2.0	28.5	1270	4.0 X 0.8	1.40	29.0	1605	1.6	1.56	31.0	1950	14	12	13
34	0.7	0.3	2.0	29.5	1345	4.0 X 0.8	1.40	30.0	1695	1.6	1.56	32.0	2050	14	12	13
37	0.7	0.3	2.0	29.5	1420	4.0 X 0.8	1.40	30.0	1775	1.6	1.56	32.0	2125	14	12	13

Basic Assumption For Current Ratings & Rating Factors

FGIL Recommendations for Current Ratings:

The Current rating of power cables is defined by the maximum intensity of current (amperes) which can flow continuously through the cable, under permanent loading conditions, without any risk of damaging the cable or deterioration or its electrical properties.

The value given in the tables are valid for one circuit in a three phase system under conditions specified. For grouping cables rating factors must be used.

The current carrying capacities mentioned in FGIL technical data are intended as a guide, to assist operating engineers in selecting cables for safety and reliability.

1. Maximum condr. Temperature: 90˚ C
2. Ambient air temperature: 40˚ C
3. Ground temperature: 30˚ C
4. Depth of laying (for cable laid directly in ground) : 75 cm (1.1 kV)
5. Thermal resistivity of soil : 150˚ C cm/watt
6. Max. short-circuit conductor temperature: 250˚ C

Installation method and Rating factors are given in tables 1 to 23

Table-1 Rating Factors for variations in Ambient Air Temperature for Cables in Free Air								
Air Temperature (˚C)	25	30	35	40	45	50	55	60
Rating Factor	1.14	1.1	1.05	1.00	0.95	0.89	0.84	0.77

Table-2 Rating Factors for variations in Ground Temperature for Direct Buried Cables								
Ground Temperature (˚C)	15	20	25	30	35	40	45	50
Rating Factor	1.12	1.08	1.04	1.00	0.96	0.91	0.87	0.82

Table-3 Rating Factors for variations in Ground Temperature for Cables in Ducts								
Ground Temperature (˚C)	15	20	25	30	35	40	45	50
Rating Factor	1.12	1.08	1.04	1.00	0.96	0.91	0.87	0.82

Note: Remaining Derating factors are as per IS : 3961 (P-6)

Fort Gloster Industries Limited

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Corporate Office
Woodburn Central | 6th Floor | Unit 601
5A Woodburn Park | Kolkata - 700020

Regd Office & Works
PO Fort Gloster I Bauria I Howrah 711310

E sales@fortgloster.in **I M** +91 6292319430 **I U** www.fortgloster.com

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