YAZAKI

TECHNICAL DATA

• 6th Edition •

MASCI

ISO 9000 QMS03196/800
TIS 18001 OHS07012/210
OHSAS 18001 OHSAS07009/130

ISO 14001 TH009912
ISO 14001 TH013591

TIS 11-2553
TIS 85-2548
TIS 293-2541
TIS 2202-2547

TIS 64-2517
TIS 118-2522
TIS 2143-2546
TIS 386-2531
TIS 2341-2564

THAI-YAZAKI ELECTRIC WIRE COMPANY LIMITED

YAZAKI

THAI-YAZAKI ELECTRIC WIRE CO., LTD.

Technical Data

For
Electric Wires
and Cables

Publication : 6th Edition JUNE 2024

This catalog provides a comprehensive descriptions of the main products of Thai-Yazaki Electric Wire Co., Ltd.

These products are manufactured in conformity to the Thai Industrial Standard (TIS), Thai-Yazaki Standard, and IEC 60502 Standard.

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Technical Data and General Information

A

A

Wire Gauges

Gauge				Diameter		Sectional Area			Weight	
B.W.G.	A.W.G.	S.W.G.	mm.G	Mil	mm.	Cir.Mil	in^2	mm^2	lb/1,000 ft	kg/km
5/0	-	710	-	500	12.700	250,000	0.1964	126.7	756.9	1,126
-	-	-	12	472.4	12.000	223,162	0.1753	113.1	675.6	1,005
-	-	6/0	-	464	11.786	215,296	0.1691	109.1	651.7	969.9
-	4/0	-	-	460	11.684	211,600	0.1662	107.2	640.5	953.0
4/0	-	-	-	454	11.532	206,100	0.1619	104.4	624.0	928.1
-	-	5/0	-	432	10.973	186,624	0.1466	94.56	565.0	840.6
3/0	-	-	-	425	10.795	180,600	0.1419	91.52	546.9	813.6
-	3/0	-	-	409.6	10.404	167,772	0.1318	85.03	508.0	755.9
-	-	4/0	-	400	10.160	160,000	0.1257	81.07	484.5	720.7
-	-	-	10	393.7	10.000	155,000	0.1217	78.54	468.0	698.2
2/0	-	-	-	380	9.652	144,400	0.1134	73.17	437.1	650.5
-	-	3/0	-	372	9.440	138,384	0.1087	70.12	418.9	623.4
-	2/0	-	-	364.8	9.266	133,079	0.1045	67.42	402.7	599.4
-	-	-	9	354.3	9.000	125,528	0.09859	63.62	380.0	565.6
-	-	2/0	-	348	8.839	121,104	0.09512	61.36	366.6	545.5
0	-	-	-	340	8.636	115,600	0.09079	58.58	349.9	520.8
-	0	-	-	324.9	8.250	105,560	0.08291	53.49	319.5	475.5
-	-	0	-	324	8.230	104,976	0.08245	53.19	317.8	472.8
-	-	-	8	315	8.000	99,225	0.07793	50.27	300.3	446.9
1	-	1	-	300	7.629	90,000	0.07069	45.60	272.4	405.4
-	1	-	-	289.3	7.348	83,694	0.06573	42.41	253.3	377.0
2	-	-	-	284	7.214	80,660	0.06335	40.87	244.2	363.3
-	-	2	-	276	7.010	76,176	0.05983	39.60	230.6	343.2
-	-	-	7.0	275.6	7.000	75,955	0.05966	38.48	229.9	342.1
3	-	-	-	259	6.579	67,080	0.05269	33.99	203.1	302.2
-	2	-	-	257.6	6.544	66,358	0.05212	33.63	200.9	299.0
-	-	-	6.5	255.9	6.500	65,485	0.05143	22.18	189.2	295.0
-	-	3	-	252	6.401	63,504	0.04988	32.18	192.2	286.1
4	-	-	-	238	6.045	56,640	0.04449	28.70	171.5	255.1
-	-	-	6.0	236.2	6.000	55,790	0.04382	28.27	168.9	251.1
-	-	4	-	232	5.893	53,824	0.04227	27.27	162.9	242.4
-	3	-	-	229.4	5.827	52,624	0.04133	26.66	159.3	237.0
5	-	-	-	220	5.588	48,400	0.03801	24.52	146.5	218.0
-	-	-	5.5	216.5	5.500	46,872	0.03681	23.72	141.9	210.9
-	-	5	-	212	5.385	44,944	0.03530	22.77	136.0	202.4
-	4	-	-	204.3	5.189	41,738	0.03278	21.15	126.3	188.0
6	-	-	-	203	5.156	41,210	0.03237	20.88	124.8	185.6
-	-	-	5.0	196.9	5.000	38,770	0.03045	19.63	117.4	174.5
-	-	6	-	192	4.877	36,864	0.02895	18.68	111.6	166.3
-	5	-	-	181.9	4.621	33,088	0.02599	16.77	100.2	149.1
7	-	-	-	180	4.572	32,400	0.02545	16.42	98.08	146.0
-	-	-	4.5	177.2	4.500	31,400	0.02466	15.90	95.04	141.4
-	-	7	-	176	4.470	30,976	0.02433	15.70	93.77	139.6
8	-	-	-	165	4.191	27,220	0.02138	13.80	82.40	122.7
-	6	-	-	162	4.115	26,244	0.02061	13.30	79.43	118.2

Wire Gauges

Gauge				Diameter		Sectional Area			Weight	
B.W.G.	A.W.G.	S.W.G.	mm.G	Mil	mm.	Cir.Mil	in^2	mm^2	lb/1,000 ft	kg/km
-	-	8	-	160	4.064	25,600	0.02011	12.97	77.50	115.30
-	-	-	4.0	157.5	4.000	24,806	0.01948	12.57	75.08	111.80
9	-	-	-	148	3.759	21,900	0.01720	11.10	66.29	98.68
-	7	-	-	144.3	3.665	20,822	0.01635	10.55	63.01	93.79
-	-	9	-	144	3.658	20,736	0.01629	10.52	62.78	93.52
-	-	-	3.5	137.8	3.500	18,989	0.01491	9.621	57.46	85.53
10	-	-	-	134	3.404	17,960	0.01410	9.098	54.34	80.88
-	8	-	-	128.5	3.264	16,512	0.01297	8.368	49.99	74.39
-	-	10	-	128	3.251	16,384	0.01287	8.302	49.60	73.81
-	-	-	3.2	126	3.200	15,876	0.01247	8.042	48.06	71.49
11	-	-	-	120	3.048	14,400	0.01131	7.297	43.59	64.87
-	-	11	-	116	2.946	13,456	0.01057	6.818	40.74	60.61
-	9	-	-	114.4	2.906	13,087	0.01028	6.632	39.62	58.96
-	-	-	2.9	114.2	2.900	13,042	0.01024	6.605	39.47	58.72
12	-	-	-	109	2.769	11,880	0.009331	6.020	35.96	53.52
-	-	12	-	104	2.642	10,816	0.008495	5.481	32.74	48.73
-	-	-	2.6	102.4	2.600	10,486	0.008246	5.309	31.78	47.29
-	10	-	-	101.9	2.588	10,384	0.008156	5.262	31.43	46.78
13	-	-	-	95	2.413	9,025	0.007088	4.573	27.32	40.65
-	-	13	-	92	2.337	8,464	0.006648	4.289	25.62	38.13
-	11	-	-	90.74	2.305	8,234	0.006467	4.172	24.92	37.09
-	-	-	2.3	90.55	2.300	8,199	0.006439	4.155	24.82	36.94
14	-	-	-	83	2.108	6,889	0.005411	3.491	20.85	31.04
-	12	-	-	80.81	2.053	6,530	0.005129	3.309	19.77	29.42
-	-	14	-	80	2.032	6,400	0.005027	3.243	19.37	28.83
-	-	-	2.0	78.74	2.000	6,200	0.004869	3.142	18.77	27.93
15	-	15	-	72	1.829	5,184	0.004072	2.627	18.46	27.36
-	13	-	-	71.96	1.828	5,178	0.004067	2.624	15.67	23.33
-	-	-	1.8	70.87	1.800	5,023	0.003945	2.545	15.20	22.63
16	-	-	-	65	1.651	4,225	0.003318	2.141	12.79	19.03
-	14	-	-	64.08	1.628	4,106	0.003225	2.081	12.43	18.50
-	-	16	-	64	1.626	4,096	0.003217	2.075	12.40	18.45
-	-	-	1.6	62.99	1.600	3,968	0.003116	2.011	12.01	17.88
17	-	-	-	58	1.473	3,364	0.002642	1.705	10.18	15.16
-	15	-	-	57.07	1.450	3,257	0.002558	1.650	9.859	14.67
-	-	17	-	56	1.422	3,136	0.002463	1.589	9.493	14.13
-	-	-	1.4	55.12	1.400	3,038	0.002386	1.539	9.196	13.68
-	16	-	-	50.82	1.291	2,583	0.002029	1.309	7.820	11.64
18	-	-	-	49	1.245	2,401	0.001886	1.217	7.269	10.82
-	-	18	-	48	1.219	2,304	0.001810	1.167	6.976	10.38
-	-	-	1.2	47.24	1.200	2,232	0.001753	1.131	6.756	10.06
-	17	-	-	45.26	1.150	2,048	0.001608	1.037	6.197	9.219
19	-	-	-	42	1.067	1,764	0.001385	0.8938	5.388	7.946
-	18	-	-	40.3	1.024	1,624	0.001275	0.8226	4.914	7.313
-		19	-	40	1.016	1,600	0.001257	0.8107	4.845	7.207
-	-	-	1.0	39.37	1.000	1,550	0.001217	0.7854	4.690	6.982
-	-	20	-	36	0.914	1,296	0.001018	0.6576	3.923	5.838

Wire Gauges

Gauge				Diameter		Sectional Area			Weight	
B.W.G.	A.W.G.	S.W.G.	mm.G	Mil	mm.	Cir.Mil	in^2	mm^2	lb/1,000 ft	kg/km
-	19	-	-	35.89	0.9116	1,288	0.001012	0.6529	3.900	5.804
-	-	-	0.90	35.43	0.9000	1,255	0.0009857	0.6362	3.799	5.656
20	-	-	-	35	0.8890	1,225	0.0009621	0.6207	3.708	5.518
21	-	21	-	32	0.8128	1,024	0.0008042	0.5189	3.099	4.613
-	20	-	-	31.96	0.8118	1,021	0.0008019	0.5174	3.091	4.600
-	-	-	0.80	31.50	0.8000	992.3	0.0007794	0.5027	3.004	4.469
-	21	-	-	28.46	0.7229	810	0.0006362	0.4105	2.452	3.649
22	-	22	-	28	0.7112	784	0.0006158	0.3973	2.373	3.532
-	-	-	0.70	27.56	0.7000	759.6	0.0005966	0.3848	2.299	3.421
-	-	-	0.65	25.59	0.6500	654.8	0.0005143	0.3318	1.982	2.950
	22	-	-	25.35	0.6438	642.6	0.0005047	0.3256	1.945	2.895
23	-	-	-	25	0.6350	625	0.0004909	0.3167	1.892	2.816
-	-	23	-	24	0.6096	576	0.0004524	0.2919	1.744	2.595
-	-	-	0.60	23.62	0.6000	557.9	0.0004382	0.2827	1.689	2.513
-	23	-	-	22.57	0.5733	509.4	0.0004001	0.2581	1.542	2.295
24	-	24	-	22	0.5583	484	0.0003801	0.2452	1.465	2.180
-	-	-	0.55	21.65	0.5500	468.7	0.0003681	0.2376	1.419	2.112
-	24	-	-	20.10	0.5106	404	0.0003173	0.2047	1.223	1.820
25	-	25	-	20	0.5080	400	0.0003142	0.2027	1.211	1.802
-	-	-	0.50	19.69	0.5000	387.7	0.0003045	0.1963	1.174	1.745
26	-	26	-	18	0.4572	324	0.0002545	0.1642	0.9809	1.460
-	25	-	-	17.90	0.4547	320.4	0.0002516	0.1623	0.9697	1.443
-	-	-	0.45	17.72	0.4500	314	0.0002466	0.1590	0.9504	1.414
-	-	27	-	16.4	0.4166	269	0.0002113	0.1363	0.7844	1.212
27	-	-	-	16	0.4064	256	0.0002011	0.1297	0.7750	1.153
-	26	-	-	15.94	0.4049	254.1	0.0001996	0.1288	0.7693	1.145
-	-	-	0.40	15.75	0.400	248.1	0.0001949	0.1257	0.7512	1.118
-	-	28	-	14.8	0.3759	219	0.0001720	0.1110	0.6629	0.9868
-	27	-	-	14.20	0.361	201.6	0.0001583	0.1021	0.6101	0.9077
28	-	-	-	14	0.3556	196	0.0001539	0.09932	0.5931	0.8330
-	-	-	0.35	13.78	0.3500	189.9	0.0001491	0.09621	0.5746	0.8553
-	-	29	-	13.6	0.3454	185	0.0001453	0.09372	0.5600	0.8332
29	-	-	-	13	0.3302	169	0.0001327	0.08563	0.5114	0.7613
-	28	-	-	12.64	0.3211	159.8	0.0001255	0.08097	0.4837	0.7198
-	-	-	0.30	12.60	0.3200	158.8	0.0001246	0.08042	0.7806	0.7149
-	-	30	-	12.4	0.3150	153.8	0.0001208	0.07791	0.4656	0.6926
30	-	-	-	12	0.3048	144	0.0001131	0.07297	0.4359	0.6487
-	-	31		11.6	0.2946	134.6	0.0001057	0.06818	0.4074	0.6061
-	-	-	0.29	11.42	0.2900	130.4	0.0001024	0.06605	0.3947	0.5872
-	29	-	-	11.26	0.2859	126.8	0.00009959	0.06425	0.3838	0.5712
-	-	32	-	10.8	0.2743	116.6	0.00009158	0.05913	0.3530	0.5257
-	-	-	0.26	10.24	0.2600	104.9	0.00008239	0.05309	0.3175	0.4720
-	30	-	-	10.03	0.2546	100.6	0.00007901	0.05097	0.305	0.4531
31	-	33	-	10	0.2540	100	0.00007954	0.05067	0.3027	0.4505
-	-	34	-	9.2	0.2337	84.64	0.00006648	0.04289	0.2562	0.3813
-	-	-	0.23	9.055	0.2300	81.99	0.00006440	0.04155	0.2482	0.3694

Wire Gauges

Gauge				Diameter		Sectional Area			Weight	
B.W.G.	A.W.G.	S.W.G.	mm.G	Mil	mm.	Cir.Mil	in^2	mm^2	lb/1,000 ft	kg/km
32	-	-	-	9	0.2286	81.102	0.00006362	0.04104	0.2452	0.3649
-	31	-	-	8.928	0.2238	79.71	0.00006260	0.04039	0.2413	0.3591
-	-	35	-	8.4	0.2134	70.56	0.00005542	0.03575	0.2136	0.3178
33	-	-	-	8	0.2032	64	0.00005027	0.03243	0.1937	0.2883
-	32	-	-	7.950	0.2019	65.20	0.00004964	0.03203	0.1913	0.2847
-	-	-	0.20	7.874	0.2000	62	0.00004869	0.03142	0.1877	0.2793
-	-	36	-	7.6	0.1930	57.76	0.00004536	0.02927	0.1748	0.2602
-	-	-	0.18	7.087	0.1800	50.23	0.00003945	0.02545	0.1520	0.2263
-	33	-	-	7.080	0.1798	50.13	0.00003937	0.02540	0.1517	0.2258
34	-	-	-	7.	0.1778	49	0.00003848	0.02483	0.1483	0.2207
-	-	37	-	6.8	0.1727	46.24	0.00003632	0.02343	0.1400	0.2083
-	34	-	-	6.305	0.1601	39.75	0.00003122	0.02014	0.1203	0.1790
-	-	-	0.16	6.299	0.1600	39.68	0.00003116	0.02011	0.1201	0.1788
-	-	38	-	6	0.1524	36	0.00002827	0.01824	0.1090	0.1622
-	35	-	-	5.615	0.1426	31.53	0.00002476	0.01597	0.09543	0.1420
-	-	-	0.14	5.512	0.1400	30.38	0.00002386	0.01539	0.09196	0.1368
-	-	39	-	5.2	0.1321	27.04	0.00002124	0.01370	0.08186	0.1218
35	36	-	-	5.000	0.1270	25	0.00001963	0.01267	0.07565	0.1126
-	-	40	-	4.8	0.1219	23.04	0.00001810	0.01167	0.06976	0.1037
-	-	-	0.12	4.724	0.1200	22.32	0.00001753	0.01131	0.06756	0.1006
-	37	-	-	4.453	0.1131	19.83	0.00001557	0.01005	0.06001	0.08934
-	-	41	-	4.4	0.1118	19.36	0.00001521	0.009810	0.05812	0.08721
36	-	42	-	4	0.1016	16.00	0.00001257	0.008107	0.04845	0.07207
-	38	-	-	3.965	0.1007	15.72	0.00001235	0.007968	0.04760	0.07084
-	-	-	0.10	3.937	0.1000	15.50	0.00001217	0.007854	0.04690	0.06982
-	-	43	-	3.6	0.09114	12.96	0.00001018	0.006567	0.03923	0.05838
-	39	-	-	3.531	0.08969	12.47	0.000009794	0.006319	0.03775	0.05618
-	-	44	-	3.2	0.08138	10.24	0.000008042	0.005819	0.03099	0.04613
-	40	-	-	3.145	0.07987	9.891	0.000007768	0.005012	0.02994	0.04456
-	41	45	-	3.800	0.07113	7.842	0.000006159	0.003973	0.02374	0.03532
-	42	-	-	2.494	0.06334	6.219	0.000004884	0.003151	0.01882	0.02801
-	-	46	-	2.4	0.06096	5.760	0.000004528	0.002929	0.01744	0.02595
-	43	-	-	2.221	0.05641	4.932	0.000003873	0.002495	0.01498	0.02222
-	-	47	-	2	0.05080	4.000	0.000003142	0.002027	0.01211	0.01802
-	44	-	-	1.987	0.05023	3.911	0.000003072	0.001982	0.01184	0.01762
-	-	-	0.05	1.969	0.05000	3.877	0.000003045	0.001963	0.01174	0.01745
-	45	-	-	1.761	0.04473	3.102	0.000002436	0.001572	0.009383	0.01398
-	-	48	-	1.6	0.04064	2.560	0.000002011	0.001297	0.007750	0.01153
-	46	-	-	1.568	0.03984	2.460	0.000001931	0.001246	0.007446	0.01108
-	47	-	-	1.397	0.03547	1.951	0.000001532	0.0009884	0.005904	0.008787
-	48	-	-	1.224	0.03159	1.547	0.000001215	0.0007838	0.004683	0.006968
-	-	49	-	1.2	0.03048	1.440	0.000001131	0.0007297	0.004359	0.006487
-	49	-	-	1.108	0.02813	1.227	0.000009635	0.0006216	0.003713	0.005526
-	-	50	-	1	0.02540	1.000	0.000007854	0.0005067	0.003027	0.004505
-	50	-	-	0.986	0.02505	0.9728	0.000007641	0.0004929	0.002945	0.004382

NOTE B.W.G. - Birmingham Iron Wire Gauge
A.W.G. - American Wire Gauge
S.W.G. - British Standard Wire Gauge
mm.G. - Millimeter Gauge

A

Conversion table AWG/MCM (kcmil) to the metric cross-section area

Conductor Cross-swection area AWG/MCM (kcmil)		Theoretical Cross-Section area mm²	Advised Cross-Section area lb/1,000 ft
AWG	20	0.51	0.5
	18	0.82	1
	16	1.31	1.5
	14	2.08	2.5
	12	3.31	4
	10	5.27	6
	8	8.40	10
	6	13.30	16
	4	21.20	25
	3	26.70	25
	2	33.60	35
	1	42.40	so
	1/0	53.40	so
	2/0	67.50	70
	3/0	85.00	95
	4/0	107.02	120
MCM (kcmil)	250	126.70	120
	300	152.00	150
	350	177.40	185
	400	202.70	240
	500	253.40	240
	600	304.00	300
	700	354.00	400
	750	380.00	400
	800	405.40	400
	900	456.00	500
	1000	506.70	500
	1250	633.40	630
	1500	760.10	800

A

SI Prefixes

Multiply factor								Prefix	Symbol
	1	000	000	000	000	=	10^{12}	tera	T
		1	000	000	000	=	10^{9}	giga	G
			1	000	000	=	10^{6}	mega	M
				1	000	=	10^{3}	kilo	k
					100	=	10^{2}	hecto	h
					10	=	10^{1}	deca	da
					0.1	=	10^{-1}	deci	d
					0.01	=	10^{-2}	centi	c
					0.001	=	10^{-3}	milli	m
				0.000	001	=	10^{-6}	micro	μ
			0.000	000	001	=	10^{-9}	nano	n
		0.000	000	000	001	=	10^{-12}	pico	p
	0.000	000	000	000	001	=	10^{-15}	femto	f
0.000	000	000	000	000	001	=	10^{-18}	atto	a

Properties of Insulation and Jacket Materials

Resistance to Industrial Chemicals

A

Reagent	Relative Rating							Reagent	Relative Rating						
	BR	CR	ERC	PVC	PE	XLPE	NYLON		BR	CR	ERC	PVC	PE	XLPE	NYLON
Acetone	◎	○	◎	×	◎	◎	○	Chlorine Gas	△	△	×	×	×	×	◎
Aniline	○	×	○	○	○	○		Ozone	○		○	○	◎	◎	×
Ethanol	◎	◎	◎	△	○	○	○	Bromine	×	×	×	×	×	×	
Ethyleneglycol	○	◎	○	△	◎	◎	○	Nirtic Acid, conc.	×	×	×	×	△	△	×
Xylene	×	×	×	×	○	○	○	Nitric Acid, 10%	×	×	△	○	○	○	△
Glycerin	◎	◎	◎	○	◎	◎	○	Fuming Nitric Acid	×	×		×	×	×	
Cresol	○	△	○	△	○	○	×	TapWater	◎	◎	◎	◎	◎	◎	◎
Chloroform	×	×	×	×	△	△	×	Seawater	○	◎	◎	◎	◎	◎	
Acetic Acid, conc.	○	△	○	×	○	○	△	Sulfuric Acid, conc.	×	×	×	△	△	△	×
Acetic Acid, 10%	○	×	○	△	◎	◎	○	Sulfuric Acid, 10%	○	○	○	◎	○	○	○
Ethyl Acetate	○	×	△	×	○	○	○	Phosphoric Acid	○	△	○	×	◎	◎	○
Carbon Tetrachloride	×	×	×	×	×	×	△	Sodium Hydroxide, 10%	○	○	○	○	○	○	◎
Cyclohexane	△	×	×		△	△		Freon	×	×		○	○	○	
Dioctyl Phthalate	◎	×		×				Formic Acid	△	×		○	○	○	◎
Trichloroethylene	×	×	×	△	△	△	△	JIC No.1 Oil (OF Oil)	×	△	×	△	○	○	
Trichlorobenzene	×	×	×		△	△		ASTM No.1 Oil	○	○	△	△	○	○	
Toluene	×	×	×	×	△	△	○	ASTM No.2 Oil	△	○	△	△	○	○	
Carbon Disulfide	×	×	×	△	○	○		ASTM No.3 Oil	×	△	×	△	△	△	
Phenol	○	△	○	×	○	○	×	Gasoline	×	△	×	×	○	○	○
Furfural	◎	○	◎	△	◎	◎		Creosote Oil	△	×	×	×	△	△	
Hexane	×	△	×	△	○	○		JIS No.2 Oil	×	×	×	△	○	○	
Benzene	×	×	×	×	△	△	○	Heavy Oil	×	×	×	△	△	△	
Methanol	◎	◎	◎	×	○	○	△	Lube Oil	×	△	△	△	△	△	○
Methyl Ethyl Ketone	△	×	△	×	○	○		Silicone Oil	◎	◎	◎	○	◎	◎	
Dioxane				×	○	○		Vegetable Oil	◎	◎	○		◎	◎	
Nitrobenzene	○	×	○	×	○	○		Petroleum Ether	△	△		×	◎	◎	
Formaline	○	○		○	○	○	△	Trans Oil	×	△	×	○	○	○	
Ammonia, conc.	○	△	○	△	○	○	○	Naphtha	×	×	×	○	○	○	○
Ammonia,10%	○	△	○	○	○	○	◎	Coal Tar					○	○	
Sodium Chloride	○	○	○	○	◎	◎	◎								
Hydrochloric Acid, conc.	○	○	○	△	○	○	×								
Hydrochloric Acid, 10%	◎	○	○	○	◎	◎	○								

Where: ◎ : High Resistance ○ : Fair Resistance
× : Not Applicable △ : Poor Resistance, care on use

Properties of Insulation and Jacket Materials

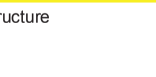
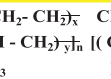
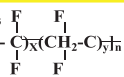
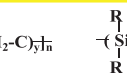
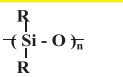
General Comparison Data

Material		Polyvinyl Chloride	Low Density Polyethylene	Cross-liked Polyethylene	Polyisoprene	Styrene Butadiene Copolymer	Polyisprene	Chlorosulphonated Polyethylene
Designation		**PVC**	**PE**	**XLPE**	**NR**	**SBR**	**CR**	**CSM**
Chemical structure		$-(CH_2-\underset{Cl}{CH})_n-$	$-(CH_2-CH_2)_n-$	$\sim CH_2-\underset{}{CH}-CH_2\sim$ $\sim CH_2-CH-CH_2\sim$	$-(CH_2-\underset{CH_3}{C}=CH-CH_2)_n-$	$-[(CH_2-CH=CH-CH_2)_x-(CH_2-\underset{}{CH})_y]-_n$ 	$-(CH_2-\underset{Cl}{C}=CH-CH_2)_n-$	$-(CH_2)_x-CH-(CH)_y CH)]_n$ SO_2Cl
Density		1.3 - 1.5	0.91 - 0.93	0.91 - 0.93	0.93 - 0.94	0.93 - 0.94	1.15 - 1.23	1.10
Hardness (Shore)		D30 - 90	D45 - 60		30 - 90	10 - 95	20 - 90	50 - 90
Max. Operating Temp.	°C	70	75	90	60	75	80	90
Emergency Temp. Rating	°C	85	90	130	85			
Short Circuit Temp. Rating	°C	120	150	250	150			
Brittleness Temp.	°C	~ -40	< - 70	< - 70	-55 ~ -58	-30 ~ -65	-30 ~ -50	-20 ~ -50
Softening Temp.	/°C	120 - 140	100 - 115					
Thermal Expansion	°C	0.7 - 2.5 x 10^{-4}	1.6 - 1.8 x 10^{-4}	1.6 - 1.8 x 10^{-4}	1.8 x 10^{-4}	1.8 x 10^{-4}	1.9 x 10^{-4}	1.8 x 10^{-4}
Thermal Conductivity Cal / cm•sec•	°C	3.0 - 4.0 x 10^{-4}	8.0 x 10^{-4}	8.0 x 10^{-4}	5.1 x 10^{-4}	5.8 x 10^{-4}	5.6 x 10^{-4}	6.3 x 10^{-4}
Specific Heat	Cal /°C•g	0.3 - 0.5	0.55	0.55	0.52	-	0.52	
Tensile Strength	kg / mm^2	1.5 - 2.5	1.5 - 2.0	1.8 - 3.0	0.8 - 3.0	0.4 - 3.0	0.7 - 3.0	0.5 - 2.0
Elongation	%	200 - 400	300 - 700	300 - 700	300 - 700	100 - 700	400 - 900	100 - 500
Abrasion Resistance		Excellent	Good	Excellent	Good	Good	Good	Good
Voltage Breakdown	kv / mm	20 - 30	30 - 50	30 - 50	16 - 32	16 - 30	15 - 25	16 - 32
Volume Resistivity	Ω•cm	10^{12} - 10^{15}	>10^{16}	>10^{16}	10^{15}	10^{14} - 10^{15}	10^{10} - 10^{12}	10^{13} - 10^{14}
Dielectric Constant		5.7	2.2 - 2.4	2.2 - 2.4	3 - 5	3 - 5	7 - 10	
Dissipation Factor (tan δ)		0.1 - 0.03	<0.0005	<0.0005	0.3 - 0.5	2 - 5	1.7 - 4	-
Weathering		Good	Inferior*	Inferior*	Poor	Poor	Excellent	Good
Ozone Resistance		Excellent	Excellent	Excellent	Poor	Inferior	Good	Good
Flame Resistance		Self - Extinguish	Burns	Burns	Burn	Burn	Self - Extinguish	Self - Extinguish
Track Resistance		Inferior	Excellent	Excellent	Fair	Fair	Inferior	Good
Water Resistance		Fair	Excellent	Excellent	Fair	Fair	Fair	Fair
Acid Resistance		Excellent	Good	Good	Good	Fair	Excellent	Good
Alcari Resistance		Excellent	Excellent	Excellent	Good	Good	Excellent	Excellent
Oil Resistance		Good	Excellent	Excellent	Poor	Inferior	Good	Fair
Solvent Resistance		Fair	Excellent	Excellent	Inferior	Inferior	Fair	Fair

* Improved to "good" with mixture of carbon black.

Properties of Insulation and Jacket Materials

General Comparison Data (Continued)

Material		Ethylene Propylene Copolymer	Hexafluoropropylene Vinylidenefluoride Copolymer	Polyorganosiloxane	Polypropylene	Polytetra Fluoroethylene	Polychloro Trifluoroethylene	Polyamide
Designation		**EPM, EPDM**	**FPM**	**Q**	**PP**	**PTFE**	**PCTFE**	**Nylon(12)**
Chemical structure								
Density		0.86 - 0.87	1.82 - 1.85	0.97 - 1.40	0.9 - 0.915	2.13 - 2.2	2.1	1.01 - 1.02
Hardness (Shore)		40 - 85	60 - 90	50 - 85	R85 - 110	D50 - 65	R110 - 115	R100 - 110
Max. Operating Temp.	°C	90	200	180	80	260	180	90
Emergency Temp. Rating	°C							
Short Circuit Temp. Rating	°C				150	310		120
Brittleness Temp.	°C	-40 ~ -60	-44 ~ -60	-70 ~ -100		<-70	<-70	-70
Softening Temp.	/°C						210	170 - 180
Thermal Expansion	°C		1.6×10^{-4}	2.6×10^{-4}	$6.0 - 8.5 \times 10^{-4}$	1.0×10^{-5}	$4.5 - 7.0 \times 10^{-5}$	12×10^{-5}
Thermal Conductivity Cal / cm•sec•	°C		5.5×10^{-4}	5.7×10^{-4}	2.8×10^{-4}	6×10^{-4}	6×10^{-4}	$5.9 - 8.3 \times 10^{-4}$
Specific Heat	Cal /°C•g				0.46	0.25	0.22	0.62
Tensile Strength	kg / mm²	0.5 - 1.5	1.5 - 2.5	0.3 - 1.0	2.0 - 4.0	1.4 - 2.1	2.8 - 3.5	5.0 - 6.0
Elongation	%	300 - 700	200 - 600	50 - 300	200 - 700	200	10 - 100	180 - 285
Abrasion Resistance		Good	Good	Fair	Excellent	Excellent	Excellent	Excellent
Voltage Breakdown	kv / mm	20 - 35	24	20 - 40	20 - 32	15 - 30	10 - 20	20 - 30
Volume Resistivity	Ω•cm	$10^{14} - 10^{15}$	$10^{12} - 10^{14}$	$10^{14} - 10^{15}$	$>10^{16}$	$>10^{18}$	$1.2 - 10^{18}$	$10^{14} - 10^{15}$
Dielectric Constant		3 - 5	6 - 7	3 - 4	2.0 - 2.2	2.0	2.24 - 2.8	3.5 - 4.5
Dissipation Factor (tan δ)		0.2 - 0.8		0.1 -1.0	0.0002 - 0.0006	<0.0002	0.0012 - 0.0036	0.03 - 0.06
Weathering		Excellent	Good	Good	Inferior*	Excellent	Excellent	Inferior*
Ozone Resistance		Excellent	Good	Excellent	Excellent	Excellent	Excellent	Good
Flame Resistance		Burn	Self - Extinguish	Burn	Burn	No Burn	No Burn	Burn
Track Resistance		Excellent	Fair	Excellent	Excellent	Excellent	Excellent	Good
Water Resistance		Good	Excellent	Fair	Excellent	Excellent	Excellent	Excellent
Acid Resistance		Excellent	Excellent	Poor	Excellent	Excellent	Excellentt	Good
Alcari Resistance		Excellent	Excellent	Good	Excellent	Excellent	Excellent	Excellent
Oil Resistance		Inferior*	Excellent	Fair	Excellent	Excellent	Excellent	Excellent
Solvent Resistance		Poor	Excellent	Fair	Excellent	Excellent	Excellentt	Good

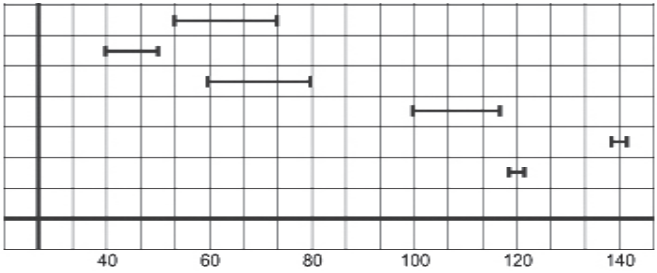
* Improved to "goodH with mixture of carbon black.

Properties of Insulation and Jacket Materials

Thermal Properties

Deflection temperature of plastics under load [ASTM D648]

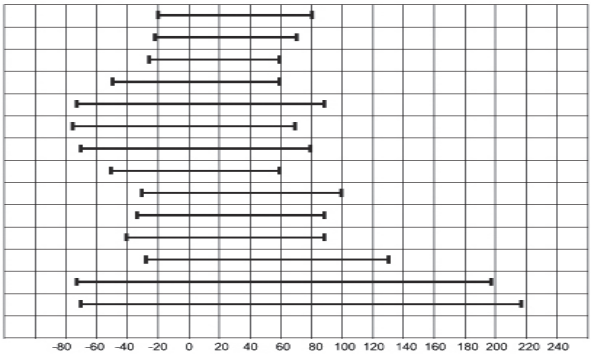
Polyvinyle Choloride (Hard Type)
Low Density Polyethylene
High Density Polyethylene
Polypropylene Polyamide
Polytetrafluoroethylene



Temperature - degrees C

Operating Temperature

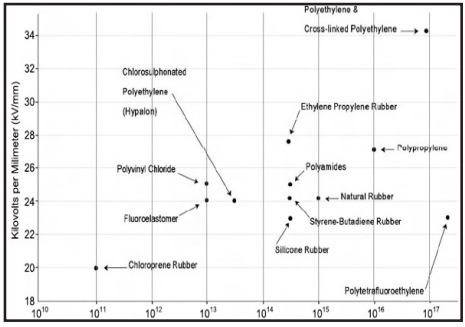
[Max. point : Max Continuous Operating Temperature
Min.point : Brittleness Temperature]



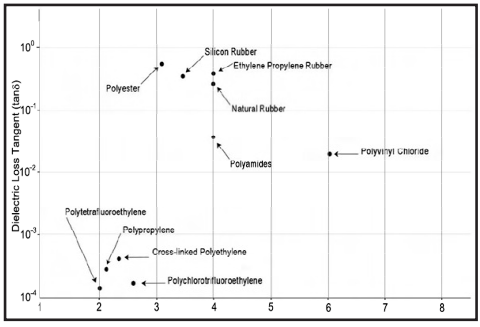
Temperature - degrees C

Polyvinyle Chloride, 80°C Grade
Polyvinyle Chloride, 75°C Grade
Polyvinyle Chloride, 60°C Grade Cold Resisting Polyvinyle Chloride
Cross-Linked Polyethylene Polyethylene
Nylon
Synthetic Natural Rubber
Chloroprene
Styrene-Butadiene Rubber
Ethylene-Propylene Rubber
Chlorosulphonated Polyethylene (Hypalon)
Silicone
Teflon

Electrical Properties



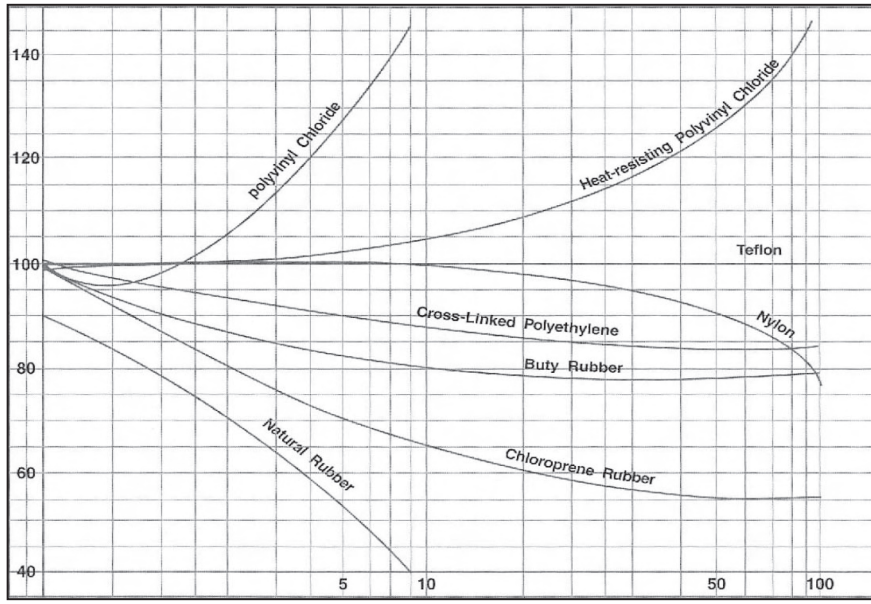
Volume Resistivity [Ω•cm]

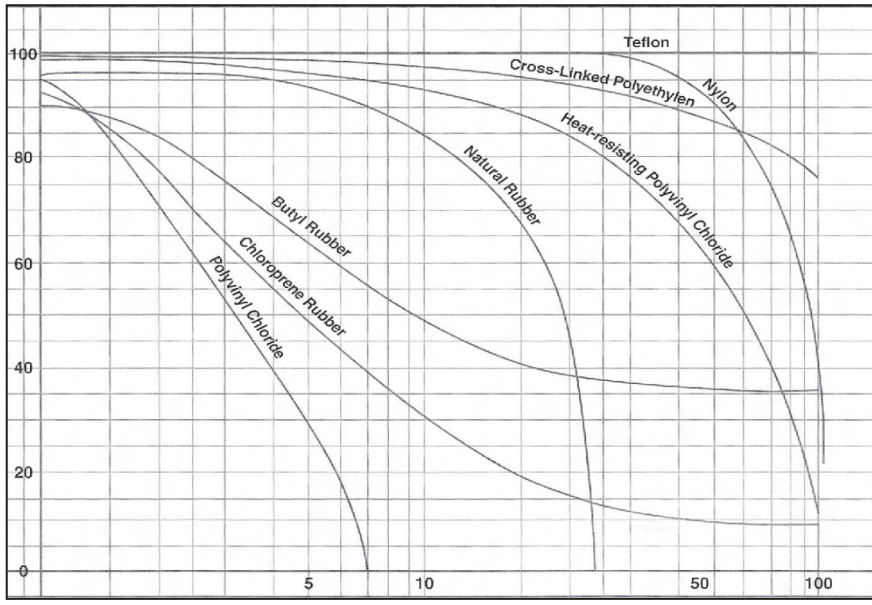


Dielectric Constant [ε]

Properties of Insulation and Jacket Materials

Long - Time Heat Aging Curves





Condition of Installation

Minimum Bending Radius

Type of cable \ Number of core		Single core		Multi cores
		Round conductor	Sector shape conductor	
PVC & PE Sheath	Unshield cable	8D	12D	6D
	Shield Cable	10D	12D	8D
Wire armoured cable		10D	12D	10D
Lead sheathed		10D	12D	10D
Corrugated metal armouredcable		-	-	8D
Flattape armoured cable		-	-	8D
Al. flat sheathed cable		20D	20D	20D
Al. corrugated sheathed cable		15D	15D	15D
Al. solidconductor		-	-	10D
Cabtyre cable		6D	-	4D

D: Overall diameter of cable

A

Pennissible Maximum Pulling Tension

Pulling tool	Material of conductor	Permissible maximum pulling tension (kgf)
Pulling eye	Copper	7 x (Number or core) x (Cross-sectional area of conductor)
	Aluminium	4 x (Number of core) x (Cross-sectional area of conductor)
Cable grip	Copper & Aluminium	The same as using the pulling eye, but the maximum tension should be less than 1.5 tons.

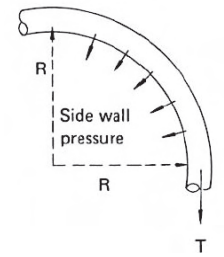
Note : When cable grip is used is should cover more than 500 mm. in length of the cable end and be bound to the cable sheath

Side Wall Pressure to cable

Permissible maximum side wall pressure to the cable at bending point during installation is

500 kg/m for at cable (Single core and multi core)
300 kg/m for PVC insulated PVC sheathed cable
250 kg/m for at triplex type

Side wall pressure to cable = $\frac{\text{Pulling tension (kgf)}}{\text{bending radius (m)}}$



Symbols of Electrical Units

Electrical Unit		Symbol
CURRENT	(AMPERE)	A
VOLTAGE	(VOLT)	V (kV)
RESISTANCE	(OHM)	Ω (kΩ, MΩ)
ELECTRIC POWER	(WATT)	W (kW, MW.)
ELECTRIC ENERGY	(WATT HOUR)	Wh (kWh.)
HORSE POWER		HP
POWER FACTOR	(COS 0)	P.F.
FREQUENCY	(HERTZ)	Hz
CAPACITANCE	(FARAD)	F (μF, pF.)
APPARENT POWER	(VOLTAMPERE)	VA (kVA)
DIRECT CURRENT		DC
ALTERNATING CURRENT		AC
EFFICENCY		Eff.
MAXIMUM VALUES	(VOLTAMPERE)	Em, Im
AVERAGE VALUES	(VOLTAMPERE)	Eav, Iav
EFFECTIVE VALUES	(VOLTAMPERE)	E. I
INSTANTANEOUS VALUES	(VOLTAMPERE)	e, I

Electrical Formulas

Direct Current	Alternating Current	
	Single Phase	Three Phase
$A = \frac{kW \times 1000}{V}$	$A = \frac{kW \times 1000}{V \times P.F.}$	$A = \frac{kW \times 1000}{1.73 \times V \times P.F.}$
$A = \frac{kVA \times 1000}{V}$	$A = \frac{kVA \times 1000}{V}$	$A = \frac{kVA \times 1000}{1.73 \times V}$
$A = \frac{HP \times 746}{V \times (\%Eff.)}$	$A = \frac{HP \times 746}{V \times (\%Eff.) \times P.F.}$	$A = \frac{HP \times 746}{1.73 \times V \times (\%Eff.) \times P.F.}$
$kW = \frac{A \times V}{1000}$	$kW = \frac{A \times V \times P.F.}{1000}$	$kW = \frac{A \times V \times 1.73 \times P.F.}{1000}$
$kVA = \frac{A \times V}{1000}$	$kVA = \frac{A \times V}{1000}$	$kVA = \frac{A \times V \times 1.73}{1000}$
$HP = \frac{A \times V (\%Eff.)}{746}$	$HP = \frac{A \times V \times (\%Eff.) \times P.F.}{746}$	$HP = \frac{A \times V \times 1.73 (\%Eff.) \times P.F.}{746}$

Approximate Motor Amperes per Terminal

1 phase	220 V ac = 4	amps/HP
3 phase	200 V ac = 2.5	amps/HP
3 phase	380 V ac = 1.41	amps/HP
3 phase	440 V ac = 1	amps/HP
3 phase	550 V ac = 1	amps/HP

Table of The Dimesions for The Motor Starters

The figures are based on normal 3 - phase motor for a.c. at 50 c.p.s. 1400 - 1450 r.p.m.

Moter ratings in HP at searvice voltage						Rating of motor starter (A)	Relay setting (A)	Max. quick-blow back-up fuse (A)	Min cross section of cables (mm^2)
220 V		380 V		440 V					
HP	Full load current (A)	HP	Full load current (A)	HP	Full load current (A)				
		0.05		0.05		15	0.15 - 0.25	1	1.5
0.05		0.1		0.1		15	0.25 - 0.4	2	1.5
		0.15		0.20		15	0.4 - 0.65	4	1.5
0.1		0.2		0.25	0.5	15	0.4 - 0.65	4	1.5
0.15		0.25	0.6	0.50	0.9	15	0.6 - 1	6	1.5
0.25	1.1	0.5	1.0			15	1.0 - 1.6	6	1.5
		0.75	1.5	0.75	1.2	15	1.0 - 1.6	6	1.5
0.5	1.8	1.0	1.9	1.0	1.6	15	1.5 - 2.5	15 (10)	1.5
0.75	2.5	1.5	2.6	2	3.2	15	2.5 - 4	25 (15)	1.5
1.0	3.2	2	3.4	2.5	3.9	15	2.5 - 4	25 (15)	1.5
1.5	4.4	2.5	4.2	3	4.5	15	4 - 6.5	25 (20)	1.5
2.0	5.8	3	4.9	4	6.0	15	4 - 6.5	25 (20)	1.5
2.5	7.3	4	6.3	5	7.5	15	6 - 10	35 (25)	1.5
3	8.4	5	7.8	6	8.5	15	6 - 10	35 (25)	1.5
4	11	6	9.3	7.5	11.0	15	9 - 14	35	1.5
5	13.5	7.5	11.5			15	9 - 14	35	1.5
		10	15	10	14	25	13 - 20	60	2.5
7.5	19.5	15	22	15	21	25	16 - 25	60	4
10	26	20	29	20	27	60	20 - 31	100	6
15	39	25	36	30	39	60	28 - 43	125	10
20	51	30	42			60	40 - 60	160	16
		35	50	35	46	60	40 - 60	160	16
		40	56	40	52	60	40 - 60	160	16
25	63	50	69	50	65	100	50 - 75	200	16
35	91	60	83	60	76	100	70 - 100	200	25
40	100	75	104	75	96	200	84 - 120	400	35
50	125	100	136	100	125	200	105 - 150	500	50
75	184	125	167	125	155	200	140 - 200	500	95
		150	200	150	180	350	175 - 250	600	120
100	245	175	245	175	215	350	175 - 250	600	120
120	295	200	268	200	240	350	210 - 300	850	150
150	370	250	335	250	300	600	280 - 400	850	240
175	425	300	400	300	360	600	350 - 500	1000	400
200	475	350	470	350	410	600	350 - 500	1000	400
225	540	400	535	400	450	600	420 - 600	1000	

Figures in brackets apply to hand operated motor starters.

Standard Coefficient of Conversion

Items		Description			
1. LENGTH	1 micron	= 0.001 mm	= 3.94 X 10^{-5} in.		
	1 mil	= 0.0254 mm	= 0.001 in		
	1 mm	= 39.37 mils	= 0.03937 in.		
	1 cm	= 0.3937 in	= 0.0328 ft.		
	1 inch	= 25.4 mm	= 0.083 ft.	= 0.0278 yd.	= 2.54 cm.
	1 feet	= 0.305 m	= 0.33 yd.		
	1 yard	= 0.914 m	= 91.44 cm.		
	1 meter	= 39.37 in	= 3.28 ft.	= 1.094 yd.	
	1 kilometer	= 3,281 ft.	= 1,094 yd.	= 0.6213 mile	
	1 mile	= 5,280 ft.	= 1,760 yd.	= 1,609 m	= 1.609 km
2. AREA	1 MCM	= 1000 CM	(Circular Mil)	= 0.5067 mm^2	= 1/1000 in^2
	1 CM	= 0.0005067 mm^2	= 0.0000007854 in^2		= 0.7854 sq. mil.
	1 mm^2	= 1973 CM	= 0.00155 in^2	= 1,550 sq. mil.	
	1 in^2	= 1273240 CM	= 645.1 mm^2	= 0.0069 $ft.^2$	
	1 yd^2	= 1,296 in^2	= 0.83613 m^2		
	1 m^2	= 1,550 in^2	= 10.7 $ft.^2$	= 1.195 $yd.^2$	
	1 km^2	= 0.001562 $mile^2$			
	1 $mile^2$	= 27,880,000 $ft.^2$	= 3,098,000 $yd.^2$	= 2,590,000 m^2	= 2.59 km^2
3. VOLUME	1 cm^3	= 0.061 in^3			
	1 in^3	= 16.39 cm^3	= 0.0036 gal.	= 0.0005787 $ft.^3$	
	1 l	= 1,000 cm^3	= 61.023 in^3	= 0.2642 gal	= 0.03531 $ft.^3$
	1 gal.	= 3,785 cm^3	= 231 in^3	= 0.1337 $ft.^3$	= 0.004951 $yd.^3$
	1 $ft.^3$	= 28,317 cm^3	= 1,728 in^3	= 28.32 l.	= 7.48 gal
	1 yd^3	= 46,656 in^3	= 0.7646 m^3		
	1 m^3	= 61,023 in^3	= 35.31 $ft.^3$	= 1.308 yd^3	
4. WEIGHT	1 g.	= 15.43 gr.	= 0.03527 oz.	= 0.002205 lb.	
	1 oz.	= 437.5 gr.	= 28.35 g.	= 0.0625 lb.	
	1 lb.	= 7,000 gr.	= 453.6 g.	= 16 oz.	= 0.4536 kg.
	1 kg.	= 15,432 gr.	= 35.27 oz.	= 2.205 lb.	
	1 ton (short)	= 2,000 lb.	= 907.2 kg.	= 0.8928 ton (long)	
	1 ton (long)	= 2,240 lb.	= 1.12 ton (short)	= 1.016 ton (metric)	
	1 ton (metric)	= 2,204.62 lb.			
5. ENERGY	1 Btu.	= 1,055 joules	= 778.1 ft.-lb	= 252 g-cal.	= 107.6 kg.-m.
		= 0.2930 watt-hr.			
	1 watt-hr.	= 3,600 joules	= 2,655.4 ft. -lb.	= 860 g-cal.	= 367.1 kg.-m.
		= 3.413 B.t.u.	= 0.001341 hp.-hr.		
	1 hp.-hr.	= 2,684,000 joules	= 1,980,000 ft.-lb	= 273,700 kg.-cm.	
		= 745.6 watt-hr.			
	1 kw - hr.	= 2,655,000 ft.-lb.	= 367,100 kg.-m.	= 1.34 hp.-hr.	
6. POWER	1 watt	= 44.26 ft.-lb./min	= 6.199 kg-m/min	= 0.001341 hp.	
	1 hp	= 33,000 ft.-lb./min		= 745.6 watts	= 550 ft.-lb./sec.
		= 76.04 kg-m/sec			
	1 kw	= 44,256.7 ft-lb./min		= 101.979 kg-m/sec	= 1.341 hp.
		= 1,000 watts.			
7. TEMPERATURE	Temp °C	= 5/9 (temp °F-32)			
	Temp °F	= (9/5 x temp °C) +32			

Conductivity and Density of Metals

Kind	Symbol	Conductivty (% IACS)	Density (g/cm^3)
Silver	Ag	108.6	10.50
Stranded Copper (Annealed)	Cu	100.0	8.89
Gold	Au	72.5	19.30
Aluminium	Al	61.0	2.70
Iron	Fe	13.0	7.78
Tin	Sn	12.2	7.29
Steel	-	11.6	7.78

Conductor Materials

Material	Specific resistance 20°C			Temperature coefficient, 20°C	Density (g/cm3)
	μΩ-cm	μΩ-in	Ω-cmil/ft		
Annealed copper	1.724	0.6788	10.37	0.00393	8.89
Hard-drawn copper	1.79	0.695	10.77	0.00378	8.89
Annealed aluminium	2.82	1.113	17.0	0.0039	2.70
Hard-drawn aluminium	2.92	1.15	17.5	0.0038	2.70
Pure iron	10.0	3.93	60.0	0.006	7.86
Steel wire	10.7-17.5	4.2-6.9	64-106	0.006-0.00036	7.78
Cast iron	75-100	29.5-39.4	450-600	0.001-0.00074	7.32

Temperature Correction Factors for Conductor Resistance

Factors for correcting resistances at various temperatures of conductor to the standard reference temperature of 20°C and reciprocals of the factors for calculating resistances at other temperatures from the value at 20°C

Temperature °C	Correction Factor		Reciprocal of Factor	
	Copper	Aluminum	Copper	Aluminum
0	1.085	1.088	0.921	0.919
5	1.063	1.064	0.941	0.940
10	1.041	1.042	0.961	0.960
15	1.020	1.021	0.980	0.980
20	1.000	1.000	1.000	1.000
25	0.981	0.980	1.020	1.020
30	0.962	0.961	1.039	1.040
35	0.944	0.943	1.059	1.060
40	0.927	0.925	1.079	1.081
45	0.911	0.908	1.098	1.101
50	0.895	0.892	1.118	1.121
55	0.879	0.876	1.138	1.141
60	0.864	0.861	1.157	1.161
65	0.850	0.846	1.177	1.181
70	0.836	0.832	1.197	1.202
75	0.822	0.819	1.216	1.222
80	0.809	0.805	1.236	1.242
85	0.797	0.792	1.255	1.262
90	0.784	0.780	1.275	1.282

A

The correction factor is given by:

$$k = \frac{1}{k_1} = \frac{1}{1 + \alpha(\theta - 20)}$$

Where:

k = temperature correction factor of conductor

k_1 = reciprocal of k

α = constant mass temperature coefficient at 20°C per °C
= 0.00393 for copper (based on 100% conductivity)
= 0.00403 for aluminum (based on 61% conductivity)

θ = referred temperature, °C

Electrical Formulas

D.C. resistance

Method of calculation of conductor maximum d.c. resistance

$$R_{dc} = \frac{4A}{n\pi d^2} \times K_1 \times K_2 \times K_3$$

Where:

R_{dc} = the d.c. resistance at 20°C, Ω/km

A = the standard resistivity of the conductor metal at 20°C
- 17.241 for annealed copper
- 28.264 for aluminium alloy 1350
- 17.654 for tinned copper

K_1 = a factor dependent on the diameter of the wire in the conductor, on the kind of metal and on whether or not the copper wires are tinned or nickel-coated.

K_2 = A factor dependent on the conductor construction.
- 1.00 for Solid conductors
- 1.02 for stranded or uniaxial conductors in fixed cables, where the diameter of wires exceeds 0.6 mm
- 1.03 for stranded or bunched conductors in all cables where the diameter of wires<= 0.6 mm
- 1.04 for stranded or bunched conductors in all cables where the diameter of wires>= 0.6 mm

K_3 = A factor dependent on whether or not the conductor is, typically, used also in multicore cables.
- 1.00 for conductors in fixed cables of< 500 mm² (typically single core cables)
- 1.02 for conductors in fixed cables of< 500 mm² (typically multi core cables)
- 1.05 for conductors in all flexible cords and cables

n = the number of wires in the conductor

d = the diameter of wires in the conductor

Diameter of wire in conductor		K_1			
		Soild Conductor		Stranded Conductor	
mm		Plain or silver plated copper	Tinned copper or plain aluminium	Plain or silver plated copper	Tinned copper or plain aluminium
	≤0.10	-	-	1.07	1.12
>0.10	≤0.31	-	-	1.04	1.07
>0.31	≤0.91	1.03	1.05	1.02	1.04
>0.91	≤3.60	1.03	1.04	1.02	1.03
>3.60	≤4.50	1.03	1.04	-	-
>4.50		1.03	1.03	-	-

Inductance

The inductance, L, per core of a 3-core cable or of three single-core cables comprises two parts namely the self-inductance of the conductor and the mutual inductance with other cores.

The formula for calculating the Inductance of a cable is given by:

$$L = K + 0.2\log_{10}\left(\frac{2S}{d}\right) \text{ (mH/km)}$$

Where:

L = Inductance of cable in (mH/km)
K = Constant relating to the conductor formation (see table below)
5 = Axial spacing between conductors within the cable (mm) or axial spacing between Conductors of a trefoil group of single core cables (mm) or
= 1.26 x phase spacing for a flat formation of three single-core cables (mm)
d = conductor diameter or for shaped designs the diameter of an equivalent circular conductor (mm)

Typical Values for K for Different Stranded Conductors (at 50Hz)

Number of Wires in Conductor	K
9	0.0642
7	0.0554
37	0.0528
61 and Over	0.0514
1 (Solid)	0.05
Hollow core conductor, 12 mm duct	0.0383

A

Reactance (Inductive Reactance)

$$X = 2 \times \pi \times f \times L \text{ (}\Omega\text{/km)}$$

Where:

f = Frequency (Hz)
L = Inductance (mH/km)

Impedance

$$Z = \sqrt{R^2 + X^2} \text{ (}\Omega\text{/km)}$$

Where:

R = Conductor Resistance (Ω/km)
X = cable Inductive Reactance (Ω/km)

Dielectric loss (A.C. cables only)

The dielectric loss per unit length in each phase is giving by :

$$W_d = \omega C U_0^2 \tan\delta \text{ (W/m)}$$

Where:

ω = 2πf
C = capacitance per unit length (F/m)
U_o = voltage to earth (V)

Type of cable	Permittivity (ε)	tanδ	U_0
PVC	8	0.1	6
PE (HD and LD)	2.3	0.001	127
XLPE			
• up to and including 18/30 (36)kV cable (unfilled)	2.5	0.004	127
• greater 18/30 (36)kV cable (unfilled)	2.5	0.001	127
• greater 18/30 (36)kV cable (filled)	3	0.005	63.5

Capacitance

The capacitance of circular conductor is giving by :

$$C = \frac{\varepsilon}{18 \ln\left(\frac{D_i}{d_c}\right)} 10^{-9} \text{ (F/m)}$$

Where:

ε = relative permittivity of the insulation
D_i = external diameter of the insulation (excluding screen) (mm)
d_c = diameter of conductor, including screen, if any (mm)

The same formula can be used for oval conductors if the geometric mean of the appropriate major and minor diameters is substituted for D_i and d_c

AC resistance at temperature :

$$R_{ac} = R_{dc_t}(1 + y_s + y_p)$$

Where:

R_{dc_t} = DC resistance at operating temperature
y_s = Skin effect factor
y_p = Proximity effect factor

Skin effect factor y_s

$$y_s = X_s^4 /(192 + X_s^4)$$

Where:

$$X_s^4 = 8 \times \pi \times f \times 10^{-7} \times \frac{k_s}{R_{dc_t}}$$

k_s = Factor determined by conductor construction

Type of conductor	Wheather dried and impregnated or not	k_s	k_p
Copper			
Round, stranded	Yes	1	0.8
Round, stranded	No	1	1
Aluminium	Either		see note
Round, stranded	Either	1	

f = Frequency (Hz)
R_{dc_t} = DC resistance at operating temperature

Proximity effect factor y_p

1. For 2 core and 2 single core cables :

$$y_p = X_p^4/(192+0.8X_p^4) \times \left(\frac{d_c}{S}\right)^2 \times 2.9$$

2. For 3 core and 3 single core cables :

$$y_p = X_p^4/(192+0.8X_p^4) \times \left(\frac{d_c}{S}\right)^2 \times \left[0.312 \times \left(\frac{d_c}{S}\right)^2 + \frac{1.18}{[X_p^4/(192+0.8X_p^4)0.27]}\right]$$

Where:

$$X_p^4 = 8 \times \pi \times f \times 10^{-7} \times \frac{k_p}{R_{dc_t}}$$

R_{dc_t} = DC resistance at operating temperature
k_p = Factor determined by conductor construction
d_c = Diameter of conductor (mm)
S = Spacing between conductor centres (mm)

A

Charging Current

$$I_c = \omega CV \times 10^{-6} (A)$$

Where:

I_c = charging current (A/km)
ω = 2π time the frequency of the applied voltage
C = capacitance between the electrodes between which the voltage is applied (μF/km)
V = applied voltage (V)

Insulation Resistance

$$IR \text{ at } 20°C = 3.67 \times 10^{-12} \times p \times \log_{10}\left(\frac{D_2}{D_1}\right) \ (M\Omega\text{- km})$$

Where:

R_i = insulation resistance of one kilometer of cable in Meggaohms (MΩ-km)
D_1 = inner diameters of the insulation (mm)
D_2 = outer diameters of the insulations (mm)
p = resistivity (Ω-cm)

XLPE : 2.5×10^{15}

PVC : 1×10^{13} - 1×10^{14}

A

Short-Circuit Current Rating

Copper Conductor $$I = A \times \sqrt{\left(\frac{0.0297}{t}\right) \log\left(\frac{234 + T_2}{234 + T_1}\right)} \times 1.973$$

Aluminium Conductor $$I = A \times \sqrt{\left(\frac{0.0125}{t}\right) \log\left(\frac{228 + T_2}{228 + T_1}\right)} \times 1.973$$

Where:

I = Short circuit current (kA)
A = Cross-section area (mm^2)
t = Short circuit duration (sec)
T_1 = Max. permissible continuous operating temp (°C); PVC=70, XLPE=90
T_2 = Max. permissible temperature at short circuit (°C); PVC=160, XLPE=250

Short-Circuit Current 1 sec at conductor (kA)

Size (mm^2)	Copper		Aluminium	
	XLPE	PVC	XLPE	PVC
1.5	0.21	0.17	-	-
2.5	0.35	0.29	-	-
4	0.57	0.46	-	-
6	0.85	0.68	-	-
10	1.42	1.14	0.93	0.75
16	2.27	1.83	1.48	1.19
25	3.55	2.85	2.32	1.87
35	4.97	3.99	3.25	2.61
50	7.10	5.71	4.64	3.73
70	9.94	7.99	6.50	5.23
95	13.5	10.8	8.82	7.09
120	17.0	13.7	11.1	8.96
150	21.3	17.1	13.9	11.2
185	26.3	21.1	17.2	13.8
240	34.1	27.4	22.3	17.9
300	42.6	34.2	27.8	22.4
400	56.8	45.6	37.1	29.9
500	71.0	57.1	46.4	37.3
630	89.4	71.9	58.5	47.0
800	113.6	91.3	74.2	59.7
1000	142.0	114.1	92.8	74.7

Short Circuit Performance of Metallic Shields and Sheath of Insulated Cable

$$I = \frac{A}{\sqrt{t}}\sqrt{K \log\left[\frac{T_2 + \lambda}{T_1 + \lambda}\right]}$$

$$M = \sqrt{K \log\left[\frac{T_2 + \lambda}{T_1 + \lambda}\right]}$$

$$I = \frac{MA}{\sqrt{t}}$$

I = Short-circuit current of copper shield (A)
A = Effective cross-sectional area of shield or sheath (circular mils) see table below
t = Time of short circuit (second)

Type of shield or sheath	Formula for calculating A
1. Wires applied either helically. as a braid or serving or longitudinally with corrugations.	nd_s^2
2. Helically applied tape. not overlapped.	1.27nwb
3. Helically applied flat tape. overlapped. See note 3.	$4bd_m \times \sqrt{\frac{100}{2(100 - L)}}$
4. Corrugated tape. longitudinally applied.	$1.27[\pi(d_{is} + 50) + B]b$
5. Tubular sheath.	$4bd_m$

Where:

A = Effective cross-sectional area. shield or sheath, cmil.
B = Tape overlap. mils (usually 375)
b = Thickness of tape. mils.
d_{is} = Diameter over extruded insulation screen, mils.
d_m = Mean diameter of shield or sheath. mils.
d_s = Diameter of wires. mils.
w = Width of tape. mils.
n = Number of serving or braid wires. or tapes.
L = Overlap of tape. percent.

Voltage Drop Calculation

For single phase:

$$V_{1\phi} = \frac{2I(R\cos\theta + X\sin\theta)L}{1000}$$

Where:

I is the nominal full load or starting current as applicable (A)
R is the ac resistance of the cable (Ω/km)
X is the ac reactance of the cable (Ω/km)
$\cos\theta$ is the load power factor (pu)
L is the length of the cable (m)

For three phase:

$$V_{3\phi} = \frac{\sqrt{3}I(R\cos\theta + X\sin\theta)L}{1000}$$

Where:

I is the nominal full load or starting current as applicable (A)
R is the ac resistance of the cable (Ω/km)
X is the ac reactance of the cable (Ω/km)
$\cos\theta$ is the load power factor (pu)
L is the length of the cable (m)

Calculating Maximum Cable Length Due to Voltage Drop

It may be more convenient to calculate the maximum length of a cable for a particular conductor size given a maximum permissible voltage drop (5% of the at full load Ref. NEC Standard) rather than the voltage drop itself. The maximum cable length that will achieve this can be calculated by re-arranging the voltage maximum permissible voltage drop:

For single phase:

$$L_{max} = \frac{1000V_{3\phi}}{2I(R\cos\theta + X\sin\theta)}$$

Where:

I is the nominal full load or starting current as applicable (A)
R is the ac resistance of the cable (Ω/km)
X is the ac reactance of the cable (Ω/km)
$\cos\theta$ is the load power factor (pu)
$V_{1\phi}$ is the maximum permissible single phase voltage drop (V)

For three phase:

$$L_{max} = \frac{1000V_{3\phi}}{\sqrt{3}I(R\cos\theta + X\sin\theta)}$$

Where:

I is the nominal full load or starting current as applicable (A)
R is the ac resistance of the cable (Ω/km)
X is the ac reactance of the cable (Ω/km)
$\cos\theta$ is the load power factor (pu)
$V_{3\phi}$ is the maximum permissible single phase voltage drop (V)

CURRENT-CARRYING CAPACITIES OF CABLE

(Refer EIT Standard 022001-22)

Table 5-8 : Correction factor for a group of circuits, or a group of multi-cores cable

No. of circuits or multi-cores cable	In cable raceway	Single layer on wall or floor
2	0.80	0.85
3	0.70	0.79
4	0.65	0.75
5	0.60	0.73
6	0.57	0.72
7	0.54	0.72
8	0.52	0.71
9	0.50	0.70
10·12	0.45	0.70
13-16	0.41	0.70
17-20	0.38	0.70

Table 5-20: Current rating of copper conductor, PVC insulated with/without sheathed for $U_0/U \leq 0.6/1$ kV, conductor temperature 70ºC, ambient temperature 40ºC, installed in raceway in air.

Installation Group	Group 1				Group 2			
No. of loaded Conductor	2		3		2		3	
Conductor Type	Single-core	Multi-cores	Single-core	Multi-cores	Single-core	Multi-cores	Single-core	Multi-cores
Installation Method								
Electrical system	AC or DC		AC		AC or DC		AC	
Cable Code	60227 IEC 01, 60227 IEC 02, 60227 IEC 05, 60227 IEC 06, 60227 IEC 10, NYY, NYY-G, VCT, VCT-G, IEC 60502-1 and special cable such as fire resistant (FRC), low smoke and halogen free (LSHF) etc.							
Size (mm²)	Current rating (A)							
1	10	10	9	9	12	11	10	10
1.5	13	12	12	11	15	14	13	13
2.5	17	16	16	15	21	20	18	17
4	23	22	21	20	28	26	24	23
6	30	28	27	25	36	33	31	30
10	40	37	37	34	50	45	44	40
16	53	50	49	45	66	60	59	54
25	70	65	64	59	88	78	77	70
35	86	80	77	72	109	97	96	86
50	104	96	94	86	131	116	117	103
70	131	121	118	109	167	146	149	130
95	158	145	143	131	202	175	180	156
120	183	167	164	150	234	202	208	179
150	209	191	188	171	261	224	228	196
185	238	216	213	194	297	256	258	222
240	279	253	249	227	348	299	301	258
300	319	291	285	259	398	343	343	295
400	-	-	-	-	475	-	406	-
500	-	-	-	-	545	-	464	-

Remark: *1. For ambient temperature other than 40ºC, correction factor given in Table 5-43 shall be applied.*
2. For installation more than one circuit in raceway, correction factor given in Table 5-8 shall be applied.
3. The current rating are applicable to DC electrical system with a maximum voltage of 1.5 kV DC.

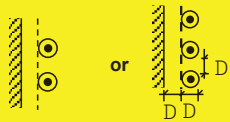
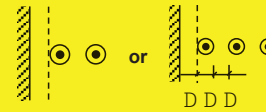
Table 5-21: Current rating of copper conductor, PVC insulated with sheathed for $U_0/U \leq 0.6/1$ kV, conductor temperature 70ºC or 90ºC, ambient temperature 40ºC, installed on wall.

Installation Group	Group 3								
Cable Type	Flat	Round				Round			
Conductor Type	Multi-cores	Single-core				Multi-cores			
Insulation Type	PVC	PVC		XLPE		PVC		XLPE	
Conductor temperature	70°C	70°C		90°C		70°C		90°C	
No. of loaded conductor	2	2	3	2	3	2	3	2	3
Installation Method									
Electrical system	AC	AC, DC	AC	AC, DC	AC	AC, DC	AC	AC, DC	AC
Cable Code	VAF, VAF-G	NYY, IEC 60502-1		IEC60502-1		NYY, NYY-G, VCT, 60227 IEC 10, IEC 60502-1		IEC 60502-1	
Size (mm²)	Current rating (A)								
1	14	13	12	17	16	13	12	17	15
1.5	17	17	16	23	21	17	15	22	20
2.5	23	23	22	31	29	23	21	30	27
4	32	32	29	42	37	31	28	41	36
6	41	41	37	54	49	40	36	53	47
10	56	57	51	74	67	55	50	73	65
16	74	76	69	99	90	74	66	97	87
25	-	99	90	130	118	97	84	126	108
35	-	123	112	160	147	120	104	156	134
50	-	158	145	207	190	146	125	190	163
70	-	204	186	267	244	185	160	245	208
95	-	247	227	323	297	224	194	298	253
120	-	287	264	375	345	260	225	348	293
150	-	331	304	433	397	299	260	401	338
185	-	379	348	496	455	341	297	460	386
240	-	448	411	586	537	401	351	545	455
300	-	517	474	676	620	461	404	630	524
400	-	604	552	790	722	-	-	-	-
500	-	689	629	900	823	-	-	-	-

Remark: *1. For ambient temperature other than 40ºC, correction factor given in Table 5-43 shall be applied.*
2. The current rating are applicable to DC electrical system with a maximum voltage of 1.5 kV DC.
3. For installation more than one circuit in raceway, correction factor given in Table 5-8 shall be applied.

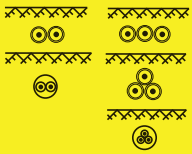
A

Table 5-22: Current rating of copper conductor, PVC insulated TIS 11-2553 for $U_0/U \leq 450/750V$, conductor temperature 70ºC or 90ºC, ambient temperature 40ºC installed on insulator in air.

Installation Group	Group 4	
Installation Method		
Cable Code	60227 IEC 01, NYY	
Size (mm²)	Current rating (A)	
4	30	37
6	39	48
10	56	67
16	78	92
25	113	127
35	141	157
50	171	191
70	221	244
95	271	297
120	315	345
150	365	397
185	418	453
240	495	535
300	573	617
400	692	741

Remark: *For ambient temperature other than 40ºC, correction factor given in Table 5-43 shall be applied*

Table 5-23: Current rating for copper conductor, PVC insulated with sheathed for $U_0/U \leq 0.6/1kV$, conductor temperature 70°C, ambient temperature 30°C, installed underground conduit or direct burial.

Installation Group	Group 5		Group 6
No. of loaded conductors	2	3	≤ 3
Conductor Type	Single-core/Multi-cores	Single-core/Multi-cores	Single-core/Multi-cores
Installation Method	 or	 or	 or or
Cable Code	NYY, VCT, and cable according with IEC 60502-1		
Size (mm²)	Current rating (A)		
1	17	15	21
1.5	21	19	26
2.5	28	25	35
4	36	33	45
6	46	41	57
10	62	55	76
16	81	72	99
25	106	94	128
35	129	114	154
50	153	136	181
70	190	168	223
95	232	204	267
120	265	234	304
150	303	266	342
185	344	303	386
240	404	361	448
300	462	404	507
400	529	462	577
500	605	527	654

A

Remark :

1. *For ground temperature other than 30°C, correction factor given in Table 5-44 shall be applied.*
2. *For installation more than one circuit, correction factor given in Table 5-45 or 5-46 shall be applied.*
3. *For installation more than one circuit in raceway, correction factor given in Table 5-8 shall be applied.*
4. *The installation of the electrical system which is belong to MEA or PEA, Please consider current rating according to MEA or PEA standard except that no current rating is specified.*

Table 5-24: Current rating for copper conductor, PVC insulated single-core TIS 11-2553 for $U_0/U \leq 300/500V$, conductor temperature 70ºC or 90ºC, ambient temperature 40ºC, installed in air.

Conductor temperature	70°C	90°C
Cable Code	60227 IEC 05, 60227 IEC 06	60227 IEC 07, 60227 IEC 08
Size (mm²)	Current rating (A)	
0.5	3	3
0.75	6	6
1	10*	10
1.5	-	16
2.5	-	25

Remark :

1. *For ambient temperature other than 40ºC, correction factor given in Table 5-43 shall be applied.*
2. **Current rating for 60227 IEC 06 cable only.*

Table 5-25: Current rating for flexible copper conductor, PVC insulated with sheathed TIS 11-2553 for U0/U ≤ 300/500V, conductor temperature 70ºC or 90ºC, ambient temperature 40ºC, installed in air.

No. of loaded conductors	2	3
Cable Code	60227 IEC 52, 60227 IEC 53, 60227 IEC 56, 60227 IEC 57	
Size (mm²)	Current rating (A)	
0.5	3	3
0.75	6	6
1	10	10
1.5	16	16
2.5	25	20

Remark : *For ambient temperature other than 40ºC, correction factor given in Table 5-43 shall be applied.*

Table 5-26: Current rating for flexible copper conductor, PVC insulated with/without sheathed TIS 11-2553 for $U_0/U \leq 450/750V$, conductor temperature 70°C, ambient temperature 40°C, installed in air.

Conductor Type/ No. of loaded conductor	2 Single-core cable or 2 Cores cable with/without ground	3, 4, 5 Cores cable
Cable Code	60227 IEC 02, VCT, VCT-G	VCT, VCT-G
Size (mm^2)	Current rating (A)	
1	13	11
1.5	16	14
2.5	25	21
4	30	26
6	39	34
10	51	47
16	73	63
25	97	83
35	140	102
50	175	-
70	216	-
95	258	-
120	302	-
150	347	-
185	394	-
240	471	-

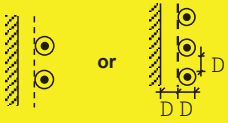
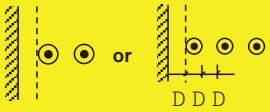
Remark : *For ambient temperature other than 40°C, correction factor given in Table 5-43 shall be applied.*

Table 5-27: Current rating for copper conductor, XLPE insulated with/without sheathed for $U_0/U \leq 0.6/1$ kV, conductor temperature 90ºC, ambient temperature 40ºC, installed in raceway in air.

Installation Group	Group 1				Group 2			
No. of loaded Conductor	2		3		2		3	
Conductor Type	Single-core	Multi-cores	Single-core	Multi-cores	Single-core	Multi-cores	Single-core	Multi-cores
Installation Method								
Electrical system	AC or DC		AC		AC or DC		AC	
Cable Code	IEC 60502-1 and special cable such as fire resistant (FRC), low smoke and halogen free (LSHF) etc.							
Size (mm²)	Current rating (A)							
1	13	13	12	12	15	15	14	14
1.5	17	17	15	15	21	20	18	18
2.5	24	23	21	20	28	27	25	24
4	32	30	28	27	38	36	34	32
6	41	38	36	35	49	46	44	40
10	56	52	49	46	68	63	60	55
16	74	69	66	62	91	83	80	73
25	96	90	86	81	121	108	106	96
35	119	110	106	99	149	133	131	116
50	144	132	128	118	180	159	159	140
70	182	167	163	149	230	201	202	177
95	219	200	197	179	278	241	245	212
120	253	230	227	207	322	278	284	244
150	289	264	259	236	358	304	311	273
185	329	299	295	268	409	349	349	309
240	386	351	346	315	480	418	410	362
300	442	402	396	360	549	484	468	414
400	-	-	-	-	622	-	531	-
500	-	-	-	-	713	-	606	-

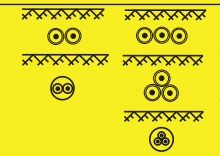
Remark: *1. For ambient temperature other than 40ºC, correction factor given in Table 5-43 shall be applied.*
2. For installation more than one circuit in raceway, correction factor given in Table 5-8 shall be applied.
3. The current rating are applicable to DC electrical system with a maximum voltage of 1.5 kV DC.

Table 5-28: Current rating for copper conductor, XLPE insulated with/without sheathed for U_0/U ≤ 0.6/1kV, conductor temperature 90ºC, ambient temperature 40ºC, installed on insulator in air.

Installation Group	Group 4	
Installation Method		
Cable Code	Cable according with IEC 60502-1	
Size (mm²)	Current rating (A)	
4	47	54
6	60	68
10	82	90
16	110	124
25	147	166
35	183	206
50	224	250
70	289	321
95	354	391
120	413	455
150	480	525
185	551	602
240	654	711
300	758	821
400	917	987
500	1,064	1,140

Remark: *For ambient temperature other than 40ºC, correction factor given in Table 5-43 shall be applied*

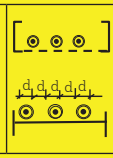
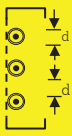
Table 5-29: Current rating for copper conductor, XLPE insulated with sheathed for $U_0/U \leq 0.6/1$ kV, conductor temperature 90ºC, ambient temperature 30ºC, installed underground conduit or direct burial.

Installation Group	Group 5		Group 6
No. of loaded conductors	2	3	≤ 3
Conductor Type	Single-core/Multi-cores	Single-core/Multi-cores	Single-core/Multi-cores
Installation Method	 or	 or	 or or
Cable Code	Cable according with IEC 60502-1		
Size (mm²)	Current rating (A)		
1.5	25	22	33
2.5	33	29	43
4	43	38	55
6	54	47	70
10	71	63	92
16	94	83	119
25	124	109	152
35	150	132	184
50	180	159	217
70	223	196	266
95	271	238	318
120	313	275	362
150	355	312	406
185	406	356	459
240	477	418	533
300	543	475	601
400	625	545	684
500	717	623	777

Remark :

1. *For ground temperature other than 30ºC, correction factor given in Table 5-44 shall be applied.*
2. *For installation more than one circuit, correction factor given in Table 5-45 or 5-46 shall be applied.*
3. *For installation more than one circuit in raceway, correction factor given in Table 5-8 shall be applied.*
4. *The installation of the electrical system which is belong to MEA or PEA, Please consider current rating according to MEA or PEA standard except that no current rating is specified.*

Table 5-30: Current rating of copper conductor, PVC insulated with sheathed for $U_0/U \leq 0.6/1$ kV, conductor temperature 70ºC, ambient temperature 40ºC, installed on perforated cable tray or cable ladder without cover.

Installation Group	Group 7						
No. of loaded conductors	2		3				
Conductor Type	Single-core/Multi-cores		Single-core				Multi-cores
Installation Method							
Electrical system	AC or DC		AC				
Cable Code	60227 IEC 10, NYY, VCT, IEC 60502-1 and special cable such as fire resistant (FRC), low smoke and halogen free (LSHF) etc.						
Size (mm²)	Current rating (A)						
1	-	15	-	-	-	-	13
1.5	-	19	-	-	-	-	16
2.5	-	26	-	-	-	-	22
4	-	35	-	-	-	-	30
6	-	44	-	-	-	-	37
10	-	61	-	-	-	-	52
16	-	82	-	-	-	-	70
25	114	104	99	96	127	113	88
35	141	129	124	119	157	141	110
50	171	157	151	145	191	171	133
70	218	202	196	188	244	221	171
95	264	245	239	230	297	271	207
120	306	285	279	268	345	315	240
150	353	330	324	310	397	365	278
185	403	378	371	356	453	418	317
240	475	447	441	422	535	495	374
300	547	516	511	488	617	573	432
400	656	-	599	571	741	692	-
500	755	-	686	652	854	800	-

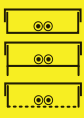
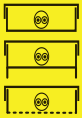
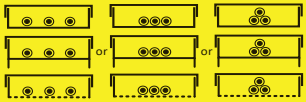
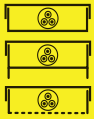
Remark: *1. For ambient temperature other than 40ºC, correction factor given in Table 5-43 shall be applied.*
2. For installation more than one circuit in raceway, correction factor given in Table 40 or 5-41 for single core and multi cores cable respectively shall be applied.
3. The current rating are applicable to DC electrical system with a maximum voltage of 1.5 kV DC.

Table 5-30 (a): Current rating of copper conductor, PVC insulated with sheathed for $U_0/U \leq 0.6/1$ kV, conductor temperature 70ºC, ambient temperature 40ºC, installed on unperforated cable tray without cover.

Installation Group	Group 7			
No. of loaded conductors	2		3	3 or 4
Conductor Type	Single-core	Multi-cores	Single-core	Multi-cores
Installation Method				
Electrical system	AC or DC		AC	
Cable Code	60227 IEC 10, NYY, VCT, IEC 60502-1 and special cable such as fire resistant (FRC), low smoke and halogen free (LSHF) etc.			
Size (mm²)	Current rating (A)			
1	-	13	-	12
1.5	-	17	-	15
2.5	-	23	-	21
4	-	31	-	28
6	-	40	-	36
10	-	55	-	50
16	-	74	-	66
25	99	97	90	84
35	123	120	112	104
50	158	146	145	125
70	204	185	186	160
95	247	224	227	194
120	287	260	264	225
150	331	299	304	260
185	379	341	348	297
240	448	401	411	351
300	517	461	474	404
400	604	-	552	-
500	689	-	629	-

Remark: *1. For ambient temperature other than 40ºC, correction factor given in Table 5-43 shall be applied.*
2. For installation more than one circuit in raceway, correction factor given in Table 5-40 or 5-41 for single core and multi cores cable respectively shall be applied.
3. The current rating are applicable to DC electrical system with a maximum voltage of 1.5 kV DC.

Table 5-31: Current rating for copper conductor, PVC insulated with sheathed for $U_0/U \leq 0.6/1$ kV, conductor temperature 70ºC, ambient temperature 40ºC, installed on perforated or unperforated cable tray or cable ladder with cover.

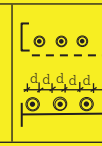
Installation Group	Group 7			
No. of loaded conductors	2		3	
Conductor Type	Single-core	Multi-cores	Single-core	Multi-cores
Installation Method				
Electrical system	AC or DC		AC	
Cable Code	60227 IEC 10, NYY, VCT, IEC 60502-1 and special cable such as fire resistant (FRC), low smoke and halogen free (LSHF) etc.			
Size (mm²)	Current rating (A)			
1	-	11	-	10
1.5	-	14	-	13
2.5	-	20	-	17
4	-	26	-	23
6	-	33	-	30
10	-	45	-	40
16	-	60	-	54
25	88	78	77	70
35	109	97	96	86
50	131	116	117	103
70	167	146	149	130
95	202	175	180	156
120	234	202	208	179
150	261	224	228	196
185	279	256	258	222
240	348	299	301	258
300	398	343	343	295
400	475	-	406	-
500	545	-	464	-

Remark *(Table 5-31)*

1. *For ambient temperature other than 40ºC, correction factor given in Table 5-43 shall be applied.*
2. *For installation more than one circuit, correction factor given in Table 5-40 or 5-41 for single core and multi cores cable respectively shall be applied.*
3. *The current rating are applicable to DC electrical system with a maximum voltage of 1.5 kV DC.*

A

Table 5-32: Current rating for copper conductor, XLPE insulated with sheathed for $U_0/U \leq 0.6/1$ kV, conductor temperature 90ºC, ambient temperature 40ºC, installed on perforated cable tray or cable ladder without cover.

Installation Group	Group 7						
No. of loaded conductors	2		3				
Conductor Type	Single-core	Multi-cores	Single-core				Multi-cores
Installation Method							
Electrical system	AC or DC		AC				
Cable Code	Cable according with IEC 60502-1 and special cable such as fire resistant (FRC), low smoke and halogen free (LSHF) etc.						
Size (mm²)	Current rating (A)						
1	-	19	-				16
1.5	-	24	-				21
2.5	-	33	-				29
4	-	45	-				38
6	-	57	-				49
10	-	78	-				68
16	-	105	-				91
25	147	136	128	123	166	147	116
35	182	168	160	154	206	183	144
50	220	205	197	188	250	224	175
70	282	263	254	244	321	289	224
95	343	320	311	298	391	354	271
120	398	374	364	349	455	413	315
150	459	430	422	404	525	480	363
185	523	493	485	464	602	551	415
240	618	583	577	552	711	654	490
300	713	674	670	640	821	758	564
400	855	-	790	749	987	917	-
500	986	-	908	861	1,140	1,064	-

Remark: *1. For ambient temperature other than 40ºC, correction factor given in Table 5-43 shall be applied.*
2. For installation more than one circuit in raceway, correction factor given in Table 5-40 or 5-41 for single core and multi cores cable respectively shall be applied.
3. The current rating are applicable to DC electrical system with a maximum voltage of 1.5 kV DC.

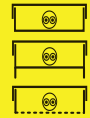
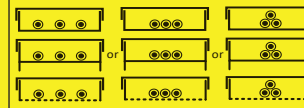
Table 5-32 (a): Current rating for copper conductor, XLPE insulated with sheathed for $U_0/U \leq 0.6/1$ kV, conductor temperature 90ºC, ambient temperature 40ºC, installed on unperforated cable tray without cover.

Installation Group	Group 7			
No. of loaded conductors	2		3	
Conductor Type	Single-core	Multi-cores	Single-core	Multi-cores
Installation Method				
Electrical system	AC or DC		AC	
Cable Code	Cable according with IEC 60502-1 and special cable such as fire resistant (FRC), low smoke and halogen free (LSHF) etc.			
Size (mm²)	Current rating (A)			
1	-	17	-	15
1.5	-	22	-	20
2.5	-	30	-	27
4	-	41	-	36
6	-	53	-	47
10	-	73	-	65
16	-	97	-	87
25	130	126	118	108
35	160	156	147	134
50	207	190	190	163
70	267	245	244	208
95	323	298	297	253
120	376	348	345	293
150	433	401	397	338
185	496	460	455	386
240	586	545	537	455
300	676	630	620	524
400	790	-	722	-
500	901	-	823	-

Remark: *1. For ambient temperature other than 40ºC, correction factor given in Table 5-43 shall be applied.*
2. For installation more than one circuit, correction factor given in Table 5-40 or 5-41 for single core and multi cores cable respectively shall be applied. .
3. The current rating are applicable to DC electrical system with a maximum voltage of 1.5 kV DC.

A

Table 5-33: Current rating for copper conductor, XLPE insulated with sheathed for $U_0/U \leq 0.6/1$ kV, conductor temperature 90ºC, ambient temperature 40ºC, installed on unperforated or perforated cable tray or cable ladder with cover.

Installation Group	Group 7			
No. of loaded conductors	2		3	
Conductor Type	Single-core	Multi-cores	Single-core	Multi-cores
Installation Method				
Electrical system	AC or DC		AC	
Cable Code	IEC 60502-1 and special cable such as fire resistant (FRC), low smoke and halogen free (LSHF) etc.			
Size (mm²)	Current rating (A)			
1	-	15	-	14
1.5	-	20	-	18
2.5	-	27	-	24
4	-	36	-	32
6	-	46	-	40
10	-	63	-	55
16	-	83	-	73
25	121	108	106	96
35	149	133	131	116
50	180	159	159	140
70	230	201	202	177
95	278	241	245	212
120	322	278	284	244
150	358	304	311	273
185	409	349	349	309
240	480	418	410	362
300	549	484	468	414
400	622	-	531	-
500	713	-	606	-

Remark: *1. For ambient temperature other than 40ºC, correction factor given in Table 5-43 shall be applied.*
2. For installation more than one circuit, correction factor given in Table 5-40 or 5-41 for single core and multi cores cable respectively shall be applied. .
3. The current rating are applicable to DC electrical system with a maximum voltage of 1.5 kV DC.

Table 5-40: Correction factor for current rating of single-core cable installed on cable tray for more than one circuit.

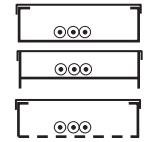
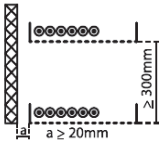
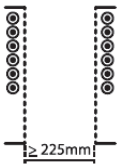
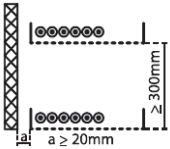
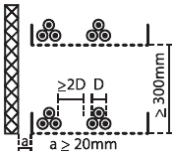
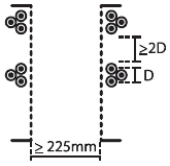
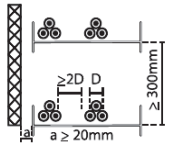
Installation method		No. of trays or ladders	No. of circuits / tray or ladder						Method of wiring
			1	2	3	4	5-6	7-9	
Perforated or unperforated cable tray or cable ladder with cover		1	See Table 5-40(a), Column 2						Flat laying, touching, Trefoil
Perforated cable tray (Note 2)		1	1.00	0.91	0.87	0.82	0.78	0.77	Flat laying, touching
		2	0.96	0.87	0.81	0.78	0.74	0.69	
		3	0.95	0.85	0.78	0.75	0.70	0.65	
Vertical perforated cable tray (Note 3)		1	1.00	0.86	0.80	0.75	0.71	0.70	Flat laying, vertical, touching
		2	0.95	0.84	0.77	0.72	0.67	0.66	
Cable ladder (Note 2)		1	1.00	0.97	0.96	0.94	0.93	0.92	Flat laying, touching
		2	0.98	0.93	0.89	0.88	0.86	0.83	
		3	0.97	0.90	0.86	0.83	0.80	0.77	
Perforated cable tray (Note 2)		1	1.00	0.98	0.96	0.93	0.89	-	Trefoil laying, space between group ≥ 2 times of the overall diameter of cable
		2	0.97	0.93	0.89	0.85	0.80	-	
		3	0.96	0.92	0.86	0.82	0.76	-	
Vertical perforated cable tray (Note 3)		1	1.00	0.91	0.89	0.88	0.87	-	
		2	1.00	0.90	0.86	0.85	0.83	-	
Cable ladder (Note 2)		1	1.00	1.00	1.00	1.00	1.00	-	
		2	0.97	0.95	0.93	0.92	0.91	-	
		3	0.96	0.94	0.90	0.89	0.86	-	

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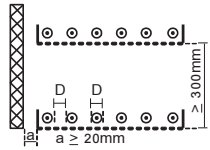
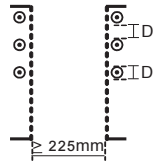
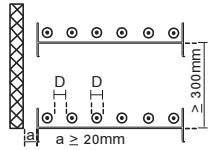
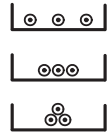
Table 5-40 (Continuous)

Installation method		No. of trays or ladders	No. of circuits / tray or ladder						Method of wiring
			1	2	3	4	5-6	7-9	
Perforated cable tray (Note 2)		1	1.00	0.93	0.90	0.87	0.83	-	Space between cable not less than diameter of cable
		2	0.97	0.89	0.85	0.81	0.76	-	
		3	0.96	0.88	0.82	0.78	0.72	-	
Vertical perforated cable tray (Note 3)		1	1.00	0.91	0.89	0.88	0.87	-	
		2	0.94	0.90	0.86	0.85	0.83	-	
Cable ladder (Note 2)		1	1.00	0.97	0.96	0.96	0.96	-	
		2	0.97	0.94	0.93	0.92	0.91	-	
		3	0.96	0.93	0.92	0.91	0.88	-	
Unperforated cable tray without cover		1	See Table 5-40(a), Column 3						Flat laying, touching

Remark: *1. Correction factors are given for single layer of cable.*
2. Correction factors are given for vertical spacing between trays of 300 mm and at least 20 mm between trays and wall.
3. Correction factors are given for horizontal spacing between trays of 225 mm with trays mounted back to back.
4. In case of more than one cable tray, correction factors shall be used from the cable tray which has highest number of cable circuits.
5. In case of one cable tray with more than 9 circuits, correction factor for 9 circuits shall be used.

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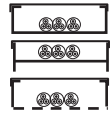
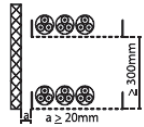
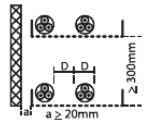
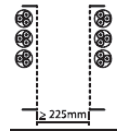
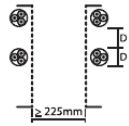
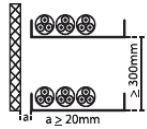
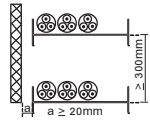
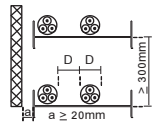
Table 5-40(a): Correction factor for current rating of single-core cable installed on cable tray for more than one circuit.

Column 1	Column 2	Column 3
Group of circuit	**Correction factor for cable tray or cable ladder with cover**	**Correction factor for unperforated cable tray without cover**
1	1.0	1.0
2	0.8	0.85
3	0.7	0.79
4	0.65	0.75
5	0.60	0.73
6	0.57	0.72
7	0.54	0.72
8	0.52	0.71
9	0.50	0.70
10-12	0.45	0.70
13-16	0.41	0.70
17-20	0.38	0.70

Table 5-41: Correction factor for current rating of single-core cable installed on cable tray for more than one circuit.

Installation method		No. of trays or ladders	No. of circuits / tray or ladder					
			1	2	3	4	5-6	7-9
Perforated or Unperforated cable tray or cable ladder with cover		1	See Table 5-40(a), Column 2					
Perforated cable tray (Note 2)		1	1.00	0.88	0.82	0.77	0.73	0.72
		2	1.00	0.87	0.80	0.77	0.73	0.68
		3	1.00	0.86	0.79	0.76	0.71	0.65
		4-6	1.00	0.84	0.77	0.73	0.68	0.64
		1	1.00	1.00	0.98	0.95	0.91	-
		2	1.00	0.99	0.96	0.92	0.87	-
		3	1.00	0.98	0.95	0.91	0.85	-
Vertical perforated cable tray (Note 3)		1	1.00	0.88	0.82	0.77	0.73	0.72
		2	1.00	0.88	0.81	0.76	0.71	0.70
		1	1.00	0.91	0.89	0.88	0.87	-
		2	1.00	0.91	0.88	0.87	0.85	-
Unperforated cable tray (Note 2)		1	0.97	0.84	0.78	0.75	0.71	0.68
		2	0.97	0.83	0.76	0.72	0.68	0.63
		3	0.97	0.82	0.75	0.71	0.66	0.61
		4-6	0.97	0.81	0.73	0.69	0.63	0.58
Cable ladder (Note 2)		1	1.00	0.87	0.82	0.80	0.79	0.78
		2	1.00	0.86	0.80	0.78	0.76	0.73
		3	1.00	0.85	0.79	0.76	0.73	0.70
		4-6	1.00	0.84	0.77	0.73	0.68	0.64
		1	1.00	1.00	1.00	1.00	1.00	-
		2	1.00	0.99	0.98	0.97	0.96	-
		3	1.00	0.98	0.97	0.96	0.93	-

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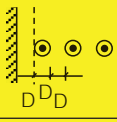
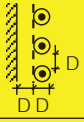
Remark *(Table 5-41)*

1. *Correction factors are given for single layer of cable.*
2. *Correction factors are given for vertical spacing between trays of 300 mm and at least 20 mm between trays and wall.*
3. *Correction factors are given for horizontal spacing between trays of 225 mm with trays mounted back to back.*
4. *In case of more than one cable tray, correction factors shall be used from the cable tray which has highest number of cable circuits.*
5. *In case of one cable tray with more than 9 circuits, correction factor for 9 circuits shall be used.*

Table 5-42: Current rating for aluminium conductor, PVC insulated TIS 293-2541 for U_0/U ≤ 450/750V, conductor temperature 70ºC, ambient temperature 40ºC, installed on insulator in air.

Installation Method		
Size (mm^2)	**Current rating (A)**	
25	97	86
35	121	108
50	147	132
70	189	171
95	231	210
120	268	245
150	310	284
185	354	327
240	419	389
300	485	452
400	584	547
500	674	635

Remark: *Where the ambient temperature in other than 40ºC, the correction factor given in Table 5-43*

Table 5-43: Correction factor for ambient temperature other than 40ºC to be applied to the current-carrying capacities for cable in air.

Ambient Temperature (ºC)	Insulation				
	PVC		XLPE or EPR	MI	
	70°C	90°C	90°C	70°C	105°C
11-15	1.34	-	1.23	1.41	1.21
16-20	1.29	-	1.19	1.34	1.16
21-25	1.22	-	1.14	1.26	1.13
26-30	1.15	-	1.10	1.18	1.09
31-35	1.08	1.00	1.05	1.09	1.04
36-40	1.00	1.00	1.00	1.00	1.00
41-45	0.91	1.00	0.96	0.91	0.96
46-50	0.82	1.00	0.90	0.79	0.91
51-55	0.70	0.96	0.84	0.67	0.87
56-60	0.57	0.83	0.78	0.53	0.82
61-65	-	0.67	0.71	-	0.76
66-70	-	0.47	0.64	-	0.70
71-75	-	-	0.55	-	0.65
76-80	-	-	0.45	-	0.59
81-85	-	-	-	-	0.51
86-90	-	-	-	-	0.43
91-95	-	-	-	-	0.35

Table 5-44: Correction factor for ambient air temperatures other than 30°C to be applied to current-carrying capacities for cables in the ground.

Ambient Temperature (ºC)	Insulation	
	PVC	XLPE or EPR
11-15	1.18	1.12
16-20	1.12	1.08
21-25	1.07	1.03
26-30	1.00	1.00
31-35	0.94	0.96
36-40	0.87	0.91
41-45	0.80	0.86
46-50	0.71	0.82
51-55	0.62	0.76
56-60	0.51	0.70
61-65	-	0.65
66-70	-	0.57
71-75	-	0.49
76-80	-	0.41

Table 5-45: Correction factor for more than one circuit, single-core or multi-cores cable U_0/U ≤ 0.6/1kV, Cables laid directly in ground

No. of circuit	Cable-to-cable clearance (mm)				
	Touching	One cable diameter	125	250	500
2	0.75	0.80	0.85	0.90	0.90
3	0.65	0.70	0.75	0.80	0.85
4	0.60	0.60	0.70	0.75	0.80
5	0.55	0.55	0.65	0.70	0.80
6	0.50	0.55	0.60	0.70	0.80

Table 5-46: Correction factor for more than one circuit, single-core or multi-cores cable U_0/U ≤ 0.6/1kV, Cables in duct in ground

No. of circuit	Duct-to-duct clearance (mm.)			
	Touching	250	500	1,000
2	0.85	0.90	0.95	0.95
3	0.75	0.85	0.90	0.95
4	0.70	0.80	0.85	0.90
5	0.65	0.80	0.85	0.90
6	0.60	0.80	0.80	0.90

Table 5-47: Schedule of reference method of installation which form the basis of the tabulated current-carrying capacities

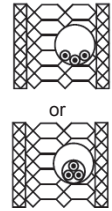
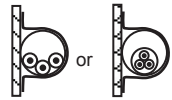
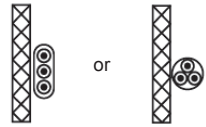
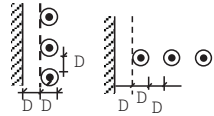
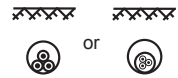
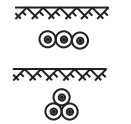
Method of Wiring	Method of Installation	Group of Installation	Note
Single-core or multi-cores insulated cable with/without sheathed installed in metallic or non-metallic raceway in a thermal insulated wall or ceiling.		Group 1	Calling or thermal insulated wall has a thermal conductant not less than 10 W/m²•K
Single-core or multi-cores insulated cable with/without sheathed installed in metallic or non-metallic raceway on wall or ceiling in concrete wall.		Group 2	Ceiling or concrete wall have thermal resistivity not more than 2 K•m/W
Single-core or multi-cores insulated cable with/without sheathed on wall and no enclosre.		Group 3	-
Single-core or multi-cores insulated cable with/without sheathed installed in air on insulators with space.		Group 4	Spacing between cable and cable, wall and cable not less than diameter of cable.
Single-core or multi-cores insulated cable with/without sheathed installed underground in metallic or non-metallic conduit.		Group 5	-
Single-core or multi-cores insulated cable with/without sheathed installed directly underground.		Group 6	-

Table 5-47: (Continuous)

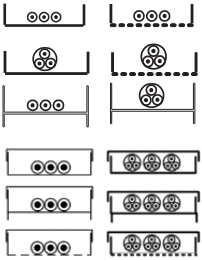
Methods of Wiring	Methods of Installation	Group of Installation	Note
Single-core or multi-cores insulated cable with sheathed installed on perforated or unperforated cable trays or cable ladder.		Group 7	Perforated tray shall have the perforation of not less than 30% of the total surface area of the tray.

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Table 5-48: Requirement for installation copper conductor, PVC insulated cable according to TIS 11-2553 and TIS 11 Part 101-2559

Cable Name	Size (mm^2)	Type of conductor	No. of core	Temp. of conductor	Sheath	Rated voltage Uo/U(V)	Application
60227 IEC 01	1.5-400	Solid or Stranded	Single core	70°C	-	450/750	• Installation exposed • Installation in raceway • Don't allow for underground installing
60227 IEC 02	1.5-240	Flexible	Single core	70°C	-	450/750	• Installation exposed • Installation in raceway • Don't allow for underground installing
60227 IEC 05	0.5-1	Solid	Single core	70°C	-	300/500	• Installation exposed • Installation in raceway • Don't allow for underground installing
60227 IEC 06	0.5-1	Flexible	Single core	70°C	-	300/500	• Installation exposed • Installation in raceway • Don't allow for underground installing
60227 IEC 07	0.5-2.5	Solid	Single core	90°C	-	300/500	• Installation exposed • Installation in raceway • Don't allow for underground installing
60227 IEC 08	0.5-2.5	Flexible	Single core	90°C	-	300/500	• Installation exposed. • Installation in raceway • Don't allow for underground installing

Table 5-48 (Continuous)

Cable Name	Size (mm^2)	Type of conductor	No. of core	Temp. of conductor	Sheath	Rated voltage Uo/U(V)	Application
60227 IEC 10	1.5-35	Solid or Stranded	Multi cores (with/without ground)	70°C	-	300/500	• Installation exposed • Installation on cable tray • Don't allow for underground installing
60227 IEC 52	0.5-0.75	Flexible	Multi cores (with/without ground)	70°C	-	300/300	For mobile-electrical equipment, electrical appliances
60227 IEC 53	0.75-2.5	Flexible	Multi cores (with/without ground)	70°C	o	300/500	For mobile-electrical equipment, electrical appliances
60227 IEC 56	0.5-0.75	Flexible	Multi cores (with/without ground)	90°C	o	300/300	For mobile-electrical equipment, electrical appliances
60227 IEC 57	0.75-2.5	Flexible	Multi cores (with/without ground)	90°C	o	300/500	For mobile-electrical equipment, electrical appliances
NYY	1-500	Solid or Stranded	Single core	70°C	o	450/750	• Installation exposed • Installation in raceway • Can use allow for underground installing
	1-300		Multi cores				
NYY-G	1-300		Multi cores (with/without ground)				
VAF VAF-G	1-16	Solid or Stranded	2 cores 2 cores with ground	70°C	o	300/500	• Installation on a wall • Installation in raceway • Don't allow for underground installing
VCT VCT-G	1-35	Flexible	Single core Multi cores (with/without ground)	70°C	o	450/750	• Installation exposed • For electrical appliances • Installation on cable tray • Can use allow for underground installing

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Voltage Drop for Single-core and Multi-cores cable

Table 1: Single-core 70°C, Copper conductor, PVC insulated cable

Size (mm²)	Single-phase, AC (mV/A/m)			Three-phase, AC (mV/A/m)			
	Installation method						
	Group 1, 2	Group 3, 7		Group 1, 2	Group 3, 7		
		Touching	Spaced		Trefoil	Flat	Spaced
1.0	44	44	44	38	38	38	38
1.5	29	29	29	25	25	25	25
2.5	18	18	18	15	15	15	15
4	11	11	11	9.5	9.5	9.5	9.5
6	7.3	7.3	7.3	6.4	6.4	6.4	6.4
10	4.4	4.4	4.4	3.8	3.8	3.8	3.8
16	2.8	2.8	2.8	2.4	2.4	2.4	2.4
25	1.81	1.75	1.75	1.52	1.50	1.50	1.52
35	1.33	1.25	1.27	1.13	1.11	1.12	1.15
50	1.00	0.94	0.97	0.85	0.81	0.84	0.86
70	0.71	0.66	0.69	0.61	0.57	0.60	0.63
95	0.56	0.50	0.54	0.48	0.44	0.47	0.50
120	0.48	0.41	0.45	0.40	0.35	0.39	0.43
150	0.41	0.35	0.39	0.35	0.30	0.34	0.38
185	0.36	0.29	0.34	0.31	0.26	0.30	0.34
240	0.30	0.25	0.29	0.27	0.21	0.25	0.29
300	0.27	0.22	0.26	0.24	0.18	0.23	0.26
400	0.25	0.19	0.23	0.22	0.16	0.20	0.24
500	0.23	0.17	0.21	0.20	0.15	0.18	0.22

Refer EIT Standard 022001-22

Table 2: Multi-cores 70°C, Copper conductor, PVC insulated cable

Size (mm²)	Single-phase AC (mV/A/m)	Three-phase AC (mV/A/m)
1.0	44	38
1.5	29	25
2.5	18	15
4	11	9.5
6	7.3	6.4
10	4.4	3.8
16	2.8	2.4
25	1.75	1.50
35	1.25	1.10
50	0.93	0.80
70	0.65	0.57
95	0.49	0.43
120	0.41	0.36
150	0.34	0.29
185	0.29	0.25
240	0.24	0.21
300	0.21	0.18
400	0.17	0.15

Refer EIT Standard 022001-22

Table 3: Single-core 90°C, Copper conductor, XLPE insulation cable

Size (mm²)	Single-phase, AC (mV/A/m)			Three-phase, AC (mV/A/m)			
	Installation method						
	Group 1, 2	Group 3, 7		Group 1, 2	Group 3, 7		
		Touching	Spaced		Trefoil	Flat	Spaced
1.0	46	46	46	40	40	40	40
1.5	31	31	31	27	27	27	27
2.5	19	19	19	16	16	16	16
4	12	12	12	10	10	10	10
6	7.9	7.9	7.9	6.8	6.8	6.8	6.8
10	4.7	4.7	4.7	4.0	4.0	4.0	4.0
16	2.9	2.9	2.9	2.5	2.5	2.5	2.5
25	1.85	1.85	1.85	1.60	1.57	1.58	1.60
35	1.37	1.35	1.37	1.17	1.14	1.15	1.17
50	1.04	1.00	1.02	0.91	0.87	0.87	0.90
70	0.75	0.70	0.73	0.65	0.61	0.62	0.64
95	0.58	0.52	0.56	0.50	0.45	0.46	0.50
120	0.49	0.42	0.47	0.42	0.37	0.38	0.42
150	0.42	0.36	0.40	0.37	0.31	0.33	0.37
185	0.37	0.31	0.35	0.32	0.26	0.27	0.31
240	0.32	0.25	0.30	0.27	0.22	0.23	0.27
300	0.28	0.22	0.26	0.24	0.19	0.20	0.24
400	0.25	0.19	0.23	0.22	0.17	0.18	0.22
500	0.23	0.17	0.21	0.20	0.15	0.16	0.20

Refer EIT Standard 022001-22

Table 34: Multi-cores 90°C, Copper conductor, XLPE insulation cable

Size (mm²)	Single-phase AC (mV/A/m)	Three-phase AC (mV/A/m)
1.0	46	40
1.5	31	27
2.5	19	16
4	12	10
6	7.9	6.8
10	4.7	4.0
16	2.9	2.5
25	1.85	1.60
35	1.35	1.15
50	0.99	0.86
70	0.68	0.60
95	0.52	0.44
120	0.42	0.36
150	0.35	0.31
185	0.30	0.25
240	0.24	0.22
300	0.21	0.18
400	0.19	0.16

Refer EIT Standard 022001-22

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