

Technical Data for Medium, High and Extra High Voltage Cables

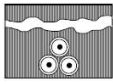
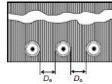
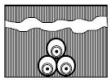
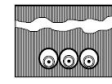
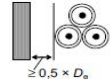
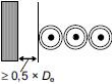
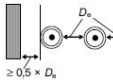


TABLE OF CONTENTS

Title	Page
Current Carrying Capacity for MV Cables	2 ...3
Rating Factors for Calculation of Current Carrying Capacity in Different Conditions (MV)	4 ...9
Current Carrying Capacity for HV and EHV Cables	10
Rating Factors for Calculation of Current Carrying Capacity in Different Conditions (HV & EHV)	11 ...12
Short Circuit Current of Conductors	13
Application Codes for High Voltage Cables	14
Nominal Screen Cross Sectional Area	15

CURRENT CARRYING CAPACITY FOR MV CABLES

Current ratings for single core copper cables with rated voltage 3.6/6kV to 18/30kV*

Nominal cross section	Buried direct in the ground		In single way ducts		In air		
	Trefoil	Flat spaced	Trefoil ducts	Flat touching ducts	Trefoil	Flat touching	Flat space
							
mm ²	A	A	A	A	A	A	A
16	109	113	103	104	125	128	150
25	140	144	132	133	163	167	196
35	166	172	157	159	198	203	238
50	196	203	186	188	238	243	286
70	239	146	227	229	296	303	356
95	285	293	271	274	361	369	434
120	323	332	308	311	417	426	500
150	361	366	343	347	473	481	559
185	406	410	387	391	543	550	637
240	469	470	447	453	641	647	745
300	526	524	504	510	735	739	846
400	590	572	564	571	845	837	938
500	662	629	630	640	946	937	1030
630	741	692	695	705	1060	1050	1135

Maximum conductor temperature : 90°C

Ambient air temperature : 30°C

Ground temperature : 20°C

Depth of laying : 0.8m

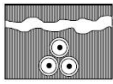
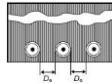
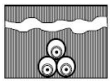
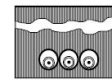
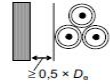
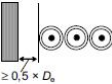
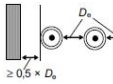
Thermal resistivity of soil : 1.5 K.m/W

Thermal resistivity of earthenware ducts : 1.2 K.m/W

Screens bonded at both ends

* : current rating calculated for cables having a rated voltage of 6/10kV

Current ratings for single core aluminum cables with rated voltage 3.6/6kV to 18/30kV*

Nominal cross section	Buried direct in the ground		In single way ducts		In air		
	Trefoil	Flat spaced	Trefoil ducts	Flat touching ducts	Trefoil	Flat touching	Flat space
							
mm ²	A	A	A	A	A	A	A
16	84	88	80	81	97	99	116
25	108	112	102	103	127	130	153
35	129	134	122	123	154	157	185
50	152	157	144	146	184	189	222
70	186	192	176	178	230	236	278
95	221	229	210	213	280	287	338
120	252	260	240	242	324	332	391
150	281	288	267	271	368	376	440
185	317	324	303	307	424	432	504
240	367	373	351	356	502	511	593
300	414	419	397	402	577	586	677
400	470	466	451	457	673	676	769
500	526	517	505	512	774	770	869
630	590	574	565	563	866	878	980

Maximum conductor temperature : 90°C

Ambient air temperature : 30°C

Ground temperature : 20°C

Depth of laying : 0.8m

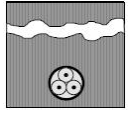
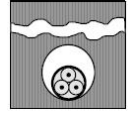
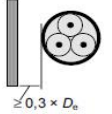
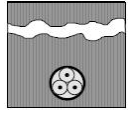
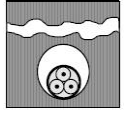
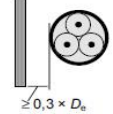
Thermal resistivity of soil : 1.5 K.m/W

Thermal resistivity of earthenware ducts : 1.2 K.m/W

Screens bonded at both ends

* : current rating calculated for cables having a rated voltage of 6/10kV

Current ratings for three core copper cables with rated voltage 3.6/6kV to 18/30kV*

Nominal cross section	Unarmored			armored		
	Buried direct in ground	In a buried duct	In air	Buried direct in ground	In a buried duct	In air
						
mm ²	A	A	A	A	A	A
16	101	87	109	101	88	110
25	129	112	142	129	112	143
35	153	133	170	154	134	172
50	181	158	204	181	158	205
70	221	193	253	220	194	253
95	262	231	304	263	232	307
120	298	264	351	298	264	352
150	334	297	398	332	296	397
185	377	336	455	374	335	453
240	434	390	531	431	387	529
300	489	441	606	482	435	599
400	553	501	696	541	492	683

Maximum conductor temperature : 90°C

Ambient air temperature : 30°C

Ground temperature : 20°C

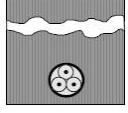
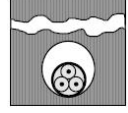
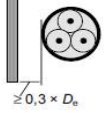
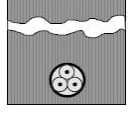
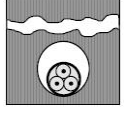
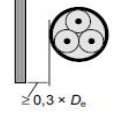
Depth of laying : 0.8m

Thermal resistivity of soil : 1.5 K.m/W

Thermal resistivity of earthenware ducts : 1.2 K.m/W

* : current rating calculated for cables having a rated voltage of 6/10kV

Current ratings for three core aluminum cables with rated voltage 3.6/6kV to 18/30kV*

Nominal cross section	Unarmored			armored		
	Buried direct in ground	In a buried duct	In air	Buried direct in ground	In a buried duct	In air
						
mm ²	A	A	A	A	A	A
16	78	67	84	78	68	85
25	100	87	110	100	87	111
35	119	103	132	119	104	133
50	140	122	158	140	123	159
70	171	150	196	171	150	196
95	203	179	236	204	180	238
120	232	205	273	232	206	274
150	260	231	309	259	231	309
185	294	262	355	293	262	354
240	340	305	415	338	304	415
300	384	346	475	380	343	472
400	438	398	552	432	393	545

Maximum conductor temperature : 90°C

Ambient air temperature : 30°C

Ground temperature : 20°C

Depth of laying : 0.8m

Thermal resistivity of soil : 1.5 K.m/W

Thermal resistivity of earthenware ducts : 1.2 K.m/W

* : current rating calculated for cables having a rated voltage of 6/10kV

RATING FACTORS FOR CALCULATION OF CURRENT CARRYING CAPACITY IN DIFFERENT CONDITIONS (MV)

RATING FACTOR FOR AMBIENT AIR TEMPERATURE

Maximum conductor temperature (°C)	Ambient air temperature (°C)								
	20	25	30	35	40	45	50	55	60
90	1.08	1.04	1	0.96	0.91	0.87	0.82	0.76	0.71

RATING FACTOR FOR GROUND TEMPERATURE

Maximum conductor temperature (°C)	Ambient ground temperature (°C)								
	10	15	20	25	30	35	40	45	50
90	1.07	1.04	1	0.96	0.93	0.89	0.85	0.80	0.76

RATING FACTOR FOR DEPTH OF LAYING (for direct buried cables)

Depth of laying (m)	Single core cables		Three core cables
	Nominal conductor size		
	≤ 185 mm ²	> 185 mm ²	
0.5	1.04	1.06	1.04
0.6	1.02	1.04	1.03
0.8	1	1	1
1	0.98	0.97	0.98
1.25	0.96	0.95	0.96
1.5	0.95	0.93	0.95
1.75	0.94	0.91	0.94
2	0.93	0.90	0.93
2.5	0.91	0.88	0.91
3	0.90	0.86	0.90

RATING FACTOR FOR DEPTH OF LAYING (for cables in ducts)

Depth of laying (m)	Single core cables		Three core cables
	Nominal conductor size		
	≤ 185 mm ²	> 185 mm ²	
0.5	1.04	1.05	1.03
0.6	1.02	1.03	1.02
0.8	1	1	1
1	0.98	0.97	0.99
1.25	0.96	0.95	0.97
1.5	0.95	0.93	0.96
1.75	0.94	0.92	0.95
2	0.93	0.91	0.94
2.5	0.91	0.89	0.93
3	0.90	0.88	0.92

RATING FACTOR FOR SOIL THERMAL RESISTIVITY (for direct buried single core cables)

Conductor cross section (mm ²)	Soil thermal resistivity (K.m/W)							
	0.7	0.8	0.9	1	1.5	2	2.5	3
16	1.29	1.24	1.19	1.15	1	0.89	0.82	0.75
25	1.30	1.25	1.20	1.16	1	0.89	0.81	0.75
35	1.30	1.25	1.21	1.16	1	0.89	0.81	0.75
50	1.32	1.26	1.21	1.16	1	0.89	0.81	0.74
70	1.33	1.27	1.22	1.17	1	0.89	0.81	0.74
95	1.34	1.28	1.22	1.18	1	0.89	0.80	0.74
120	1.34	1.28	1.22	1.18	1	0.88	0.80	0.74
150	1.35	1.28	1.23	1.18	1	0.88	0.80	0.74
185	1.35	1.29	1.23	1.18	1	0.88	0.80	0.74
240	1.36	1.29	1.23	1.18	1	0.88	0.80	0.73
300	1.36	1.30	1.24	1.19	1	0.88	0.80	0.73
400	1.37	1.30	1.24	1.19	1	0.88	0.79	0.73

RATING FACTOR FOR SOIL THERMAL RESISTIVITY (for single core cables in buried ducts)

Conductor cross section (mm ²)	Soil thermal resistivity (K.m/W)							
	0.7	0.8	0.9	1	1.5	2	2.5	3
16	1.20	1.17	1.14	1.11	1	0.92	0.85	0.79
25	1.21	1.17	1.14	1.12	1	0.91	0.85	0.79
35	1.21	1.18	1.15	1.12	1	0.91	0.84	0.79
50	1.21	1.18	1.15	1.12	1	0.91	0.84	0.78
70	1.22	1.19	1.15	1.12	1	0.91	0.84	0.78
95	1.23	1.19	1.16	1.13	1	0.91	0.84	0.78
120	1.23	1.20	1.16	1.13	1	0.91	0.84	0.78
150	1.24	1.20	1.16	1.13	1	0.91	0.83	0.78
185	1.24	1.20	1.17	1.13	1	0.91	0.83	0.78
240	1.25	1.21	1.17	1.14	1	0.90	0.83	0.77
300	1.25	1.21	1.17	1.14	1	0.90	0.83	0.77
400	1.25	1.21	1.17	1.14	1	0.90	0.83	0.77

RATING FACTOR FOR SOIL THERMAL RESISTIVITY (for direct buried three core cables)

Conductor cross section (mm ²)	Soil thermal resistivity (K.m/W)							
	0.7	0.8	0.9	1	1.5	2	2.5	3
16	1.23	1.19	1.16	1.13	1	0.91	0.84	0.78
25	1.24	1.20	1.16	1.13	1	0.91	0.84	0.78
35	1.25	1.21	1.17	1.13	1	0.91	0.83	0.78
50	1.25	1.21	1.17	1.14	1	0.91	0.83	0.77
70	1.26	1.21	1.18	1.14	1	0.90	0.83	0.77
95	1.26	1.22	1.18	1.14	1	0.90	0.83	0.77
120	1.26	1.22	1.18	1.14	1	0.90	0.83	0.77
150	1.27	1.22	1.18	1.15	1	0.90	0.83	0.77
185	1.27	1.23	1.18	1.15	1	0.90	0.83	0.77
240	1.28	1.23	1.19	1.15	1	0.90	0.83	0.77
300	1.28	1.23	1.19	1.15	1	0.90	0.82	0.77
400	1.28	1.23	1.19	1.15	1	0.90	0.82	0.76

RATING FACTOR FOR SOIL THERMAL RESISTIVITY (for three core cables in ducts)

Conductor cross section (mm ²)	Soil thermal resistivity (K.m/W)							
	0.7	0.8	0.9	1	1.5	2	2.5	3
16	1.12	1.11	1.09	1.08	1	0.94	0.89	0.84
25	1.14	1.12	1.10	1.08	1	0.94	0.89	0.84
35	1.14	1.12	1.10	1.08	1	0.94	0.88	0.84
50	1.14	1.12	1.10	1.08	1	0.94	0.88	0.84
70	1.15	1.13	1.11	1.09	1	0.94	0.88	0.83
95	1.15	1.13	1.11	1.09	1	0.94	0.88	0.83
120	1.15	1.13	1.11	1.09	1	0.93	0.88	0.83
150	1.16	1.13	1.11	1.09	1	0.93	0.88	0.83
185	1.16	1.14	1.11	1.09	1	0.93	0.87	0.83
240	1.16	1.14	1.12	1.10	1	0.93	0.87	0.82
300	1.17	1.14	1.12	1.10	1	0.93	0.87	0.82
400	1.17	1.14	1.12	1.10	1	0.92	0.86	0.81

RATING FACTOR FOR GROUPS OF THREE CORE CABLES

(in horizontal formation laid direct in the ground)

Number of cables in groups	Spacing between cable centres (mm)				
	Touching	200	400	600	800
2	0.80	0.86	0.90	0.92	0.94
3	0.69	0.77	0.82	0.86	0.89
4	0.62	0.72	0.79	0.83	0.87
5	0.57	0.68	0.76	0.81	0.85
6	0.54	0.65	0.74	0.80	0.84
7	0.51	0.63	0.72	0.78	0.83
8	0.49	0.61	0.71	0.78	0.83
9	0.47	0.60	0.70	0.77	-
10	0.46	0.59	0.69	-	-
11	0.45	0.57	0.69	-	-
12	0.43	0.56	0.68	-	-

RATING FACTOR FOR GROUPS OF THREE PHASE CIRCUITS

(for single core cables laid direct in the ground)

Number of cables in groups	Spacing between cable centres (mm)				
	Touching	200	400	600	800
2	0.73	0.83	0.88	0.90	0.92
3	0.60	0.73	0.79	0.83	0.86
4	0.54	0.68	0.75	0.80	0.84
5	0.49	0.63	0.72	0.78	0.82
6	0.46	0.61	0.70	0.76	0.81
7	0.43	0.58	0.68	0.75	0.80
8	0.41	0.57	0.67	0.74	-
9	0.39	0.55	0.66	0.73	-
10	0.37	0.54	0.65	-	-
11	0.36	0.53	0.64	-	-
12	0.35	0.52	0.64	-	-

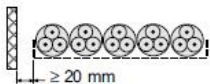
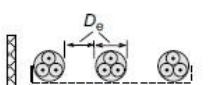
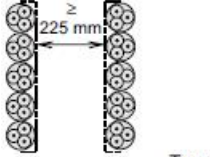
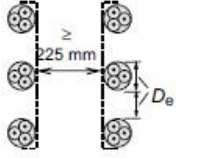

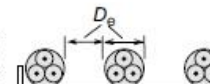
RATING FACTOR FOR GROUPS OF THREE CORE CABLES**(for three core cables in single way ducts in horizontal formation)**

Number of cables in groups	Spacing between cable centres (mm)				
	Touching	200	400	600	800
2	0.85	0.88	0.92	0.94	0.95
3	0.75	0.80	0.85	0.88	0.91
4	0.69	0.75	0.82	0.86	0.89
5	0.65	0.72	0.79	0.84	0.87
6	0.62	0.69	0.77	0.83	0.87
7	0.59	0.67	0.76	0.82	0.86
8	0.57	0.65	0.75	0.81	-
9	0.55	0.64	0.74	0.80	-
10	0.54	0.63	0.73	-	-
11	0.52	0.62	0.73	-	-
12	0.51	0.61	0.72	-	-

RATING FACTOR FOR GROUPS OF THREE PHASE CIRCUITS**(for single core cables in single way ducts)**

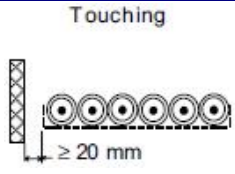
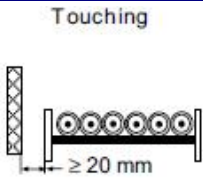
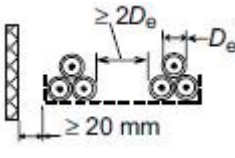
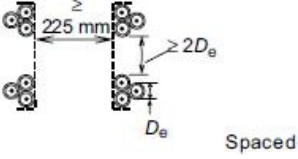
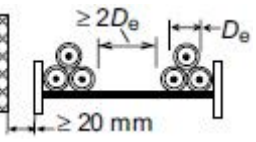
Number of cables in groups	Spacing between cable centres (mm)				
	Touching	200	400	600	800
2	0.78	0.85	0.89	0.91	0.93
3	0.66	0.75	0.81	0.85	0.88
4	0.59	0.70	0.77	0.82	0.86
5	0.55	0.66	0.74	0.80	0.84
6	0.51	0.64	0.72	0.78	0.83
7	0.48	0.61	0.71	0.77	0.82
8	0.46	0.60	0.70	0.76	-
9	0.44	0.58	0.69	0.76	-
10	0.43	0.57	0.68	-	-
11	0.42	0.56	0.67	-	-
12	0.40	0.55	0.67	-	-

RATING FACTOR FOR GROUPS OF MORE THAN ONE MULTI CORE CABLE IN AIR
 (to be applied to the current carrying capacity for one multi core cable in free air)

Method of installation		Number of trays	Number of cables						
			1	2	3	4	6	9	
Cables on perforated trays	 <p>Touching</p>	1	1.00	0.88	0.82	0.79	0.76	0.73	
		2	1.00	0.87	0.80	0.77	0.73	0.68	
		3	1.00	0.86	0.79	0.76	0.71	0.66	
	 <p>Spaced</p>	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	-	
Cables on vertical perforated trays	 <p>Touching</p>	1	1.00	0.88	0.82	0.78	0.73	0.72	
		2	1.00	0.88	0.81	0.76	0.71	0.70	
	 <p>Spaced</p>	1	1.00	0.91	0.89	0.88	0.87	-	
		2	1.00	0.91	0.88	0.87	0.85	-	
Cables on ladder supports, cleats, etc.	 <p>Touching</p>	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	
	 <p>Spaced</p>	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	-	

- 1- Factors apply to single layer groups of cables as shown above and do not apply when cables are installed in more than one layer touching each other. Values for such installations may be significantly lower and must be determined by an appropriate method.
- 2- Value are given for vertical spacing between trays of 300mm and at least 20mm between trays and wall. For closer spacing, the factors should be reduced.
- 3- Values are given for horizontal spacing between trays of 225mm with trays mounted back to back. For closer spacing, the factors should be reduced.

RATING FACTOR FOR GROUPS OF MORE THAN ONE CIRCUIT OF SINGLE CORE CABLES (1)
 (to be applied to the current carrying capacity for one circuit of single core cable in free air)

Method of installation	Number of trays	Number of three phase circuits			Use as a multiplier to rating for	
		1	2	3		
Perforated trays (2)		1	0.98	0.91	0.87	Three cables in horizontal formation
		2	0.96	0.87	0.81	
		3	0.95	0.85	0.78	
Ladder supports, cleats, etc. (2)		1	1.00	0.97	0.96	Three cables in horizontal formation
		2	0.98	0.93	0.89	
		3	0.97	0.90	0.86	
Perforated trays (2)		1	1.00	0.98	0.96	Three cables in trefoil formation
		2	0.97	0.93	0.89	
		3	0.96	0.92	0.86	
Vertical perforated trays (3)		1	1.00	0.91	0.89	Three cables in trefoil formation
		2	1.00	0.90	0.86	
Ladder supports, cleats, etc. (2)		1	1.00	1.00	1.00	Three cables in trefoil formation
		2	0.97	0.95	0.93	
		3	0.96	0.94	0.90	

- 1- Factors are given for single layer of cables (or trefoil groups) as shown in the table and do not apply when cables are installed in more than one layer touching each other. Values for such installations may be significantly lower and should be determined by an appropriate method.
- 2- Values are given for vertical spacing between trays of 300mm.
- 3- For closer spacing, the factors should be reduced.
- 4- Values are given for horizontal spacing between trays of 225mm with trays mounted back to back. For closer spacing, the factors should be reduced.
- 5- For circuits having more than one cable in parallel per phase, each three phase set of conductors should be considered as a circuit for the propose of this table.

CURRENT CARRYING CAPACITY FOR HV AND EHV CABLES

Current rating for 63-400kV cables with copper conductor (95mm² screen)

Cross sectional area	Cables in ground								Cables in air							
	Flat formation				Trefoil formation				Flat formation				Trefoil formation			
	Cross bonded		Both ends		Cross bonded		Both ends		Cross bonded		Both ends		Cross bonded		Both ends	
mm ²	65°C	90°C	65°C	90°C	65°C	90°C	65°C	90°C	65°C	90°C	65°C	90°C	65°C	90°C	65°C	90°C
185	410	490	375	455	385	465	385	460	445	600	405	555	385	520	380	520
240	475	570	425	515	450	540	440	530	525	710	465	640	450	615	445	610
300	530	640	440	535	505	610	480	580	600	805	500	685	525	710	500	685
400	600	720	485	595	575	690	540	650	680	915	565	775	605	820	575	785
500	685	825	530	650	655	785	600	730	790	1060	625	860	695	945	650	895
630	780	940	570	705	740	890	660	810	915	1235	685	950	800	1085	735	1010
800	870	1055	610	755	825	995	720	885	1045	1415	745	1040	905	1235	815	1130
1000	960	1165	645	800	900	1095	770	950	1175	1590	800	1125	1005	1380	895	1245
1200	1115	1345	690	860	1060	1280	855	1055	1395	1880	880	1240	1210	1650	1025	1425
1600	1280	1550	735	920	1215	1470	930	1155	1655	2235	960	1355	1420	1940	1150	1615
2000	1410	1705	765	955	1320	1605	980	1220	1845	2500	1000	1425	1565	2145	1230	1740
2500	1540	1875	795	1000	1445	1755	1025	1285	2095	2845	1065	1515	1750	2410	1330	1890

Current rating for 63-400kV cables with aluminum conductor (95mm² screen)

Cross sectional area	Cables in ground								Cables in air							
	Flat formation				Trefoil formation				Flat formation				Trefoil formation			
	Cross bonded		Both ends		Cross bonded		Both ends		Cross bonded		Both ends		Cross bonded		Both ends	
mm ²	65°C	90°C	65°C	90°C	65°C	90°C	65°C	90°C	65°C	90°C	65°C	90°C	65°C	90°C	65°C	90°C
185	320	380	300	365	300	360	300	360	350	470	330	445	300	405	300	405
240	370	445	345	420	350	420	350	420	410	555	380	520	355	480	350	480
300	415	495	365	445	395	475	385	460	465	625	415	565	410	550	400	540
400	470	565	410	500	450	540	435	525	535	715	470	640	475	640	460	625
500	540	645	455	555	515	620	490	595	620	835	530	725	550	745	530	720
630	620	740	500	610	590	710	550	670	730	975	595	820	640	865	605	830
800	700	845	540	665	670	805	610	745	840	1130	660	910	735	995	685	940
1000	785	950	585	720	745	900	670	820	960	1295	720	1005	830	1135	765	1055
1200	850	1025	610	755	805	970	710	870	1055	1420	765	1070	905	1235	825	1140
1600	960	1165	655	815	900	1095	775	955	1220	1650	836	1170	1035	1420	925	1285
2000	1050	1275	685	855	975	1190	820	1015	1355	1840	885	1250	1140	1570	1000	1395

RATING FACTORS FOR CALCULATION OF CURRENT CARRYING CAPACITY IN DIFFERENT CONDITIONS (HV & EHV)

RATING FACTOR FOR CROSS SECTIONAL AREA OF METAL SCREEN

Conductor (mm ²)		Copper screen (mm ²)						
Al	Cu	25	35	50	95	150	240	300
300		1.02	1.02	1.01	1	0.99	0.98	0.97
500	300	1.03	1.03	1.02	1	0.98	0.96	0.96
800	500	1.05	1.04	1.02	1	0.97	0.94	0.94
1200	630	1.06	1.05	1.02	1	0.97	0.93	0.92
2000	800	1.07	1.06	1.02	1	0.96	0.92	0.91
	1200	1.12	1.1	1.02	1	0.94	0.89	0.88
	2000	1.16	1.13	1.02	1	0.93	0.87	0.86
	3000	1.17	1.14	1.02	1	0.93	0.87	0.85

RATING FACTOR FOR GROUND TEMPERATURE

Conductor temperature (°C)	Ground temperature (°C)							
	10	15	20	25	30	35	40	45
90	1.07	1.04	1	0.96	0.93	0.89	0.84	0.80
65	1.11	1.05	1	0.94	0.88	0.82	0.74	0.66

RATING FACTOR FOR GROUND THERMAL RESISTIVITY

Thermal resistivity (Km/W)	0.7	1.0	1.2	1.5	2.0	2.5	3.0
Rating factor	1.14	1.00	0.93	0.84	0.74	0.67	0.61

RATING FACTOR FOR PHASE SPACING, ONE GROUP IN FLAT FORMATION WITH CROSS BONDED OR SINGLE BONDED SCREENS

Spacing (mm)	D	D+70	200	250	300	350	400
Rating factor	0.93	1	1.03	1.05	1.07	1.08	1.10

D: Cable outer diameter

RATING FACTOR FOR LAYING DEPTH

Laying depth (m)	Rating factor
0.50	1.10
0.70	1.05
0.90	1.01
1.00	1.00
1.20	0.98
1.50	0.95

RATING FACTOR FOR GROUPS OF CABLES IN THE GROUND

Distance between groups (axial) (mm)	Number of groups								
	1	2	3	4	5	6	7	8	9
100	1	0.76	0.67	0.59	0.55	0.51	0.49	0.47	0.46
200	1	0.81	0.71	0.65	0.61	0.49	0.56	0.53	0.52
400	1	0.85	0.77	0.72	0.69	0.66	0.64	0.63	0.62
600	1	0.88	0.81	0.77	0.74	0.72	0.71	0.70	0.69
800	1	0.90	0.84	0.81	0.79	0.77	0.76	0.75	0.75
2000	1	0.96	0.93	0.92	0.91	0.91	0.91	0.90	0.90

RATING FACTOR FOR AMBIENT AIR TEMPERATURE

Air temperature (°C)	5	10	15	20	25	30	35	40	45	50	55
Rating factor	1.28	1.24	1.19	1.15	1.10	1.05	1.0	0.95	0.89	0.83	0.77

SHORT CIRCUIT CURRENT OF CONDUCTORS

MAXIMUM SHORT CIRCUIT CURRENT OF CONDUCTORS AT 1 sec.

Cross section (mm ²)	Copper conductor	Aluminum conductor
	Initial temp.: 90°C Final temp.: 250°C (kA)	Initial temp.: 90°C Final temp.: 250°C (kA)
50	7.15	4.70
70	10.0	6.58
95	13.6	8.93
120	17.2	11.3
150	21.4	14.1
185	26.5	17.4
240	34.3	22.6
300	42.9	28.2
400	57.2	37.6
500	77.5	47.0
630	90.1	59.5
800	114	75.6
1000	143	94.5
1200	172	113
1600	229	151
2000	286	189
2500	357.5	236.2

The maximum short circuit current for times between 0.2 and 5 seconds may be calculated with the following formula:

$$I_k = \frac{I_1}{\sqrt{t_k}}$$

Where

- I_k : short circuit current in amps during the time t_k ;
- I_1 : short circuit current in amps during the time of 1 sec.
- t_k : short circuit current duration, seconds.

MAXIMUM SHORT CIRCUIT CURRENT ON THE SCREEN AT 1 sec.

Cross section (mm ²)	Metallic copper screen (kA)
16	3.3
25	5.1
35	7.1
50	10
70	14
95	19
120	24
150	30
200	40
240	48
300	60

APPLICATION CODES FOR HIGH VOLTAGE CABLES

Letters	Description
N	Standard type
A	Aluminum conductor
Y	PVC
2X	XLPE
2Y	PE
H	Halogen free and low smoke
S	Common screen of copper wires
SE	Individual screen of copper wires (for multi core cables)
(FL)	Longitudinal watertight screen region and polymer laminated sheath
R	Wire armor
B	Tape armor
F	Flat wire armor
G	helix of galvanized steel tape
SC	Semi conductor
SCT	Semi conducting tape
WBSCT	Water blocking semi conducting tape
CWS	Copper wire screen
PET	Polyester tape
PE-AL-PE	Aluminum copolymer coated on both sides tape (applied helically)
WBT	Water blocking tape
AWA	Aluminum wire armor
SWA	Steel wire armor (galvanized)
ATA	Aluminum tape armor
STA	Steel tape armor (galvanized)
XLPE	Cross linked polyethylene
PVC	Polyvinyl chloride
PE	Polyethylene

NOMINAL SCREEN CROSS SECTIONAL AREA

Cross section (mm ²)	16	25	50	70	95	120	150	185	240	300	400	
Nominal cross sectional area of screen (mm ²)	16	16	16	16	16	16	16	25	25	25	25	35