

CURRENT-CARRYING CAPACITIES

CURRENT-CARRYING CAPACITIES
and other
TECHNICAL **TABLES**





TABLE 1

Current-carrying capacities and associated voltage drops for single-core p.v.c. insulated cable, non armoured, with or without sheath (copper conductors)

Conductor operating temperature 70°C

Conductor cross-sectional area	2 cable, single-phase a.c., or d.c.		3 or 4 cables, three-phase a.c.		2 cable, single-phase a.c., or d.c.		3 or 4 cables, three-phase a.c.		Flat or vertical (2 cables, single-phase a.c., or d.c., or 3 or 4 cables three-phase)				Trefoil (3 cables three phase)	
	Current Carrying Capacity	Volt drop per ampere per metre	Current Carrying Capacity	Volt drop per ampere per metre	Current Carrying Capacity	Volt drop per ampere per metre	Current Carrying Capacity	Volt drop per ampere per metre	Current Carrying Capacity	Volt drop per ampere per metre			Current Carrying Capacity	Volt drop per ampere per metre
										Single phase	d.c.			
mm ²	A	mV	A	mV	A	mV	A	mV	A	mV	mV	mV	A	mV
1.0	14	42.0	12	37.0	17	42.0	16	37.0	-	-	-	-	-	-
1.5	17	28.0	14	24.0	21	28.0	20	24.0	-	-	-	-	-	-
2.5	24	17.0	21	15.0	30	17.0	26	15.0	-	-	-	-	-	-
4.0	32	11.0	29	9.2	40	11.0	36	9.2	-	-	-	-	-	-
6.0	41	7.1	37	6.2	50	7.1	45	6.2	-	-	-	-	-	-
10.0	55	4.2	51	3.7	68	4.2	61	3.7	-	-	-	-	-	-
16.0	74	2.7	66	2.3	90	2.7	81	2.3	-	-	-	-	-	-
25.0	97	1.7	87	1.5	118	1.7	106	1.5	-	-	-	-	-	-
35.0	119	1.3	106	1.1	145	1.3	130	1.1	-	-	-	-	-	-
		a.c. d.c.				a.c. d.c.								
50.0	145	0.97 0.91	125	0.84	175	0.93 0.91	160	0.82	195	0.95	0.91	0.85	170	0.80
70.0	185	0.71 0.63	160	0.62	220	0.65 0.63	200	0.59	240	0.68	0.63	0.62	210	0.59
95.0	230	0.56 0.45	195	0.48	270	0.48 0.45	240	0.45	300	0.52	0.45	0.49	260	0.42
120.0	260	0.48 0.36	220	0.42	310	0.40 0.36	280	0.38	350	0.44	0.36	0.43	300	0.34
150.0	-	-	-	-	355	0.34 0.29	320	0.34	410	0.39	0.29	0.39	350	0.29
185.0	-	-	-	-	405	0.29 0.24	365	0.30	470	0.35	0.24	0.36	400	0.25
240.0	-	-	-	-	480	0.24 0.18	430	0.27	560	0.36	0.18	0.38	480	0.22
300.0	-	-	-	-	560	0.22 0.14	500	0.25	660	0.33	0.14	0.35	570	0.19
400.0	-	-	-	-	680	0.20 0.12	610	0.24	800	0.30	0.12	0.33	680	0.17
500.0	-	-	-	-	800	0.18 0.086	710	0.23	910	0.28	0.086	0.31	770	0.16
630.0	-	-	-	-	910	0.17 0.068	820	0.22	1040	0.26	0.068	0.30	880	0.15

Correction Factors:

For Ambient Temperature

Ambient temperatures	25°C	35°C	40°C	45°C	50°C	55°C	60°C	65°C
Correction factor	1.06	0.94	0.87	0.79	0.71	0.61	0.50	0.35

7.1 TABLE II

Current-carrying capacities and associated voltage drops for twin and multicore p.v.c. insulated cables, non armoured, (copper conductors)

Conductor operating temperature 70°C

Conductor cross-sectional area	One twin cable, with or without protective conductor single-phase a.c., or d.c.		One three-core cable, with or without protective conductor, or one four-core cable, three-phase		One twin cable, with or without protective conductor single-phase a.c., or d.c.		One three-core cable, with or without protective conductor, or one four-core cable, three-phase		One twin cable, with or without protective conductor single-phase a.c., or d.c.		One three-core cable, with or without protective conductor, or one four-core cable, three-phase	
	Current Carrying Capacity	Volt drop per ampere per metre	Current Carrying Capacity	Volt drop per ampere per metre	Current Carrying Capacity	Volt drop per ampere per metre	Current Carrying Capacity	Volt drop per ampere per metre	Current Carrying Capacity	Volt drop per ampere per metre	Current Carrying Capacity	Volt drop per ampere per metre
mm ²	A	mV	A	mV	A	mV	A	mV	A	mV	A	mV
1.0	14	42.0	12	37.0	16	42.0	13	37.0	-	-	-	-flat
1.5	18	28.0	16	24.0	20	28.0	17	24.0	-	-	-	-cables
2.5	24	17.0	21	15.0	28	17.0	24	15.0	-	-	-	-only
4.0	32	11.0	29	9.2	36	11.0	32	9.2	-	-	-	- "
6.0	40	7.1	36	6.2	46	7.1	40	6.2	-	-	-	- "
10.0	53	4.2	49	3.7	64	4.2	54	3.7	-	-	-	- "
16.0	70	2.7	62	2.3	85	2.7	71	2.3	-	-	-	- "
25.0	79	1.8	70	1.6	108	1.8	90	1.6	114	1.8	95	1.6
35.0	98	1.3	86	1.1	132	1.3	115	1.1	139	1.3	122	1.1
50.0	-	-	-	-	163	0.92	140	0.81	172	0.92	148	0.81
						a.c. d.c.						
70.0	-	-	-	-	207	0.65 0.64	176	0.57	218	0.65 0.64	186	0.57
95.0	-	-	-	-	251	0.48 0.46	215	0.42	265	0.48 0.46	227	0.42
120.0	-	-	-	-	290	0.40 0.36	251	0.34	306	0.40 0.36	265	0.34
150.0	-	-	-	-	330	0.32 0.25	287	0.29	348	0.32 0.25	302	0.29
185.0	-	-	-	-	380	0.29 0.23	330	0.24	400	0.29 0.23	348	0.24
240.0	-	-	-	-	450	0.25 0.18	392	0.20	474	0.25 0.18	413	0.20
300.0	-	-	-	-	520	0.23 0.14	450	0.18	548	0.23 0.14	474	0.18
400.0	-	-	-	-	600	0.22 0.11	520	0.17	632	0.22 0.11	548	0.17

Correction Factors:

For Ambient Temperature

Ambient temperatures	25°C	35°C	40°C	45°C	50°C	55°C	60°C	65°C
Correction factor	1.06	0.94	0.87	0.79	0.71	0.61	0.50	0.35

7.2 TABLE III

Current-carrying capacities and associated voltage drops for twin and multicore cables insulated with impregnated paper (BS 6480), lead-sheathed or aluminium-sheathed, armoured or non-armoured, with or without serving (copper conductor)

Conductor operating temperature 80°C

Normal cross-sectional area of conductor*2	One twin cable, single-phase a.c., or d.c.			One three- or four-core cable, three-phase		One twin cable, single-phase a.c., or d.c.			One three- or four-core cable, three-phase	
	Current Carrying Capacity	Volt drop per ampere per metre		Current Carrying Capacity	Volt drop per ampere per metre	Current Carrying Capacity	Volt drop per ampere per metre		Current Carrying Capacity	Volt drop per ampere per metre
		a.c.	d.c.				a.c.	d.c.		
mm ²	A	mV	mV	A	mV	A	mV	mV	A	mV
50	165	0.95	0.95	145	0.82	200	0.95	0.95	170	0.82
70	205	0.66	0.66	180	0.58	250	0.66	0.66	215	0.58
95	255	0.49	0.47	225	0.43	305	0.49	0.47	265	0.43
120	295	0.40	0.36	260	0.35	355	0.40	0.36	305	0.35
150	335	0.33	0.30	300	0.28	405	0.33	0.30	350	0.28
185	390	0.28	0.24	345	0.24	465	0.28	0.24	405	0.24
240	460	0.24	0.19	410	0.20	555	0.24	0.19	480	0.20
300	525	0.21	0.15	470	0.18	635	0.21	0.15	550	0.18
400	610	0.20	0.12	545	0.17	735	0.20	0.12	640	0.17

Correction Factors:

For Ambient Temperature

Ambient temperatures	25°C	35°C	40°C	45°C	50°C	55°C	60°C	65°C	70°C	75°C
Correction factor	1.05	0.95	0.89	0.82	0.75	0.68	0.61	0.53	0.43	0.30

7.3 TABLE IV

Current-carrying capacities and associated volt drops and masses supported, for flexible cords to BS 6500

Normal cross-sectional area of conductor	Maximum diameter of wires forming conductor	Current-carrying Capacity, d.c. Or Single-phase a.c., or three-phase a.c.	Volt drop per ampere per metre		Maximum mass supportable by twin flexible cord (see IEE Regulation 523-32)
			d.c. or single-phase a.c.	three-phase a.c.	
mm ²	mV	A	mV	mV	Kg
0.5	0.21	3	83	72.0	2
0.75	0.21	6	56	48.0	3
1.0	0.21	10	43	37.0	5
1.25	0.26	13	35	29.0	5
1.5	0.26	15	31	26.0	5
2.5	0.26	20	18	16.0	5
4.0	0.31	25	11	9.6	5

Correction factor for ambient temperature

600C rubber and p.v.c cords

Ambient temperature	350C	400C	450C	500C	550C
Correction factor	0.96	0.92	0.87	0.71	0.50

850C rubber cords having a h.o.f.r. sheath or a heat-resisting p.v.c sheath

Ambient temperature	350C To 500C	550C	600C	650C	700C
Correction factor	1.0	0.96	0.83	0.67	0.47

1500C rubber cords

Ambient temperature	350C To 1200C	1250C	1300C	1350C	1400C	1450C
Correction factor	1.0	0.96	0.85	0.74	0.60	0.42

Glass-fibre cords

Ambient temperature	350C To 1750C	1550C	1600C	1650C	1700C
Correction factor	1.0	0.96	0.85	0.74	0.60

7.4 TABLE V

Current-carrying capacities and associated voltage drops for single-core p.v.c insulated cables, non-armoured, with sheath (aluminium conductors)

Conductor operating temperature 70°C

Normal cross-sectional area of conductor	2 cable, single phase a.c., or d.c.			3 or 4 cables, three-phase a.c.		2 cable, single phase a.c., or d.c.			3 or 4 cables, three-phase a.c.		Flat or vertical (2 cables, single-phase a.c., or d.c., or 3 or 4 cables three-phase)				Trefoil (3 cables three-phase)	
	Current Carrying Capacity	Volt drop per ampere per metre		Current Carrying Capacity	Volt drop per ampere per metre	Current Carrying Capacity	Volt drop per ampere per metre		Current Carrying Capacity	Volt drop per ampere per metre	Current Carrying Capacity	Volt drop per ampere per metre			Current Carrying Capacity	Volt drop per ampere per metre
mm ²	A	mV	mV	A	mV	A	mV	mV	A	mV	A	mV	mV	mV	A	mV
16	60	4.5	4.5	52	3.9	72	4.5	4.5	65	3.9	-	-	-	-	-	-
25	78	2.9	2.8	67	2.5	94	2.8	2.8	85	2.5	-	-	-	-	-	-
35	96	2.1	2.0	83	1.8	115	2.1	2.0	105	1.8	-	-	-	-	-	-
50	120	1.6	1.5	100	1.4	143	1.5	1.5	123	1.3	155	1.5	1.5	1.34	140	1.3
70	150	1.2	1.0	125	1.0	181	1.1	1.0	156	0.93	190	1.1	1.0	0.95	170	0.90
95	175	0.93	0.75	150	0.80	223	0.77	0.75	193	0.69	235	0.80	0.75	0.72	205	0.67
120	205	0.80	0.60	175	0.70	261	0.62	0.60	225	0.56	275	0.65	0.60	0.60	235	0.54
150	235	0.73	0.49	200	0.64	298	0.51	0.49	259	0.48	320	0.55	0.49	0.51	270	0.45
185	-	-	-	-	-	345	0.42	0.39	290	0.40	370	0.46	0.39	0.45	310	0.37
240	-	-	-	-	-	411	0.34	0.29	361	0.34	440	0.43	0.29	0.43	370	0.30
300	-	-	-	-	-	476	0.29	0.23	419	0.30	510	0.38	0.23	0.39	435	0.25
380	-	-	-	-	-	554	0.26	0.19	465	0.28	584	0.35	0.19	0.37	490	0.22
480	-	-	-	-	-	643	0.23	0.15	541	0.26	677	0.32	0.15	0.34	570	0.20
600	-	-	-	-	-	737	0.21	0.12	616	0.24	776	0.30	0.12	0.33	648	0.18

Correction Factors:

For Ambient Temperature

Ambient temperatures	25°C	35°C	40°C	45°C	50°C	55°C	60°C	65°C
Correction factor	1.06	0.94	0.87	0.79	0.71	0.61	0.50	0.35

7.5 TABLE VI

Current-carrying capacities and associated voltage drops for twin and multicore armoured p.v.c. insulated cables (aluminium conductors)

Conductor operating temperature 70°C

Normal cross-sectional area of conductor*2	One twin cable, single-phase a.c., or d.c.		One three- or four-core cable, three-phase		One twin cable, single-phase a.c., or d.c.			One three- or four-core cable, three-phase		
	Current Carrying Capacity	Volt drop per ampere per metre		Current Carrying Capacity	Volt drop per ampere per metre	Current Carrying Capacity	Volt drop per ampere per metre		Current Carrying Capacity	Volt drop per ampere per metre
mm ²	A	mV	mV	A	mV	A	mV	mV	A	mV
16	63	4.5	4.5	55	3.9	66	4.5	4.3	58	3.9
25	83	2.9	2.9	67	2.5	87	2.1	2.9	71	2.5
35	100	2.1	2.0	88	1.8	105	2.9	2.0	93	1.8
50	124	1.6	1.5	105	1.3	130	1.6	1.5	110	1.3
70	157	1.1	1.0	138	0.93	165	1.1	1.0	145	0.93
95	185	0.79	0.77	166	0.68	195	0.79	0.77	175	0.68
120	-	-	-	195	0.54	-	-	-	205	0.54
150	-	-	-	219	0.45	-	-	-	230	0.45
185	-	-	-	257	0.37	-	-	-	270	0.37
240	-	-	-	304	0.30	-	-	-	320	0.30
300	-	-	-	347	0.25	-	-	-	365	0.25

Correction Factors:

For Ambient Temperature

Ambient temperatures	25°C	35°C	40°C	45°C	50°C	55°C	60°C	65°C
Correction factor	1.06	0.94	0.87	0.79	0.71	0.61	0.50	0.35

7.6 TABLE VII

Current-carrying capacities and associated voltage drops for twin and multicore armoured p.v.c. insulated cables (copper conductors)

Conductor operating temperature 70°C

Conductor cross-sectional area	One twin cable, single-phase a.c., or d.c.		One three- or four-core cable, three-phase		One twin cable, single-phase a.c., or d.c.		One three- or four-core cable, three-phase	
	Current Carrying Capacity	Volt drop per ampere per metre	Current Carrying Capacity	Volt drop per ampere per metre	Current Carrying Capacity	Volt drop per ampere per metre	Current Carrying Capacity	Volt drop per ampere per metre
mm ²	A	mV	A	mV	A	mV	A	mV
1.5	20	29.0	18	25.0	-	-	-	-
2.5	29	18.0	24	16.0	-	-	-	-
4.0	37	12.0	31	9.6	-	-	-	-
6.0	48	7.4	41	6.3	50	7.3	42	6.3
10.0	66	4.3	56	3.8	69	4.3	58	3.8
16.0	86	2.7	73	2.3	90	2.7	77	2.3
25.0	115	1.8	97	1.6	121	1.8	102	1.6
35.0	142	1.3	119	1.1	149	1.3	125	1.1
50.0	168	0.92	147	0.81	180	0.92	155	0.81
		a.c. d.c.				a.c. d.c.		
70.0	209	0.65 0.64	180	0.57	220	0.65 0.64	190	0.57
95.0	257	0.48 0.46	219	0.42	270	0.48 0.46	230	0.42
120.0	295	0.40 0.36	257	0.34	310	0.40 0.36	270	0.34
150.0	337	0.32 0.25	295	0.29	355	0.32 0.25	310	0.29
185.0	390	0.29 0.23	333	0.24	410	0.29 0.23	350	0.24
240.0	461	0.25 0.18	399	0.20	485	0.25 0.18	420	0.20
300.0	523	0.23 0.14	451	0.18	550	0.23 0.14	475	0.18
400.0	589	0.22 0.11	523	0.17	620	0.22 0.11	550	0.17

Correction Factors:

For Ambient Temperature

Ambient temperatures	25°C	35°C	40°C	45°C	50°C	55°C	60°C	65°C
Correction factor	1.06	0.94	0.87	0.79	0.71	0.61	0.50	0.35

7.7 TABLE VIII

LAY RATIOS FOR ALUMINIUM STANDARD CONDUCTOR

1	2	3	4	5	6	7	8	9	10	11
Number of wires in Conductor	Lay ratio									
	6 wire layer		12 wire layer		18-wire layer		24- wire layer		30 wire layer	
	min	max	min	max	min	max	min	max	min	max
7	10	14	-	-	-	-	-	-	-	-
19	10	16	10	14	-	-	-	-	-	-
37	10	17	10	16	10	14	-	-	-	-
61	10	17	10	16	10	15	10	14	-	-
91	10	17	10	16	10	15	10	14	10	13

7.8

TABLE IX

Standard Diameter mm	Cross Sectional Area of Standard diameter wire mm ²	Mass Per Km kg	Tensile Strength N/mm ²	Standard Resistance at 20° Per Km	Minimum Breaking Load for Diameter Wire. N
1.70	2.27	6.13	211.5	12.451	480
1.80	2.55	6.87	196.5	11.106	500
2.10	3.46	9.35	210.7	8.159	730
2.25	3.98	10.7	182.1	7.100	714
2.50	4.91	13.26	175.5	5.758	862
2.67	5.60	15.117	205	5.048	1150
2.80	6.16	16.63	201.4	4.590	1240
2.89	6.56	17.72	198.2	4.309	1300
2.96	6.88	18.58	193.2	4.107	1320
3.10	7.55	20.40	178.8	3.745	1350
3.23	8.19	22.13	166.6	3.449	1365
3.25	8.30	22.42	165.1	3.407	1370
3.40	9.08	24.54	163.7	3.113	1490
3.78	11.22	30.33	160.4	2.519	1800
4.22	13.99	37.81	160.1	2.021	2240
4.39	15.14	40.91	160.1	1.867	2410
4.65	16.98	45.90	159.0	1.664	2700

7.9

TABLE X

NOMINAL ALUMINIUM AREA mm ²	STANDING & WIRE DIAMETER mm	SECTIONAL AREA mm ²	APPROXIMATE OVERALL DIAMETER mm	APPROXIMATE MASS PER kg	CALCULATION DC RESISTANCE AT 20°C/km	CALCULATION BREAKING LOAD N	TENSILE STRENGTH N/mm ²
16	7/1.70	15.88	5.1	44.0	1.802	3,192	201.0
25	7/2.10	24.23	6.3	66.0	1.181	4,854	200.3
35	7/2.50	34.34	7.5	94.0	0.833	5,732	166.9
50	7/3.10	52.83	9.3	145.0	0.5419	8,977	166.9
50	19/1.80	48.32	9.0	133.0	0.595	9,025	186.8
70	19/2.10	65.77	10.5	181.0	0.437	13,1761	200.3
95	19/2.50	93.22	12.5	256.0	0.308	15,559	166.9
100	7/4.39	106.0	13.17	290.0	0.2702	16,026	151.1
100	19/2.67	106.33	13.35	292.0	0.2699	20,759	195.2
120	19/2.80	116.93	14.0	322.0	0.246	22,382	191.4
150	19/3.25	157.6	16.25	434.0	0.1825	24,728	156.9
150	37/2.25	147.04	15.74	405.0	0.196	25,097	170.7
185	37/2.50	181.53	17.50	500.0	0.159	30,299	166.9
240	61/2.25	242.42	20.25	670.0	0.119	39,199	161.7
300	19/4.65	322.7	23.25	888.0	0.08916	48,735	151.0
300	61/2.50	299.28	22.50	827.0	0.097	47,324	158.1
400	37/3.78	415.2	26.45	1145.0	0.6944	63,270	152.4
400	61/2.89	399.94	26.01	1105.0	0.72	71,370	178.5
500	61/3.23	499.58	29.07	1380.0	0.058	74,938	150.0
630	91/2.96	625.88	32.56	1733.0	0.046	108,108	172.72

7.10 TABLE XI

Test Method	Property under test	Requirements			
		Insulation		Sheath	
		1	2	1A	2A
A, B	Minimum tensile strength (N/mm ²)	12.5	10	12.5	10
, B	Minimum elongation at break (%)	125	150	125	150
C. 1	Properties after ageing in air 7 days at 80 + 2°C				
	Tensile strength Minimum value (N/mm ²)	12.5	10	12.5	10
	Minimum variation from unaged Value (%)	20	20	20	20
C.1	Elongation at break Minimum Value (%)				
	Maximum variation from unaged value (%)	125	150	125	150
C.2, C.3	Loss of mass (max) (mg/cm ²)	20	20	20	20
		2.0	2.0	2.0	2.0
D. 1, D.2,) D,3)	Hot pressure test temperature (°C)	80 +2	70+2	80+2	70+2
	Maximum deformation (%) 80+2	50	50	50	50
E.1, E.2	Heat shock test Temperature at which specimen shall not crack (°C)	150+2	150+2	150+2	150+2
C.4	Non – contamination test 7 days at 80 +2°C				
	Tensile strength				
	Minimum value (N/mm ²)	12.5	10	--	--
	Maximum variation from unaged value (%)	20	20	--	--
	Elongation at break Minimum Value (%)				
	Maximum variation from unaged value (%)	125	150	---	---
		20	20	---	---
	Minimum insulation resistance constant (K value) at 20°C (M?KM) at 70 °C	70	380	--	--
		0.037	0.037	--	--

7.11 TABLE XII

Test Method	Property under test	Type of insulation or sheath						
		3	4	5	6	7	8	9
B	Minimum tensile strength (N/mm ²)	18.5	7.5	12.5	6	7.5	7.5	12.5
	Minimum elongation at Break (%)	125	150	100	125	125	150	150
C.2,	Loss of mass after ageing 7 days at 80+ 2°C	-	-	-	-	-	-	-
C.3	(mg/cm ²)	2.0	-	-	2.0	2.0	2.0	-
C.1	Elongation at break after ageing 7 Days at 135 +2°C							
	Minimum value (%)	-	65	65	-	-	-	-
	Tensile strength after ageing 7 days at 100 +2°C							
	Minimum value (N/mm ²)	-	-	-	-	-	-	12.5
	Maximum variation From unaged value (%)	-	-	-	-	-	-	25
	Elongation at break After ageing 7 days at 100+2°C	-	-	-	-	-	-	-
	Minimum value (%)	-	-	-	-	-	-	150
	Variation from Unaged value (%)	-	-	-	-	-	-	25
D.4	Maximum hot deformation (%)	30	65	30	65	65	65	40
E.1	Heat shock test Temperature at which specimen shall not crack (°C)	150	150	150	150	100	120	150
F.2	Minimum insulation resistance constant (K value) at 20°C mskm	350	0.35	180	0.0035	0.0035	0.0035	0.0035