

Technical Data

Voltage Drop

SAA wiring rules AS 3000 requires that the voltage drop between the consumers terminals and any point of the installation shall not exceed 5% of the supply voltage at the consumers terminals. Voltage drop (mV/A.m) values are given on page 24. These values are given at both the load power factor which results in the maximum voltage drop and at 0.8 power factor. Actual voltage drop can be calculated as follows:

$$Vd = \frac{L \times I \times Vc}{1000}$$

WHERE

Vd = Actual voltage drop in volts

L = Route length of circuit

Vc = mV/A.m values given in the tables

I = Current to be carried by the cable

Short Circuit

The generalised form of the adiabatic temperature rise equation which is applicable to any starting temperature is as follows:

$$I^2 t = k^2 s^2$$

WHERE

t = Duration in seconds (maximum 5 seconds)

s = Nominal cross section of conductor in mm²

I = Value of fault current in amps

k = A factor taking account of the resistivity, temperature coefficient and heat capacity of the conductor material and the appropriate initial and final temperatures

Conductor Material	Insulation Material	Initial Temperature °C	Limiting Final Temperature °C	k
Copper	RADOX®	75	280	161
		90	280	153
		105	280	146

CCA 110 Flexible Single Core

Technical Table

Resistance

Voltage Drop

Part Number	Nominal Conductor Area (mm)	Construction Approx Number of Wires (mm)	Maximum Conductor dc Resistance at 20°C (Ohm/km)	Three Phase Voltage Drop (mV/A/m) Trefoil.	Touching
CCA110 -1.5	1.5	30/0,3	12,1	26,71	26,73
CCA110 -2.5	2.5	50/0,3	7,41	18,9	18,9
CCA110 -4	4,0	56/0,3	4,51	11,76	11,76
CCA110 -6	6,0	54/0,41	3,08	7,86	7,86
CCA110 -10	10	106/0,41	1,83	4,04	4,04
CCA110 -16	16	170/0,41	1,15	2,55	2,56
CCA110 -25	25	265/0,41	0,727	1,62	1,62
CCA110 -35	35	371/0,41	0,524	1,17	1,17
CCA110 -50	50	539/0,41	0,357	0,87	0,88
CCA110 -70	70	742/0,41	0,268	0,61	0,62
CCA110 -95	95	1004/0,41	0,193	0,45	0,45
CCA110 -120	120	524/0,51	0,153	0,37	0,38
CCA110 -150	150	1028/0,51	0,124	0,32	0,33
CCA110 -185	185	1295/0,51	0,0991	0,26	0,28
CCA110 -240	240	1647/0,51	0,0754	0,22	0,24
CCA110 -300	300	2100/0,51	0,0501	0,20	0,21
CCA110 -400	400	1750/0,64	0,0470	0,17	0,20
CCA110 -500	500	2158/0,64	0,0366	0,16	0,18
CCA110 -630	600	1760/0,8	0,0293	0,15	0,17

Resistance, Reactance, Inductance & Impedance of 0.6/1kV Copper Clad Aluminium Class 5 Power Cables

Reactance at 50 Hz

Inductance

Impedance at 50 Hz

Nominal Conductor Sector Area sqmm	Diameter of CCA Conductor	Max Conductor AC Resistance at 110°C (Ohm/km)	Max Conductor DC Resistance at 20°C (Ohm/km)	Trefoil (or Single)		Trefoil (or Single)		Trefoil (or Single)	
				Unbraided (Ohm/km)	Multicore (Ohm/km)	Unbraided (Ohm/km)	Multicore (mH/km)	Unbraided (Ohm/km)	Multicore (Ohm/km)
6	4,25	4,34	3,08	0,115	0,0812	0,3049	0,2221	3,555	3,553
10	5,50	2,58	1,83	0,106	0,0777	0,282	0,2129	2,095	2,094
16	6,90	1,62	1,15	0,1	0,075	0,2642	0,2053	1,311	1,31
25	8,70	1,02	0,727	0,095	0,0729	0,2528	0,1989	0,855	0,854
35	10,40	0,784	0,554	0,91	0,0713	0,2417	0,1936	0,606	0,605
50	12,40	0,547	0,387	0,0869	0,07	0,229	0,1892	0,439	0,439
70	14,70	0,379	0,268	0,0832	0,069	0,2192	0,1856	0,309	0,309
95	17,20	0,271	0,193	0,0807	0,0682	0,2147	0,1827	0,251	0,251
120	19,30	0,216	0,153	0,0709	0,0676	0,2099	0,1804	0,204	0,204
150	21,60	0,175	0,124	0,0779	0,0671	0,207	0,1784	0,171	0,174
185	24,60	0,140	0,0991	0,0772	0,0666	0,2038	0,1767	0,148	0,149
240	27,40	0,106	0,0754	0,076	0,0662	0,2016	0,1751	0,13	0,128
300	30,90	0,0847	0,0601	0,0755	0,066	0,1994	0,1738	0,117	0,114
400	34,90	0,0664	0,047	0,0746	0,0657	0,197	0,1725	0,106	0,106
500	39,60	0,0516	0,0366	0,0738	0,0655	0,1958	0,1714	0,098	0,098
630	44,60	0,0400	0,0283	0,0729	0,0653	0,194	0,1703	0,09	0,09

Value of Constant K for Determination of Permissible Short Circuit Current

Initial Temperature of Conductor (°C)	CCA Final Temperature of Conductor (°C)			
	140	150	160	250
130	24,6	34,5	42,0	79,6
125	30,2	38,7	45,5	81,5
110	43,2	49,5	55,0	87,1
90	56,6	61,5	66,0	94,5
85	59,5	64,3	68,6	96,3
80	62,4	67,0	71,1	98,1
75	65,2	69,6	73,6	99,9
70	68,0	72,2	76,0	102
65	70,7	74,7	78,4	104
60	73,3	77,2	80,8	105
55	75,8	79,6	83,1	107
50	78,4	82,0	85,5	109
45	80,9	84,4	87,7	111
40	83,3	86,8	90,0	113
35	85,8	89,1	92,3	114
30	88,2	91,5	94,5	116
25	90,6	93,8	96,8	118

CCA 110 2 CORE Plus Earth Flexible Multicore

Cables Part Number	Nominal Conductor Area (mm ²)	Construction Approx Number of Wires (mm)	Conductor Diameter (mm)	Maximum Conductor dc Resistance at 20°C (Ohm/km)	Three Phase Voltage Drop at 50 Hz of Multicore Cables mV/Am Conductor Temperature 110°C
CCA3G-1,5	2 x 1,5 + 1,5	3"30/0,3	1,9	12,1	30,85
CCA3G-2,5	2 x 2,5 + 2,5	3"50/0,3	2,45	7,41	18,9
CCA3G-4	2 x 4 + 4	3"56/0,3	3,1	4,61	11,76
CCA3G-6	2 x 6 + 6	3"54/0,41	3,8	3,08	7,86
CCA3G-10	2 x 10 + 10	3"106/0,41	5	1,83	4,67
CCA3G-16	2 x 16 + 16	3"170/0,41	6,1	1,15	2,6
CCA3G-25	2 x 25 + 6	2"265/0,41+ 1" 64/0,41	8,7	0,727	1,5
CCA3G-35	2 x 35 + 10	2"371/0,41 + 1" 106/0,41	10,2	0,254	1,2
CCA3G-50	2 x 50 + 15	2"530/0,41+ 1" 170/0,41	12,3	0,387	0,87
CCA3G-70	2 x 70 + 25	2"742/0,41 + 1" 265/0,41	13,9	0,268	0,61
CCA3G-95	2 x 95 + 15	2"1004/0,41 + 1" 265/0,41	16,2	0,193	0,45
CCA3G-120	2 x 120 + 35	2"524/0,51 + 1" 371/0,41	18,2	0,153	0,36
CCA3G-150	2 x 150 + 90	2"1028/0,51 + 1" 530/0,41	22,3	0,124	0,3
CCA3G-185	2 x 190 + 70	2"1295/0,51 + 1" 742/0,41	24,7	0,0991	0,25

CCA 110 3 CORE Plus Earth Flexible Multicore

Cables Part Number	Nominal Conductor Area (mm ²)	Construction Approx Number of Wires (mm)	Conductor Diameter (mm)	Maximum Conductor dc Resistance at 20°C (Ohm/km)	Three Phase Voltage Drop at 50 Hz of Multicore Cables mV/Am Conductor Temperature 110°C
CCA4G-1,5	3 x 1,5 + 1,5	4"30/0,3	1,9	12,1	30,85
CCA4G-2,5	3 x 2,5 + 2,5	4"50/0,3	2,45	7,41	18,9
CCA4G-4	3 x 4 + 4	4"56/0,3	3,1	4,61	11,76
CCA4G-6	3 x 6 + 6	4"54/0,41	3,8	3,08	7,86
CCA4G-10	3 x 10 + 10	4"106/0,41	5	1,83	4,67
CCA4G-16	3 x 16 + 16	4"170/0,41	6,1	1,15	2,6
CCA4G-25	3 x 25 + 6	3"265/0,41+ 1" 64/0,41	8,7	0,727	1,5
CCA4G-35	3 x 35 + 10	3"371/0,41 + 1" 106/0,41	10,2	0,254	1,2
CCA4G-50	3 x 50 + 15	3"530/0,41+ 1" 170/0,41	12,3	0,387	0,87
CCA4G-70	3 x 70 + 25	3"742/0,41 + 1" 265/0,41	13,9	0,268	0,61
CCA4G-95	3 x 95 + 15	3"1004/0,41 + 1" 265/0,41	16,2	0,193	0,45
CCA4G-120	3 x 120 + 35	3"524/0,51 + 1" 371/0,41	18,2	0,153	0,36
CCA4G-150	3 x 150 + 90	3"1028/0,51 + 1" 530/0,41	22,3	0,124	0,3
CCA4G-185	3 x 190 + 70	3"1295/0,51 + 1" 742/0,41	24,7	0,0991	0,25

CCA 110 4 CORE Plus Earth Flexible Multicore

Cables Part Number	Nominal Conductor Area (mm ²)	Construction Approx Number of Wires (mm)	Conductor Diameter (mm)	Maximum Conductor dc Resistance at 20°C (Ohm/km)	Three Phase Voltage Drop at 50 Hz of Multicore Cables mV/Am Conductor Temperature 110°C
CCA5G-1,5	4 x 1,5 + 1,5	5"30/0,3	1,9	12,1	30,85
CCA5G-2,5	4 x 2,5 + 2,5	5"50/0,3	2,45	7,41	18,9
CCA5G-4	4 x 4 + 4	5"56/0,3	3,1	4,61	11,76
CCA5G-6	4 x 6 + 6	5"54/0,41	3,8	3,08	7,86
CCA5G-10	4 x 10 + 10	5"106/0,41	5	1,83	4,67
CCA5G-16	4 x 16 + 16	5"170/0,41	6,1	1,15	2,6
CCA5G-25	4 x 25 + 6	4"265/0,41+ 1" 64/0,41	8,7	0,727	1,5
CCA5G-35	4 x 35 + 10	4"371/0,41 + 1" 106/0,41	10,2	0,254	1,2
CCA5G-50	4 x 50 + 15	4"530/0,41+ 1" 170/0,41	12,3	0,387	0,87
CCA5G-70	4 x 70 + 25	4"742/0,41 + 1" 265/0,41	13,9	0,268	0,61
CCA5G-95	4 x 95 + 15	4"1004/0,41 + 1" 265/0,41	16,2	0,193	0,45
CCA5G-120	4 x 120 + 35	4"524/0,51 + 1" 371/0,41	18,2	0,153	0,36
CCA5G-150	4 x 150 + 90	4"1028/0,51 + 1" 530/0,41	22,3	0,124	0,3
CCA5G-185	4 x 190 + 70	4"1295/0,51 + 1" 742/0,41	24,7	0,0991	0,25

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Flexible Fire Rated Cables, Single Core

Conductor Cross Sectional Area (mm ²)	Conductor Diameter (mm)	Conductor Short Circuit Rating for 5s (A)	Max conductor resistance (Ω /km) at		Inductance (mH/km)	Reactance (Ω /km)	Impedance (Ω /km)
			20°C	110°C			
0.75	1.10	48	26	35.9			
1.0	1.19	64	19.5	26.9			
1.5	1.50	96	13.3	18.4			
2.5	1.98	160	7.98	11.02			
4	2.45	256	4.95	6.83			
6	3.03	384	3.30	4.56	0.309	0.097	4.558
10	3.95	640	1.91	2.64	0.283	0.089	2.639
16	5.10	1023	1.21	1.67	0.262	0.082	1.673
25	6.27	1599	0.780	1.08	0.252	0.079	1.080
35	7.00	2238	0.554	0.765	0.245	0.077	0.769
50	9.00	3198	0.386	0.533	0.230	0.072	0.538
70	10.80	4477	0.272	0.376	0.221	0.070	0.382
95	12.90	6075	0.206	0.284	0.214	0.067	0.292
120	13.97	7674	0.161	0.222	0.211	0.066	0.232
150	15.84	9593	0.129	0.178	0.210	0.066	0.190
185	18.06	11831	0.106	0.146	0.207	0.065	0.160
240	19.55	15348	0.0801	0.1106	0.205	0.064	0.128
300	23.22	19185	0.0641	0.0885	0.199	0.062	0.108
400	25.14	25581	0.0486	0.0671	0.199	0.062	0.092
500	29.74	31976	0.0384	0.0530	0.195	0.061	0.081
630	34.08	40289	0.0287	0.0396	0.192	0.060	0.072

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Flexible Fire Rated Cables, Multi Core

Cross-sectional area of conductor n x mm ²	Inductance mH/km	Reactance Ohm/km	Impedance Ohm/km
0.75	0.333	0.104	35.900
1.0	0.324	0.102	26.925
1.5	0.301	0.094	18.365
2.5	0.275	0.086	11.019
4	0.258	0.081	6.835
6	0.242	0.076	4.557
10	0.225	0.071	2.638
16	0.211	0.066	1.672
25	0.210	0.066	1.079
35	0.205	0.064	0.768
50	0.197	0.062	0.537
70	0.193	0.061	0.380
95	0.187	0.059	0.290
120	0.186	0.058	0.230
150	0.185	0.058	0.187
185	0.184	0.058	0.157
240	0.183	0.058	0.125
300	0.180	0.056	0.105

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Flexible Fire Rated Cables, Multi Core

Cross-sectional area of conductor	Conductor Dimensions	Conductor Short Circuit Current Rating for (5s)	Maximum conductor resistance	
mm ²	mm	A	20 °C W/km	110 °C W/km
0.75	1.10	48	26	35.9
1.0	1.19	64	19.5	26.9
1.5	1.50	96	13.3	18.4
2.5	1.98	160	7.98	11.02
4	2.45	256	4.95	6.83
6	3.03	384	3.30	4.56
10	3.95	640	1.91	2.64
16	5.10	1023	1.21	1.67
25	6.27	1599	0.780	1.08
35	7.00	2238	0.554	0.765
50	9.00	3198	0.386	0.533
70	10.80	4477	0.272	0.376
90	12.90	6075	0.206	0.284
120	13.97	7674	0.161	0.222
150	15.84	9593	0.129	0.178
185	18.06	11831	0.106	0.146
240	19.55	15348	0.0801	0.1106
300	23.22	19185	0.0641	0.0885
400	25.14	25581	0.0486	0.0671
500	29.74	31976	0.0384	0.0530
630	34.08	40289	0.0287	0.0396

Value of Constant K For Determination of Permissible Short Circuit Current

Constant (K) Initial temperature of conductor (°C)	Final temperature of conductor			
	CCA			
	140	150	160	250
130	24.6	34.5	42.0	79.6
125	30.2	38.7	45.5	81.5
110	43.2	49.5	55.0	87.1
90	56.6	61.5	66.0	94.5
85	59.5	64.3	68.6	96.3
80	62.4	67.0	71.1	98.1
75	65.2	69.6	73.6	99.9
70	68.0	72.2	76.0	102
65	70.7	74.7	78.4	104
60	73.3	77.2	80.8	105
55	75.8	79.6	83.1	107
50	78.4	82.0	85.5	109
45	80.9	84.4	87.7	111
40	83.3	86.8	90.0	113
35	85.8	89.1	92.3	114
30	88.2	91.5	94.5	116
25	90.6	93.8	96.8	118