SECONDARY CONSTANTS OF NONLOADED CABLE
22 GAUGE ASA, BSA, CSA, DSA, ESA

at 68° F. *

Freq. kHz	Characteristic Impedance			
	R Ohms	X Ohms (neg.)	Z Ohms	Angle Degrees (neg.)
.1	1298	1291	1830	44.8
.2	919	912	1295	44.8
.3	752	743	1057	44.7
.5	585	574	819	44.5
1	417	403	580	44.0
2	300	281	411	43.1
3	249	226	336	42.2
5	199	170	262	40.4
8	165	128	209	37.9
10	152	112	189	36.2
15	134	85	159	32.4
20	124	69	142	29.1

Through Carrier Frequencies – at 55° F.*

Freq. kHz	Characteristic Impedance			
	R Ohms	X Ohms (neg.)	Z Ohms	Angle Degrees (neg.)
.1	1282	1275	1808	44.8
.2	908	900	1279	44.8
.5	578	567	810	44.5
1	412	398	573	44.0
2	297	277	406	43.1
5	197	167	259	40.3
10	151	110	187	36.0
15	133	84	157	32.1
20	124	68	141	28.8
50	108	32	113	16.7
100	104	19	106	10.4
200	101	12	102	6.8
250	100	10	101	6.0
500	97	7	98	4.1
1000	95	5	95	2.9
2000	93	3	93	2.0
4000	92	2	92	1.3
5000	92	2	92	1.1
10000	91	1	91	0.7

* for temperature variations, see page 3

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at 68° F.*

Freq. kHz	Propagation Constant per mile			Phase Delay Sec./Mile ($X 10^{-6}$)	Velocity of Propagation Miles/Sec. ($X 10^3$)
	Attenuation		Phase Shift		
	α nepers	dB	β radians		
.1	.0668	.58	.0669	106.43	9.4
.2	.0943	.82	.0947	75.37	13.3
.3	.115	1.00	.116	61.65	16.2
.5	.148	1.29	.150	47.87	20.9
1	.208	1.81	.214	34.10	29.3
2	.290	2.52	.308	24.49	40.8
3	.350	3.04	.383	20.31	49.2
5	.438	3.81	.510	16.23	61.6
8	.531	4.61	.675	13.43	74.4
10	.577	5.01	.778	12.39	80.7
15	.662	5.75	1.025	10.88	91.9
20	.719	6.25	1.268	10.09	99.1

Through Carrier Frequencies – at 55° F.*

Freq. kHz	Propagation Constant per mile			Phase Delay Sec./Mile ($X 10^{-6}$)	Velocity of Propagation Miles/Sec. ($X 10^3$)
	Attenuation		Phase Shift		
	α nepers	dB	β radians		
.1	.0657	.57	.0657	104.56	9.6
.2	.0927	.81	.0932	74.17	13.5
.5	.146	1.27	.148	47.11	21.2
1	.205	1.78	.211	33.57	29.8
2	.285	2.47	.303	24.10	41.5
5	.430	3.74	.502	16.00	62.5
10	.566	4.91	.769	12.23	81.8
15	.647	5.62	1.014	10.76	92.9
20	.703	6.11	1.256	9.99	100.1
50	.850	7.39	2.735	8.71	114.9
100	1.040	9.04	5.281	8.41	119.0
200	1.375	11.9	10.28	8.18	122.3
250	1.532	13.3	12.72	8.10	123.5
500	2.219	19.3	24.66	7.85	127.4
1000	3.357	29.2	48.15	7.66	130.5
2000	5.105	44.3	94.43	7.51	133.1
4000	7.825	68.0	186.7	7.43	134.6
5000	8.957	77.8	232.6	7.40	135.1
10000	13.60	118.1	460.3	7.33	136.5

Notes: db = 8.686 α
phase delay = $\beta/2\pi f$
velocity of propagation = $2\pi f/\beta$

* For temperature variations see page 3

Estimated Average Temperature Variation*

Freq. kHz	per mile per degree F.			
	dB	Phase Radians	R Ohms	X Ohms
.3	.0013	.00015	.664	-.681
.5	.0016	.00019	.517	-.536
1	.0023	.00027	.357	-.381
2	.0033	.00037	.248	-.279
3	.0041	.00045	.195	-.233
5	.0053	.00057	.146	-.188
10	.0079	.00074	.091	-.138
15	.0098	.00084	.063	-.115
20	.0111	.00091	.044	-.101
50	.0144	.00111	.001	-.061
100	.0152	.00158	-.010	-.035
200	.0155	**	**	**
250	.0159			
500	.0189			
1000	.0295			
2000	.0576			
4000	.130			
5000	.166			
10000	.371			

* Average values between 34° and 76°F.

** At high frequency, inductance has a significant effect on phase shift and impedance; therefore, due to the uncertainty of the effect of temperature variation on inductance, the phase and impedance variations above 100 kHz are not given.