SECONDARY CONSTANTS OF NONLOADED CABLE
19 GAUGE ANB, DNB, GNB

at 68° F. *

Freq. kHz	Characteristic Impedance			
	R Ohms	X Ohms (Neg.)	Z Ohms	Angle Degrees (Neg.)
.1	1022	1012	1438	44.7
.2	725	713	1017	44.5
.3	595	581	831	44.3
.5	464	447	644	43.9
1	335	310	457	42.8
2	246	212	325	40.7
3	209	167	267	38.7
5	174	121	212	34.9
8	152	87	175	29.9
10	145	74	162	27.1
15	135	54	146	21.6
20	131	42	138	17.9

Through Carrier Frequencies – at 55° F.*

Freq. kHz	Characteristic Impedance			
	R Ohms	X Ohms (Neg.)	Z Ohms	Angle Degrees (Neg.)
.1	1010	1000	1421	44.7
.2	717	704	1005	44.5
.5	459	441	637	43.9
1	331	306	451	42.8
2	244	209	321	40.6
5	173	119	210	34.6
10	144	72	161	26.7
15	135	52	145	21.2
20	131	41	137	17.5
50	125	21	127	9.4
100	122	13	123	6.1
200	120	8	120	4.0
250	118	7	119	3.5
500	115	5	115	2.4
1000	112	3	112	1.6
2000	110	2	110	1.0
4000	109	1	109	0.6
5000	109	1	109	0.5
10000	108	1	108	0.3

* For temperature variations see page 3

at 68° F.*

Freq. kHz	Propagation Constant per Mile			Phase Delay Sec./Mile $(\times 10^{-6})$	Velocity of Propagation Miles/Sec. $(\times 10^3)$
	Attenuation		Phase Shift		
	α Nepers	dB	β Radians		
.1	.0422	.37	.0424	67.50	14.8
.2	.0594	.52	.0602	47.90	20.9
.3	.0725	.63	.0740	39.25	25.5
.5	.0929	.81	.0962	30.62	32.7
1	.129	1.12	.139	22.06	45.3
2	.176	1.53	.203	16.18	61.8
3	.208	1.81	.258	13.70	73.0
5	.252	2.19	.358	11.40	87.7
8	.291	2.53	.500	9.96	100.4
10	.308	2.68	.595	9.47	105.6
15	.337	2.93	.834	8.85	113.1
20	.356	3.09	1.077	8.57	116.7

Through Carrier Frequencies — at 55° F.*

Freq. kHz	Propagation Constant per Mile			Phase Delay Sec./Mile $(\times 10^{-6})$	Velocity of Propagation Miles/Sec. $(\times 10^3)$
	Attenuation		Phase Shift		
	α Nepers	dB	β Radians		
.1	.0415	.36	.0417	66.38	15.1
.2	.0584	.51	.0592	47.13	21.2
.5	.0914	.79	.0947	30.14	33.2
1	.127	1.10	.136	21.72	46.1
2	.173	1.50	.200	15.95	62.7
5	.247	2.14	.354	11.27	88.8
10	.301	2.62	.590	9.39	106.4
15	.328	2.85	.829	8.79	113.7
20	.348	3.02	1.071	8.52	117.3
50	.448	3.89	2.553	8.13	123.1
100	.589	5.12	4.988	7.94	126.0
200	.820	7.12	9.743	7.75	129.0
250	.916	7.96	12.04	7.66	130.5
500	1.360	11.81	23.36	7.44	134.5
1000	2.089	18.15	45.68	7.27	137.6
2000	3.228	28.04	89.64	7.13	140.2
4000	5.042	43.80	117.1	7.05	141.9
5000	5.792	50.31	220.9	7.03	142.2
10000	8.937	77.63	438.0	6.97	143.4

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	.0008	.00009	.519	-.545
.5	.0010	.00012	.389	-.432
1	.0015	.00017	.279	-.312
2	.0021	.00023	.179	-.227
3	.0027	.00027	.138	-.190
5	.0034	.00031	.092	-.158
10	.0047	.00036	.042	-.117
15	.0056	.00039	.018	-.096
20	.0058	.00042	.003	-.075
50	.0059	.00063	-.018	-.036
100	.0060	.00128	-.018	-.021
200	.0061	**	**	**
250	.0061			
500	.0083			
1000	.0157			
2000	.0386			
4000	.1022			
5000	.1400			
10000	.3260			

* 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 variations on inductance, the phase and impedance variations above 100 kHz are not given.