SECONDARY CONSTANTS OF NON-LOADED CABLE (AT 68° F.)

24 GAUGE ASM, CSM

Freq. Cyc./Sec.	Propagation Constant — Per Mile			Characteristic Impedance			
	Attenuation		Phase Shift				
	α Nepers	db	β Radians	r Ohms	x Ohms (Neg.)	Z Ohms	Angle Deg. (Neg.)
50	.05571	.4839	.05563	2,465	2,457	3,481	44.9
100	.07873	.6838	.07873	1,744	1,737	2,461	44.9
200	.1112	.9661	.1115	1,234	1,227	1,740	44.8
300	.1361	1.182	.1366	1,009	1,001	1,421	44.8
500	.1753	1.522	.1768	783	773	1,101	44.7
1,000	.2466	2.142	.2513	557	544	778	44.3
2,000	.3455	3.001	.3590	398	381	551	43.7
3,000	.4189	3.639	.4443	329	307	450	43.1
5,000	.5300	4.604	.5856	260	233	349	41.9
8,000	.6511	5.655	.7644	212	179	277	40.1
10,000	.7136	6.198	.8724	194	157	249	38.9
15,000	.8336	7.241	1.125	167	122	206	36.2

Note: $db = \alpha \times 8.686$

SECONDARY CONSTANTS OF NON-LOADED CABLE (AT 55° F.) THROUGH CARRIER FREQUENCIES 24 GAUGE ASM, CSM

Freq. Kc/Sec.	PROPAGATION CONSTANT (PER MILE)					PHASE DELAY Sec./Mi. $\times 10^{-6}$	VELOCITY OF PROPAGATION Mi./Sec. $\times 10^{3}$
	Attenuation		Phase Shift	Variation* per Degree F.			
	α Nepers	db	β Radians	db	Radians		
0.1	.078	0.7	.078			123.59	8.1
0.2	.110	1.0	.110			87.43	11.4
0.5	.173	1.5	.174			55.45	18.0
1	.243	2.1	.248	.0027	.00032	39.39	25.4
2	.340	3.0	.353	.0039	.00044	28.12	35.6
5	.520	4.5	.577	.0062	.00069	18.35	54.5
10	.699	6.1	.860	.0092	.00092	13.68	73.1
15	.816	7.1	1.11	.0114	.00107	11.76	85.0
20	.899	7.8	1.35	.0133	.00117	10.71	93.3
50	1.12	9.7	2.75	.0173	.00144	8.75	114.3
100	1.34	11.6	5.18	.0210	.00185	8.25	121.2
200	1.73	15.0	10.0	.0227	**	7.99	125.2
250	1.88	16.3	12.4	.0235		7.90	126.7
500	2.68	23.3	24.0	.0259		7.64	131.0
1,000	3.92	34.0	46.6	.0349		7.41	134.9
2,000	5.77	50.1	91.0	.0649		7.24	138.2
4,000	8.54	74.2	178.8	.1403		7.11	140.6
5,000	9.65	83.8	222.7	.1782		7.09	141.1
10,000	14.52	126.1	439.8	.3840		7.00	142.9

Freq. Kc/Sec.	CHARACTERISTIC IMPEDANCE					
	r Ohms	x Ohms (Neg.)	Z Ohms	Angle Degrees (Neg.)	Variation* per Degree F.	
					r Ohms	x Ohms
0.1	1,713	1,705	2,417	44.9		
0.2	1,213	1,206	1,710	44.8		
0.5	770	761	1,083	44.7		
1	548	535	766	44.3	+.481	−.518
2	392	374	542	43.7	+.343	−.490
5	257	229	344	41.7	+.204	−.248
10	192	154	246	38.7	+.133	−.180
15	165	120	204	36.0	+.097	−.151
20	151	99	181	33.3	+.074	−.135
50	123	49	132	21.7	+.014	−.087
100	117	29	121	13.9	−.007	−.052
200	113	18	114	9.1	**	**
250	112	15	113	7.6		
500	108	10	108	5.3		
1,000	105	5	105	2.7		
2,000	102	3	102	1.7		
4,000	101	2	101	1.1		
5,000	100	1	100	0.6		
10,000	99		99			

* Average values between 34° and 76° F.

** Due to the importance of the effect of variation of inductance on phase change and impedance at high frequency, and the uncertainty of the variation of inductance with temperature, the phase and impedance variations above 100 kc are not given.