FORM 540
October, 1962

BASIC TRANSMISSION DATA

VOICE FREQUENCY ATTENUATION AND IMPEDANCE CHARACTERISTICS OF LOADED AND NON-LOADED TELEPHONE CABLE

Compiled By

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INDEX

GENERAL

This information is intended as an engineering aid and for use in transmission maintenance of outside plant.

All figures are rounded off to practical values.

D.C. resistances shown for loaded cable include nominal values for CEECO C632 (88MH) and C656 (66MH) loading coils.

The loading systems included in the following tables are those most commonly used. Each loading system is designated by a letter indicating coil spacing and by two digits indicating coil inductance. H, D and B spacings are 6000, 4500 and 3000 feet respectively. Systems included herein are:

H88	88MH	coils	spaced	every	6000	feet
D66	66MH	"	"	"	4500	"
B88	88MH	"	"	"	3000	"
H44	44MH	"	"	"	6000	"
D88	88MH	"	"	"	4500	"

The advantage of loading is readily apparent by comparing non-loaded and loaded cable attenuation, particularly through a 300 to 3000 c/s band. For example, compare 19 gauge (.083 MF/mile) non-loaded cable and 24 gauge (.083 MF/mile) cable loaded H88.

	Attenuation (DB/Mile)		
	300 c/s	1000 c/s	3000 c/s
19 Gauge - NL	.71	1.27	2.08
24 Gauge - H88	.99	1.22	1.37

Loading is a time proven method of reducing outside plant costs and at the same time providing higher quality transmission. A brief discussion of loading principles appears in the CEECO catalog Form 318.

CONVERSION TABLES

Much of the telephone engineering outside the United States utilizes the metric and other reference systems. These conversion tables are provided for use of this cable data in these cases.

CABLE CONDUCTOR CONVERSION

GAUGE	CONDUCTOR DIAMETER (mm)	CONDUCTOR POUNDS/MILE
16	1.3	40
19	0.91	20
22	0.64	10
24	0.51	6.5
26	0.40	4

LENGTH CONVERSION

1 Mile = 1.61 KM
1 KM = 0.62 Miles

1000' = 0.305 KM
1 KM = 3273 Feet

Standard Load Coil Spacing:

H = 6000 FEET = 1.135 MILES = 1.828 KM
B = 3000 FEET = 0.568 MILES = 0.914 KM
D = 4500 FEET = 0.852 MILES = 1.371 KM

LOSS CONVERSION

1 DB = 0.115 Nepers
1 Neper = 8.686 DB

TABLE 1

16 GAUGE CABLE - CAPACITANCE .066 MF/MILE

NON-LOADED

D.C. LOOP RESISTANCE - 42 OHMS/MILE

AT 68°F

Frequency c/s	Attenuation DB/Mile	Attenuation DB/1000'	Characteristic Impedance Z(Ohms)	Characteristic Impedance Angle (Degrees Negative)
50	.18	.034	1,420	45
100	.26	.049	1,010	45
200	.36	.068	710	44
300	.44	.084	580	44
500	.55	.104	450	43
1,000	.75	.142	320	41
2,000	1.00	.190	230	37
3,000	1.15	.219	190	33
5,000	1.33	.252	160	27
8,000	1.47	.278	140	21
10,000	1.55	.294	140	18
15,000	1.68	.318	130	14

TABLE 2

19 GAUGE CABLE - CAPACITANCE .066 MF/MILE

NON-LOADED

D.C. LOOP RESISTANCE - 85 OHMS/MILE

AT 68°F

Frequency c/s	Attenuation		Characteristic Impedance	
	DB/Mile	DB/1000'	Z(Ohms)	Angle (Degrees Negative)
50	.26	.049	2,030	45
100	.36	.068	1,430	45
200	.51	.097	1,010	45
300	.63	.119	830	44
500	.80	.152	640	44
1,000	1.11	.210	450	43
2,000	1.52	.288	320	41
3,000	1.80	.341	270	39
5,000	2.18	.414	210	35
8,000	2.52	.477	170	30
10,000	2.67	.505	160	27
15,000	2.92	.554	140	22

TABLE 3

19 GAUGE CABLE - CAPACITANCE .084 MF/MILE

NON-LOADED

D.C. LOOP RESISTANCE - 85 OHMS/MILE

AT 68°F

Frequency c/s	Attenuation		Characteristic Impedance	
	DB/Mile	DB/1000'	Z(Ohms)	Angle (Degrees Negative)
50	.29	.055	1,800	45
100	.41	.077	1,270	45
200	.58	.110	900	45
300	.71	.134	730	45
500	.91	.172	570	44
1,000	1.27	.241	400	43
2,000	1.74	.330	290	42
3,000	2.08	.394	230	40
5,000	2.55	.483	180	37
8,000	3.00	.570	150	33
10,000	3.21	.610	140	30
15,000	3.57	.677	120	25

TABLE 4

22 GAUGE CABLE - CAPACITANCE .082 MF/MILE

NON-LOADED

D.C. LOOP RESISTANCE - 171 OHMS/MILE

AT 68°F

Frequency c/s	Attenuation DB/Mile	Attenuation DB/1000'	Characteristic Impedance Z(Ohms)	Characteristic Impedance Angle (Degrees Negative)
50	.41	.077	2,580	45
100	.58	.110	1,820	45
200	.81	.153	1,290	45
300	1.00	.190	1,050	45
500	1.28	.242	820	45
1,000	1.80	.341	580	44
2,000	2.51	.478	410	43
3,000	3.03	.580	330	42
5,000	3.81	.722	260	41
8,000	4.63	.875	210	38
10,000	5.04	.955	190	37
15,000	5.79	1.10	160	33

TABLE 5

24 GAUGE CABLE - CAPACITANCE .084 MF/MILE

NON-LOADED

D.C. LOOP RESISTANCE - 274 OHMS/MILE

AT 68°F

Frequency c/s	Attenuation DB/Mile	Attenuation DB/1000'	Characteristic Impedance Z(Ohms)	Characteristic Impedance Angle (Degrees Negative)
50	.52	.098	3,220	45
100	.74	.140	2,280	45
200	1.04	.197	1,610	45
300	1.28	.242	1,320	45
500	1.65	.312	1,020	45
1,000	2.32	.444	720	44
2,000	3.25	.615	510	44
3,000	3.95	.750	420	43
5,000	5.01	.950	320	42
8,000	6.18	1.17	260	41
10,000	6.79	1.28	230	40
15,000	7.99	1.51	190	37

TABLE 6

26 GAUGE CABLE - CAPACITANCE .079 MF/MILE

NON-LOADED

D.C. LOOP RESISTANCE - 440 OHMS/MILE

AT 68°F

Frequency c/s	Attenuation DB/Mile	Attenuation DB/1000'	Characteristic Impedance Z(Ohms)	Characteristic Impedance Angle (Degrees Negative)
50	.64	.121	4,210	45
100	.91	.172	2,980	45
200	1.28	.242	2,110	45
300	1.57	.298	1,720	45
500	2.03	.390	1,330	45
1,000	2.86	.542	940	45
2,000	4.02	.762	670	44
3,000	4.89	.925	540	44
5,000	6.25	1.18	420	43
8,000	7.77	1.47	330	42
10,000	8.58	1.63	300	41
15,000	10.21	1.94	250	40

TABLE 7

19 GAUGE CABLE - CAPACITANCE .066 MF/MILE

H88 LOADING

D.C. LOOP RESISTANCE - 91 OHMS/MILE

AT 68°F

Frequency c/s	Attenuation DB/Mile	Attenuation DB/1000'	Mid-Section Characteristic Impedance Z(Ohms)	Mid-Section Characteristic Impedance Angle (Degrees Negative)
50	.24	.046	2,150	38
100	.30	.057	1,590	31
200	.34	.064	1,280	22
400	.36	.068	1,150	12
600	.37	.070	1,130	9
800	.37	.070	1,130	7
1,000	.38	.072	1,140	5
1,200	.38	.072	1,150	4
1,400	.38	.072	1,170	4
1,600	.38	.072	1,200	3
1,800	.38	.072	1,230	3
2,000	.38	.072	1,270	3
2,200	.39	.074	1,320	3
2,400	.39	.074	1,380	2
2,600	.40	.076	1,460	2
2,800	.41	.078	1,560	2
3,000	.42	.080	1,690	2
3,500	.54	.102	2,430	4
3,800	.88	.167	4,340	13

TABLE 8

19 GAUGE CABLE - CAPACITANCE .084 MF/MILE

H88 LOADING

D.C. LOOP RESISTANCE - 91 OHMS/MILE

AT 68°F

Frequency c/s	Attenuation DB/Mile	Attenuation DB/1000'	Mid-Section Characteristic Impedance Z(Ohms)	Mid-Section Characteristic Impedance Angle (Degrees Negative)
50	.27	.051	1,900	38
100	.33	.062	1,410	31
200	.38	.072	1,130	22
400	.40	.076	1,020	12
600	.41	.078	1,000	9
800	.42	.080	1,010	7
1,000	.42	.080	1,020	5
1,200	.43	.081	1,040	4
1,400	.43	.081	1,060	4
1,600	.43	.081	1,090	3
1,800	.43	.081	1,130	3
2,000	.43	.081	1,180	3
2,200	.44	.084	1,250	3
2,400	.45	.085	1,340	3
2,600	.46	.087	1,460	3
2,800	.49	.093	1,630	3
3,000	.54	.102	1,920	4
3,400	1.07	.203	4,530	19

TABLE 9

22 GAUGE CABLE - CAPACITANCE .082 MF/MILE

H88 LOADING

D. C. LOOP RESISTANCE - 177 OHMS/MILE

AT 68°F

Frequency c/s	Attenuation DB/Mile	Attenuation DB/1000'	Mid-Section Characteristic Impedance Z(Ohms)	Mid-Section Characteristic Impedance Angle (Degrees Negative)
50	.39	.074	2,650	41
100	.52	.098	1,900	37
200	.64	.121	1,410	31
400	.73	.138	1,140	21
600	.76	.144	1,070	15
800	.78	.148	1,050	12
1,000	.79	.150	1,050	10
1,200	.79	.150	1,060	8
1,400	.79	.150	1,080	7
1,600	.79	.150	1,110	6
1,800	.79	.150	1,150	6
2,000	.79	.150	1,200	5
2,200	.79	.150	1,260	5
2,400	.80	.152	1,340	5
2,600	.82	.155	1,460	5
2,800	.85	.161	1,620	5
3,000	.89	.169	1,880	6
3,400	1.38	.261	3,550	18

TABLE 10

24 GAUGE CABLE - CAPACITANCE .084 MF/MILE

H88 LOADING

D.C. LOOP RESISTANCE - 280 OHMS/MILE

AT 68°F

Frequency c/s	Attenuation DB/Mile	Attenuation DB/1000'	Mid-Section Characteristic Impedance Z(Ohms)	Mid-Section Characteristic Impedance Angle (Degrees Negative)
50	.51	.097	3,270	42
100	.69	.131	2,330	40
200	.89	.169	1,680	35
400	1.08	.204	1,280	27
600	1.16	.220	1,150	22
800	1.20	.228	1,100	18
1,000	1.22	.231	1,080	15
1,200	1.23	.233	1,080	12
1,400	1.23	.233	1,090	11
1,600	1.24	.235	1,120	9
1,800	1.24	.235	1,150	8
2,000	1.24	.235	1,200	8
2,200	1.24	.235	1,270	7
2,400	1.25	.237	1,350	7
2,600	1.27	.240	1,470	7
2,800	1.30	.246	1,640	8
3,000	1.37	.260	1,920	9
3,400	2.28	.432	3,550	31

TABLE 11

26 GAUGE CABLE - CAPACITANCE .079 MF/MILE

H88 LOADING

D.C. LOOP RESISTANCE - 446 OHMS/MILE

AT 68°F

Frequency c/s	Attenuation DB/Mile	Attenuation DB/1000'	Mid-Section Characteristic Impedance Z(Ohms)	Mid-Section Characteristic Impedance Angle (Degrees Negative)
50	.63	.119	4,250	43
100	.87	.165	3,010	42
200	1.17	.222	2,150	39
400	1.48	.280	1,580	33
600	1.65	.312	1,360	28
800	1.74	.330	1,250	24
1,000	1.80	.341	1,200	21
1,200	1.83	.347	1,180	18
1,400	1.85	.350	1,170	16
1,600	1.86	.352	1,190	14
1,800	1.86	.352	1,210	13
2,000	1.87	.354	1,250	12
2,200	1.87	.354	1,300	11
2,400	1.87	.354	1,380	11
2,600	1.89	.358	1,480	10
2,800	1.91	.362	1,610	11
3,000	1.98	.375	1,820	12
3,500	3.00	.570	3,160	35

TABLE 12

19 GAUGE CABLE - CAPACITANCE .083 MF/MILE

D66 LOADED

D.C. LOOP RESISTANCE - 93 OHMS/MILE

AT 68°F

Frequency c/s	Attenuation DB/Mile	Attenuation DB/1000'	Mid-Section Characteristic Impedance Z(Ohms)	Mid-Section Characteristic Impedance Angle (Degrees Negative)
200	.37	.070	1,120	22
300	.40	.076	1,060	16
500	.41	.078	1,010	10
1,000	.42	.080	1,000	5
1,500	.43	.081	1,010	4
2,000	.43	.081	1,080	3
2,500	.44	.084	1,150	2
2,800	.45	.085	1,220	2
3,000	.46	.087	1,270	2
3,200	.47	.089	1,340	2
3,400	.49	.093	1,430	2
3,600	.51	.097	1,530	2
3,800	.55	.104	1,680	2
4,000	.60	.113	1,900	3

Above data provided by REA Transmission Engineer - Washington, D.C.

TABLE 13

22 GAUGE CABLE - CAPACITANCE .083 MF/MILE

D66 LOADED

D.C. LOOP RESISTANCE - 179 OHMS/MILE

AT 68°F

Frequency c/s	Attenuation DB/Mile	Attenuation DB/1000'	Mid-Section Characteristic Impedance Z(Ohms)	Mid-Section Characteristic Impedance Angle (Degrees Negative)
200	.67	.127	1,370	31
300	.71	.134	1,230	25
500	.76	.144	1,090	18
1,000	.80	.152	1,030	10
1,500	.81	.153	1,040	7
2,000	.82	.155	1,090	5
2,500	.84	.159	1,150	4
2,800	.85	.161	1,220	4
3,000	.87	.165	1,270	3
3,200	.89	.169	1,340	3
3,400	.91	.172	1,430	3
3,600	.95	.180	1,530	4
3,800	1.00	.190	1,680	4
4,000	1.80	.341	1,900	5

Above data provided by REA Transmission Engineer - Washington, D.C.

TABLE 14

24 GAUGE CABLE - CAPACITANCE .083 MF/MILE

D66 LOADED

D.C. LOOP RESISTANCE - 282 OHMS/MILE

AT 68°F

Frequency c/s	Attenuation DB/Mile	Attenuation DB/1000'	Mid-Section Characteristic Impedance Z(Ohms)	Mid-Section Characteristic Impedance Angle (Degrees Negative)
100	.68	.129	2,340	40
300	1.00	.190	1,430	31
500	1.12	.212	1,200	24
1,000	1.22	.231	1,070	15
1,500	1.25	.237	1,060	10
2,000	1.27	.240	1,100	8
2,500	1.29	.244	1,160	6
2,800	1.31	.248	1,230	6
3,000	1.33	.252	1,280	5
3,200	1.36	.258	1,340	5
3,400	1.39	.264	1,430	5
3,600	1.44	.273	1,540	6
3,800	1.52	.288	1,680	6
4,000	1.63	.310	1,890	7

Above data provided by REA Transmission Engineer - Washington, D.C.

TABLE 15

19 GAUGE CABLE - CAPACITANCE .066 MF/MILE

B88 LOADING

D.C. LOOP RESISTANCE - 97 OHMS/MILE

AT 68°F

Frequency c/s	Attenuation DB/Mile	Attenuation DB/1000'	Mid-Section Characteristic Impedance Z(Ohms)	Mid-Section Characteristic Impedance Angle (Degrees Negative)
50	.22	.042	2,320	32
100	.26	.049	1,840	23
200	.28	.053	1,630	14
400	.29	.055	1,570	7
600	.29	.055	1,560	5
800	.29	.055	1,560	4
1,000	.30	.057	1,570	3
1,200	.30	.057	1,580	2
1,400	.30	.057	1,590	2
1,600	.31	.059	1,610	2
1,800	.31	.059	1,630	2
2,000	.31	.059	1,650	1
2,200	.32	.060	1,680	1
2,400	.32	.060	1,710	1
2,600	.32	.060	1,740	1
2,800	.33	.062	1,780	1
3,000	.34	.064	1,830	1
3,500	.37	.070	1,980	1
4,000	.41	.078	2,230	1
4,500	.49	.093	2,630	2
5,000	.64	.121	3,580	3
5,500	2.05	.390	11,100	29

TABLE 16

19 GAUGE CABLE - CAPACITANCE .084 MF/MILE

B88 LOADING

D.C. LOOP RESISTANCE - 85 OHMS/MILE

AT 68°F

Frequency c/s.	Attenuation DB/Mile	Attenuation DB/1000'	Mid-Section Characteristic Impedance Z(Ohms)	Mid-Section Characteristic Impedance Angle (Degrees Negative)
50	.25	.047	2,050	32
100	.29	.055	1,630	23
200	.31	.059	1,450	14
400	.32	.060	1,390	7
600	.33	.062	1,390	5
800	.33	.062	1,390	4
1,000	.34	.064	1,400	3
1,200	.34	.064	1,410	2
1,400	.34	.064	1,420	2
1,600	.34	.064	1,440	2
1,800	.34	.064	1,470	2
2,000	.35	.066	1,490	1
2,200	.35	.066	1,520	1
2,400	.36	.068	1,560	1
2,600	.37	.070	1,610	1
2,800	.38	.072	1,660	1
3,000	.40	.076	1,720	1
3,500	.43	.081	1,940	1
4,000	.48	.091	2,360	1
4,500	.72	.136	3,410	3
4,800	1.15	.219	6,280	10

TABLE 17

22 GAUGE CABLE - CAPACITANCE .082 MF/MILE

B88 LOADING

D.C. LOOP RESISTANCE - 183 OHMS/MILE

AT 68°F

Frequency c/s	Attenuation DB/Mile	Attenuation DB/1000'	Mid-Section Characteristic Impedance Z(Ohms)	Mid-Section Characteristic Impedance Angle (Degrees Negative)
50	.38	.072	2,730	38
100	.47	.089	2,020	31
200	.53	.100	1,620	22
400	.57	.108	1,460	13
600	.58	.110	1,420	9
800	.59	.112	1,420	7
1,000	.60	.113	1,420	5
1,200	.60	.113	1,430	4
1,400	.61	.115	1,440	4
1,600	.61	.115	1,460	3
1,800	.61	.115	1,480	3
2,000	.61	.115	1,510	3
2,200	.61	.115	1,540	2
2,400	.61	.115	1,580	2
2,600	.61	.115	1,620	2
2,800	.61	.115	1,670	2
3,000	.62	.117	1,730	2
3,500	.64	.121	1,950	2
4,000	.73	.138	2,330	2
4,500	.87	.165	3,240	4
4,900	2.09	.396	7,260	21

TABLE 18

24 GAUGE CABLE - CAPACITANCE .084 MF/MILE

B88 LOADING

D.C. LOOP RESISTANCE - 286 OHMS/MILE

AT 68°F

Frequency c/s	Attenuation DB/Mile	Attenuation DB/1000'	Mid-Section Characteristic Impedance Z(Ohms)	Mid-Section Characteristic Impedance Angle (Degrees Negative)
50	.50	.095	3,330	40
100	.65	.123	2,410	36
200	.79	.150	1,820	28
400	.88	.167	1,520	18
600	.91	.172	1,450	13
800	.93	.176	1,420	10
1,000	.94	.178	1,420	8
1,200	.94	.178	1,430	7
1,400	.94	.178	1,440	6
1,600	.94	.178	1,450	5
1,800	.95	.180	1,470	5
2,000	.95	.180	1,500	4
2,200	.95	.180	1,530	4
2,400	.95	.180	1,570	3
2,600	.95	.180	1,610	3
2,800	.95	.180	1,660	3
3,000	.96	.182	1,730	3
3,500	.99	.188	1,940	3
4,000	1.06	.201	2,350	3
4,500	1.25	.237	3,390	5
4,800	2.15	.407	5,960	17

TABLE 19

19 GAUGE CABLE - CAPACITANCE .066 MF/MILE

H44 LOADING

D.C. LOOP RESISTANCE - 91 OHMS/MILE

AT 68°F

Frequency c/s	Attenuation DB/Mile	Attenuation DB/1000'	Mid-Section Characteristic Impedance Z(Ohms)	Mid-Section Characteristic Impedance Angle (Degrees Negative)
50	.25	.047	2,080	41
100	.33	.062	1,490	37
200	.41	.078	1,110	30
400	.46	.087	900	21
600	.48	.091	840	15
800	.49	.093	820	12
1,000	.50	.095	810	10
1,200	.50	.095	810	8
1,400	.50	.095	810	7
1,600	.50	.095	820	6
1,800	.51	.097	830	6
2,000	.51	.097	840	5
2,200	.51	.097	850	5
2,400	.51	.097	870	4
2,600	.51	.097	880	4
2,800	.51	.097	900	4
3,000	.52	.098	930	3
3,500	.53	.100	1,000	3
4,000	.54	.102	1,130	3
4,500	.58	.110	1,340	3
5,000	.70	.133	1,810	6
5,400	1.21	.230	3,390	20

TABLE 20

19 GAUGE CABLE - CAPACITANCE .084 MF/MILE

H44 LOADING

D.C. LOOP RESISTANCE - 91 OHMS/MILE

AT 68°F

Frequency c/s	Attenuation DB/Mile	Attenuation DB/1000'	Mid-Section Characteristic Impedance Z(Ohms)	Mid-Section Characteristic Impedance Angle (Degrees Negative)
50	.28	.053	1,850	41
100	.37	.070	1,320	37
200	.46	.087	980	30
400	.52	.098	800	21
600	.54	.102	750	15
800	.55	.104	730	12
1,000	.56	.106	720	10
1,200	.56	.106	720	8
1,400	.57	.108	730	7
1,600	.57	.108	740	6
1,800	.57	.108	750	6
2,000	.57	.108	760	5
2,200	.58	.110	770	5
2,400	.58	.110	790	4
2,600	.58	.110	800	4
2,800	.58	.110	840	4
3,000	.59	.112	870	3
3,500	.60	.113	980	3
4,000	.63	.119	1,200	4
4,500	.84	.159	1,740	7
4,800	1.44	.273	2,960	23

TABLE 21

22 GAUGE CABLE - CAPACITANCE .082 MF/MILE

H44 LOADING

D.C. LOOP RESISTANCE - 177 OHMS/MILE

AT 68°F

Frequency c/s	Attenuation DB/Mile	Attenuation DB/1000'	Mid-Section Characteristic Impedance Z(Ohms)	Mid-Section Characteristic Impedance Angle (Degrees Negative)
50	.40	.076	2,610	43
100	.55	.104	1,850	41
200	.72	.136	1,330	37
400	.89	.169	990	30
600	.97	.184	870	25
800	1.02	.193	810	20
1,000	1.04	.197	780	17
1,200	1.05	.199	770	15
1,400	1.06	.201	770	13
1,600	1.07	.203	770	12
1,800	1.07	.203	770	10
2,000	1.07	.203	780	9
2,200	1.07	.203	790	9
2,400	1.07	.203	810	8
2,600	1.07	.203	830	7
2,800	1.07	.203	850	7
3,000	1.07	.203	880	6
3,500	1.09	.206	990	6
4,000	1.15	.219	1,180	7
4,500	1.29	.244	1,630	10
4,900	2.33	.441	2,800	36

TABLE 22

24 GAUGE CABLE - CAPACITANCE .084 MF/MILE

H44 LOADING

D.C. LOOP RESISTANCE - 280 OHMS/MILE

AT 68°F

Frequency c/s	Attenuation DB/Mile	Attenuation DB/1000'	Mid-Section Characteristic Impedance Z(Ohms)	Mid-Section Characteristic Impedance Angle (Degrees Negative)
50	.48	.091	3,510	44
100	.66	.125	2,480	42
200	.89	.169	1,770	40
400	1.16	.220	1,280	35
600	1.31	.248	1,080	31
800	1.40	.265	980	27
1,000	1.46	.276	920	24
1,200	1.50	.284	890	22
1,400	1.52	.288	870	19
1,600	1.54	.292	860	17
1,800	1.55	.294	850	16
2,000	1.56	.296	850	14
2,200	1.56	.296	860	13
2,400	1.57	.298	870	12
2,600	1.57	.298	880	11
2,800	1.58	.300	900	11
3,000	1.58	.300	920	10
3,500	1.59	.301	1,010	9
4,000	1.62	.307	1,140	9
4,500	1.72	.326	1,400	11
5,000	2.15	.407	2,060	21
5,200	2.81	.532	2,530	36

TABLE 23

19 GAUGE CABLE - CAPACITANCE .066 MF/MILE

D88 LOADING

D.C. LOOP RESISTANCE - 93 OHMS/MILE

AT 68°F

Frequency c/s	Attenuation DB/Mile	Attenuation DB/1000'	Mid-Section Characteristic Impedance Z(Ohms)	Mid-Section Characteristic Impedance Angle (Degrees Negative)
50	.23	.044	2,200	35
100	.28	.053	1,670	28
200	.31	.059	1,400	18
400	.33	.062	1,300	10
600	.33	.062	1,290	7
800	.34	.064	1,290	5
1,000	.34	.064	1,300	4
1,200	.34	.064	1,300	3
1,400	.34	.064	1,330	3
1,600	.35	.066	1,350	3
1,800	.35	.066	1,370	2
2,000	.35	.066	1,400	2
2,200	.35	.066	1,440	2
2,400	.36	.068	1,480	2
2,600	.36	.068	1,540	2
2,800	.37	.070	1,600	2
3,000	.38	.072	1,680	2
3,500	.42	.080	1,980	2
4,000	.53	.100	2,690	3
4,500	1.72	.323	7,880	32

TABLE 24

19 GAUGE CABLE - CAPACITANCE .084 MF/MILE

D88 LOADING

D.C. LOOP RESISTANCE - 93 OHMS/MILE

AT 68°F

Frequency c/s	Attenuation DB/Mile	Attenuation DB/1000'	Mid-Section Characteristic Impedance Z(Ohms)	Mid-Section Characteristic Impedance Angle (Degrees Negative)
50	.26	.049	1,950	35
100	.32	.060	1,480	28
200	.35	.066	1,240	18
400	.37	.070	1,160	10
600	.38	.072	1,140	7
800	.38	.072	1,150	5
1,000	.38	.072	1,160	4
1,200	.38	.072	1,170	3
1,400	.39	.074	1,190	3
1,600	.39	.074	1,220	3
1,800	.39	.074	1,250	2
2,000	.40	.076	1,290	2
2,200	.41	.078	1,330	2
2,400	.42	.080	1,390	2
2,600	.43	.081	1,460	2
2,800	.44	.084	1,560	2
3,000	.46	.087	1,680	2
3,500	.56	.106	2,290	3
3,900	1.04	.197	4,870	12

TABLE 25

22 GAUGE CABLE - CAPACITANCE .082 MF/MILE

D88 LOADING

D.C. LOOP RESISTANCE - 179 OHMS/MILE

AT 68°F

Frequency c/s	Attenuation DB/Mile	Attenuation DB/1000'	Mid-Section Characteristic Impedance Z(Ohms)	Mid-Section Characteristic Impedance Angle (Degrees Negative)
50	.39	.074	2,670	40
100	.50	.095	1,930	35
200	.60	.113	1,470	27
400	.67	.127	1,250	17
600	.69	.131	1,200	12
800	.70	.133	1,180	9
1,000	.70	.133	1,180	8
1,200	.70	.133	1,190	6
1,400	.71	.134	1,210	5
1,600	.71	.134	1,240	5
1,800	.71	.134	1,260	4
2,000	.71	.134	1,300	4
2,200	.71	.134	1,350	4
2,400	.72	.136	1,400	3
2,600	.72	.136	1,470	3
2,800	.73	.138	1,560	3
3,000	.74	.140	1,680	3
3,500	.81	.153	2,220	4
4,000	1.83	.347	5,520	25

TABLE 26

24 GAUGE CABLE - CAPACITANCE .084 MF/MILE

D88 LOADING

D.C. LOOP RESISTANCE - 282 OHMS/MILE

AT 68°F

Frequency c/s	Attenuation DB/Mile	Attenuation DB/1000'	Mid-Section Characteristic Impedance Z(Ohms)	Mid-Section Characteristic Impedance Angle (Degrees Negative)
50	.50	.095	3,290	42
100	.67	.127	2,350	38
200	.85	.161	1,720	33
400	1.00	.190	1,360	24
600	1.05	.199	1,250	18
800	1.08	.204	1,210	14
1,000	1.09	.206	1,200	12
1,200	1.10	.208	1,200	10
1,400	1.10	.208	1,210	8
1,600	1.10	.208	1,240	7
1,800	1.10	.208	1,260	7
2,000	1.10	.208	1,300	6
2,200	1.10	.208	1,340	5
2,400	1.11	.210	1,400	5
2,600	1.11	.210	1,470	5
2,800	1.12	.212	1,560	5
3,000	1.14	.216	1,690	5
3,500	1.29	.244	2,280	7
3,900	2.01	.381	4,300	21

Cable Capacity Figures to be used in Building out End Sections or Load Sections for Return loss Measurements.

	Cap.Per Mile	Cap.Per Ft.	Cap Per M Ft.	Cap.Per 3000'- 6000'	Cap.Per 2800- 5600	Cap.Per 2250- 4500	Cap.Per 2200- 4400	Cap.Per 2225'- 4450'	Loop Res. 68° F	Singl Wire Res. 68° F
19Ga. Quad Cable-Toll	.062	.00001174	.01174	.035-.07					85 ohms	42.5 o
19Ga. L.C. Cable-Toll & Local	.066	.0000125	.1250		.035-.07				85 ohms	42.5
19Ga. H.C. Cable-Local	.084	.0000159	.1590				.035-.07		85 ohms	42.5
22Ga. H.C. Cable-Local	.082	.00001553	.1553			.035-.07			171 ohms	85.5
24Ga. H.C. Cable-Local	.084	.0000159	.1590				.035-.07		274 ohms	137
26Ga. H.C. Cable-Local	.083	.00001572	.1572					.035-.07	440 "	220

*Some 24 Gauge we purchased was .079 capacity but we are now using .084.