

OPEN-WIRE IMPEDANCE, ATTENUATION, PHASE
080, 104, 128, 165-Mil Copper-Steel (40%)-8" Spacing - S and P

080-Mil Side

Freq.	Impedance				Attenuation		Phase Shift	
	R	X	Z	Angle	α	db/mi	β	B
200	1485	1334	1996	41.9	.0147	.128	.0164	.0052
300	1230	1068	1629	40.9	.0177	.153	.0205	.0065
500	1016	780	1281	37.5	.0215	.187	.0280	.0089
1000	812	488	947	31.0	.0270	.235	.0448	.0143
1500	740	358	822	25.8	.0297	.258	.0596	.0190
2000	702	284	757	22.0	.0314	.272	.0775	.0247
2500	681	235	721	19.0	.0326	.282	.0944	.0300
3000	669	200	698	16.6	.0333	.289	.1100	.0350

104-Mil Side

Freq.	Impedance				Attenuation		Phase Shift	
	R	X	Z	Angle	α	db/mi	β	B
200	1139	958	1489	40.1	.0110	.0955	.0134	.0043
300	945	710	1181	36.9	.0130	.1130	.0172	.0055
500	821	538	981	33.2	.0154	.1340	.0238	.0076
1000	691	324	763	25.1	.0187	.1620	.0402	.0128
1500	652	232	692	19.6	.0200	.1740	.0566	.0180
2000	636	180	661	15.8	.0207	.1800	.0732	.0233
2500	626	148	643	13.3	.0213	.1850	.0900	.0287
3000	621	124	633	11.3	.0216	.1880	.1070	.0341

104-Mil Phantom

Freq.	Impedance				Attenuation		Phase Shift	
	R	X	Z	Angle	α	db/mi	β	B
200	706	555	898	38.2	.0089	.0770	.0110	.0035
300	610	415	738	34.2	.0104	.0900	.0145	.0046
500	528	299	607	29.5	.0120	.1040	.0210	.0067
1000	467	172	498	20.2	.0138	.1200	.0370	.0118
1500	450	121	466	15.1	.0145	.1260	.0540	.0172
2000	443	93	453	11.9	.0149	.1290	.0710	.0226
2500	439	75	445	9.7	.0151	.1310	.0870	.0277
3000	437	63	442	8.2	.0153	.1330	.1040	.0331

128-Mil Side

Freq.	Impedance				Attenuation		Phase Shift	
	R	X	Z	Angle	α	db/mi	β	B
200	943	736	1197	38.0	.0088	.0765	.0115	.0037
300	820	575	1001	35.0	.0102	.0890	.0148	.0047
500	714	397	817	29.1	.0119	.1030	.0215	.0068
1000	635	230	676	19.9	.0138	.1200	.0379	.0121
1500	611	162	632	14.9	.0146	.1270	.0552	.0176
2000	601	124	613	11.6	.0150	.1300	.0714	.0227
2500	596	102	604	9.7	.0152	.1320	.0884	.0282
3000	593	86	599	8.2	.0154	.1340	.1060	.0338

128-Mil Phantom

Freq.	Impedance				Attenuation		Phase Shift	
	R	X	Z	Angle	α	db/mi	β	B
200	598	423	733	35.3	.0069	.0600	.0100	.0032
300	535	315	621	30.5	.0078	.0680	.0130	.0041
500	474	216	521	24.5	.0089	.0770	.0190	.0061
1000	438	120	454	15.3	.0099	.0860	.0360	.0115
1500	428	83	436	11.0	.0104	.0900	.0530	.0169
2000	424	63	429	8.5	.0105	.0910	.0700	.0223
2500	422	51	425	6.9	.0106	.0920	.0870	.0277
3000	421	43	423	5.8	.0107	.0930	.1040	.0331

165-Mil Side

Freq.	Impedance				Attenuation		Phase Shift	
	R	X	Z	Angle	α	db/mi	β	B
200	761	516	919	34.1	.0065	.0566	.0098	.0031
300	683	373	778	28.6	.0073	.0630	.0125	.0040
500	618	258	670	22.7	.0082	.0708	.0195	.0062
1000	572	143	590	14.0	.0090	.0784	.0361	.0115
1500	566	99	575	9.9	.0094	.0815	.0532	.0169
2000	562	75	567	7.6	.0096	.0830	.0703	.0224
2500	559	61	562	6.2	.0097	.0842	.0874	.0278
3000	558	51	560	5.2	.0098	.0852	.1050	.0334

165-Mil Phantom

Freq.	Impedance				Attenuation		Phase Shift	
	R	X	Z	Angle	α	db/mi	β	B
200	501	290	579	30.1	.0050	.0430	.0090	.0029
300	460	211	506	24.6	.0054	.0465	.0120	.0038
500	429	137	450	17.7	.0059	.0510	.0180	.0057
1000	411	73	417	10.1	.0063	.0550	.0350	.0111
1500	407	50	410	7.0	.0064	.0560	.0520	.0166
2000	406	38	408	5.4	.0066	.0570	.0690	.0220
2500	405	31	406	4.4	.0067	.0580	.0860	.0274
3000	404	26	405	3.7	.0068	.0590	.1030	.0328

Note: All reactances are negative. Angles are in degrees and negative. Values based on dry weather, average temperature conditions.

β = Phase shift in radians per circuit mile.

B = Phase shift in cycles per circuit mile, out and back = $\frac{2\beta}{2\pi}$