Corona

TABLE III.—TRANSIENT CORONA
(Single Half Sine Wave)

Concentric Cylinders in Air

Bar = 76 cm. t = 25 deg. C. δ = 1 Outer Cyl. rad. R = 8.8 cm.

Wire radius r cm.	60 ~ tests			Impulse tests			
				Corona		Spark-over kv. (max.) 1 in 10	Single half sine wave frequency kilocycles
	Calc. corona kv. (max.)	Test corona kv. (max.)	Test spark-over kv. (max.)	A kv. (max.)	B kv. (max.)		
0.0318	.....	13.4	135.0	13.8	15.6	100.0	100
				14.7	16.0	.....	500
				15.1	16.1	.....	900
0.0573	20.5	20.0	110.0	21.2	23.7	100.0	100
				22.0	24.0	.....	500
				22.6	24.0	.....	900
0.130	31.4	31.3	49.6	32.3	33.2	103.0	100
				33.5	34.0	.....	500
				34.2	34.8	.....	900
0.95	86.0	85.0	86.0	85.0	86.0	108.0	100
				87.0	87.5	.....	500
				87.5	88.0	.....	900
1.425	100.0	98.0	98.0	99.0	99.0	110.0	100
				99.0	99.5	.....	500
				100.0	101.0	.....	900
	Bar = 76 cm.		t = 25 deg. C.	δ = 1		R = 3.81 cm.	
0.0129	5.7	....	....	8.5	....	32.0	100
				9.2	....	68.0	500
				9.5	....	.....	900
0.0318	12.3	12.0	49.0	13.4	14.7	33.0	100
				13.5	14.7	67.5	500
				14.5	15.0	.....	900
0.0573	17.2	....	40.0	17.4	18.2	35.0	100
				20.0	20.5	66 0	500
				24.0	24.7	.....	900
0.239	33.5	....	33.9	33.4	37.1	44.7	100
				37.0	38.9	63.7	500
					37.0	103.0	900
0.318	38.0	37.9	37.9	38.5	39.0	45.0	100
				39.5	40.0	64.0	500
				41.6	42.0	98.0	900
0.635	49.0	48.1	48.1	49.0	49.7	50.0	100
				50.0	50.5	62.0	500
				51.6	52.0	81.0	900
1.27	55.0	55.0	54.5	55.0	55.0	55.0	100
				56.0	56.0	57.0	500
				56.0	56.0	59.3	900

Comparison of 60 ~ and transient corona for different sizes of wire in center of a cylinder. The voltage at which transient corona first appeared is given in col. A. Corona appeared on every application for voltages given in col. B. The difference is probably for positive and negative wire.

Air Density

TABLE IV.—EFFECT OF AIR DENSITY ON TRANSIENT CORONA AND SPARK-OVER

Concentric Cylinders[1]

Outer cylinder radius, R = 3.08. Inner cylinder, r = 0.0573 cm.

Corona					Spark-over				
Meas. 60 ~ kv. max.	Cal. 60 ~ kv. max.	Impulse kv. max.	Impulse ratio	δ	60 ~ kv. max.	Impulse kv. max.	Impulse ratio	δ	Single half sine freq. kilocycles
2.8	2.75	3.5	1.27	0.064	....	10.7	....	0.064	100
4.8	4.80	5.5	1.15	0.160	7.0	13.0	1.86	0.160	100
6.0	5.95	6.65	1.13	0.248	9.3	15.5	1.67	0.248	100
7.6	7.57	8.4	1.10	0.330	11.0	17.5	1.59	0.330	100
11.6	11.60	12.7	1.09	0.630	16.6	27.3	1.65	0.630	100
14.4	14.40	15.5	1.07	0.847	20.2	30.2	1.50	0.847	100
16.2	16.20	17.2	1.06	1.00	22.5	31.9	1.42	1.000	100
2.6	2.58	4.0	1.55	0.051	....	28.5	....	0.040	900
4.8	4.86	6.5	1.34	0.166	5.0	31.0	6.2	0.085	900
7.6	7.60	10.1	1.32	0.333	7.5	37.0	4.94	0.173	900
9.5	9.50	12.1	1.28	0.465	13.3	47.0	3.54	0.440	900
13.5	13.30	16.3	1.23	0.765	15.8	53.0	3.35	0.590	900
16.2	16.20	20.0	1.23	1.00	18.8	60.0	3.19	0.765	900
....	.....	....	....	.....	22.5	67.5	3.00	1.00	900
	Outer Cylinder Radius, R = 3.08 cm. Inner Cylinder, r = 0.635 cm.								
7.3	7.7	8.5	1.16	0.127	7.3	8.5	1.16	0.127	100
13.0	13.0	14.9	1.14	0.253	13.0	14.9	1.14	0.253	100
15.0	15.3	16.6	1.11	0.309	15.0	16.6	1.11	0.309	100
17.0	16.8	18.3	1.08	0.350	17.0	18.3	1.08	0.350	100
24.0	23.8	24.5	1.02	0.535	24.0	24.5	1.02	0.535	100
29.0	29.0	28.9	1.00	0.702	29.0	28.9	1.00	0.702	100
34.5	35.5	34.5	1.00	0.863	34.5	34.5	1.00	0.863	100
39.0	40.3	40.5	1.03	1.002	39.0	40.5	1.03	1.002	100
	Outer Cylinder Radius, R = 3.08 cm. Inner Cylinder, r = 0.635 cm.								
3.3	3.9	8.6	2.46	0.049	3.5	20.3	5.80	0.049	900
9.0	9.8	11.9	1.31	0.165	9.0	25.0	2.78	0.165	900
14.0	14.1	17.3	1.23	0.280	14.0	30.5	2.18	0.280	900
21.2	21.2	22.5	1.07	0.462	21.3	37.6	1.77	0.462	900
26.2	26.3	28.0	1.06	0.604	26.0	43.5	1.67	0.604	900
32.0	32.2	35.6	1.01	0.773	32.0	48.5	1.52	0.773	900
39.0	40.3	40.2	1.00	1.00	39.0	52.5	1.34	1.00	900

[1] Tests above made in a metal lined glass tube.