

PLP
COMPOSITE TECHNOLOGIES INC.
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Computerized Composite FLAGPOLE Engineering and Design
with Load Calculations Based on Standards Established by
The National Association of Architectural Metal Manufacturers (NAAMM)
and

The American Association of State Highway and Transportation Officials (AASHTO)
6th Edition 2013, using Appendix C-Alternate Method for wind Pressures.

TABLE 1

GIVEN INFORMATION

Flagpole name.....	90COM
Height of pole.....	90 feet
Depth of bury in ground.....	9 feet
Base diameter.....	16.877 inches
Tip diameter.....	6.862 inches
Flag size, hoist x fly.....	0 feet x 0 feet (polyester fabric)
Wind speed.....	125 MPH, gust factor 1.3
Material.....	PLP16, 50 inches wide
Breaking Stress.....	24000 psi
Modulus of Elasticity.....	2000000 psi
Wall Th./Inside Dia. ratio....	.018

TABLE 2

90COM
FLAGPOLE

BENDING MOMENT, STRESS, & DEFLECTION

POLE HEIGHT feet	OUTSIDE DIAMETER inches	INERTIA MOMENT inch ⁴	SECTION MODULUS inch ³	BENDING MOMENT ft-lbs	STRESS psi	DEFLECTION feet
90.000	6.862	19.035	5.548	0.000	0.000	18.505
89.000	7.046	20.646	5.860	11.018	22.561	18.192
88.000	7.285	22.871	6.279	44.406	84.868	17.880
87.000	7.523	25.240	6.710	100.878	180.408	17.568
86.000	7.716	23.591	6.115	181.153	355.501	17.255
85.000	8.056	35.267	8.756	285.994	391.974	16.943
84.000	8.316	38.877	9.350	416.299	534.291	16.632
83.000	8.544	42.238	9.887	572.930	695.355	16.320
82.000	8.763	45.645	10.418	756.628	871.562	16.009
81.000	8.948	42.910	9.591	968.067	1211.236	15.699
80.000	9.174	46.306	10.095	1207.892	1435.838	15.390
79.000	9.517	65.629	13.792	1476.880	1284.997	15.081
78.000	9.744	70.546	14.480	1775.933	1471.786	14.774
77.000	9.897	66.236	13.385	2105.804	1887.896	14.467
76.000	10.089	70.241	13.924	2467.067	2126.123	14.161
75.000	10.284	74.471	14.483	2860.302	2369.945	13.857
74.000	10.488	79.074	15.079	3286.131	2615.135	13.554
73.000	10.699	93.924	17.557	3745.200	2559.734	13.252
72.000	10.878	98.812	18.167	4238.145	2799.411	12.952
71.000	11.077	104.442	18.858	4765.577	3032.578	12.654
70.000	11.276	110.283	19.561	5328.108	3268.674	12.357
69.000	11.475	116.337	20.277	5926.371	3507.316	12.062
68.000	11.700	136.350	23.308	6561.015	3377.961	11.769
67.000	11.899	143.568	24.131	7232.712	3596.702	11.477
66.000	12.078	150.275	24.884	7942.101	3829.959	11.187
65.000	12.292	173.438	28.220	8689.786	3695.208	10.899
64.000	12.432	179.557	28.886	9476.365	3936.686	10.613
63.000	12.541	184.420	29.411	10302.313	4203.485	10.329
62.000	12.615	171.643	27.213	11167.974	4924.774	10.047
61.000	12.741	176.934	27.774	12073.647	5216.529	9.767
60.000	12.874	182.636	28.373	13019.701	5506.554	9.490
59.000	13.002	188.238	28.955	14006.546	5804.785	9.215
58.000	13.132	194.043	29.553	15034.590	6104.862	8.943
57.000	13.297	220.585	33.178	16104.275	5824.643	8.674
56.000	13.417	226.728	33.797	17216.059	6112.732	8.407
55.000	13.550	233.668	34.490	18370.373	6391.596	8.143
54.000	13.677	240.426	35.158	19567.611	6678.806	7.882
53.000	13.765	245.184	35.624	20808.156	7009.207	7.624
52.000	13.815	247.915	35.891	22092.297	7386.517	7.369
51.000	13.868	250.833	36.174	23420.207	7769.121	7.117
50.000	13.928	254.163	36.497	24792.078	8151.571	6.869
49.000	13.936	254.609	36.540	26205.385	8606.102	6.624
48.000	13.936	254.609	36.540	27657.553	9083.007	6.382
47.000	14.053	261.195	37.173	29148.662	9409.677	6.145
46.000	14.094	263.529	37.396	30678.898	9844.570	5.912
45.000	14.133	265.762	37.609	32248.443	10289.651	5.682
44.000	14.210	293.338	41.286	33857.418	9840.821	5.457
43.000	14.259	296.442	41.580	35506.000	10247.120	5.237
42.000	14.305	299.377	41.856	37194.332	10663.448	5.020
41.000	14.368	303.427	42.237	38922.578	11058.461	4.809
40.000	14.446	332.597	46.047	40690.906	10604.189	4.601

39.000	14.499	336.348	46.396	42499.496	10992.180	4.398
38.000	14.563	340.915	46.819	44348.512	11366.705	4.200
37.000	14.675	374.079	50.982	46238.176	10883.452	4.006
36.000	14.729	378.316	51.370	48168.711	11252.141	3.817
35.000	14.756	380.446	51.565	50140.328	11668.474	3.633
34.000	14.835	412.412	55.600	52153.094	11256.098	3.453
33.000	14.880	416.264	55.950	54207.234	11626.313	3.277
32.000	14.940	421.439	56.418	56302.859	11975.611	3.107
31.000	15.034	456.160	60.684	58440.164	11556.334	2.941
30.000	15.095	461.873	61.196	60619.363	11887.021	2.780
29.000	15.190	498.009	65.571	62838.773	11500.035	2.623
28.000	15.234	502.463	65.966	65096.660	11841.867	2.471
27.000	15.337	540.709	70.510	67393.195	11469.485	2.324
26.000	15.436	579.559	75.092	69728.609	11142.933	2.181
25.000	15.556	622.024	79.972	72103.156	10819.221	2.042
24.000	15.602	627.725	80.467	74517.102	11112.669	1.908
23.000	15.697	668.614	85.190	76970.633	10842.199	1.778
22.000	15.691	638.852	81.429	79463.914	11710.403	1.652
21.000	15.787	680.542	86.216	81997.008	11412.842	1.531
20.000	15.847	688.573	86.903	84570.070	11677.915	1.414
19.000	15.886	693.826	87.351	87183.344	11977.019	1.301
18.000	15.972	735.885	92.147	89836.898	11699.174	1.193
17.000	16.022	743.040	92.752	92530.914	11971.343	1.089
16.000	16.126	789.112	97.868	95265.570	11680.864	0.990
15.000	16.177	796.873	98.519	98041.109	11941.764	0.895
14.000	16.283	844.896	103.776	100853.547	11662.021	0.805
13.000	16.316	850.220	104.219	103698.984	11940.101	0.719
12.000	16.409	897.580	109.401	106577.523	11690.304	0.637
11.000	16.454	905.248	110.034	109489.352	11940.627	0.559
10.000	16.594	962.505	116.006	112434.555	11630.524	0.486
9.000	16.653	973.184	116.878	115413.375	11849.629	0.417
8.000	16.713	1017.721	121.788	118425.984	11668.740	0.352
7.000	16.772	1028.945	122.698	121472.500	11880.150	0.292
6.000	16.839	1075.909	127.788	124553.008	11696.240	0.236
5.000	16.888	1085.695	128.576	127667.656	11915.233	0.184
4.000	17.021	1182.287	138.921	130816.609	11299.944	0.136
3.000	17.028	1149.046	134.960	133999.969	11914.677	0.092
2.000	17.102	1199.945	140.328	137217.984	11734.052	0.052
1.000	17.155	1211.593	141.253	140470.609	11933.573	0.017
0.000	17.252	1269.068	147.121	143758.062	11725.683	0.000
-1.000	17.117	1096.235	128.087	127784.945	11971.674	0.000
-2.000	17.045	973.610	114.240	111811.828	11744.941	0.000
-3.000	16.973	851.221	100.303	95838.711	11465.912	0.000
-4.000	16.834	683.008	81.146	79865.594	11810.607	0.000
-5.000	16.731	558.894	66.809	63892.473	11476.069	0.000
-6.000	16.732	521.226	62.303	47919.355	9229.623	0.000
-7.000	16.792	526.955	62.763	31946.236	6108.013	0.000
-8.000	16.816	529.258	62.947	15973.118	3045.062	0.000
-9.000	16.877	535.142	63.417	0.000	0.000	0.000

Maximum stress is 11977.02 PSI, located at 19 FT above ground.