

PLP
COMPOSITE TECHNOLOGIES INC.
57 Creamery Road
P.O. Box 429
Fitzwilliam, New Hampshire 03447

DATE: 09-16-2013

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)
Year 2001 and Interims, using Appendix C-Alternate Method for Wind Pressures.

TABLE 1

GIVEN INFORMATION

Flagpole name.....	80C
Height of pole.....	80 feet
Depth of bury in ground.....	8 feet
Base diameter.....	16.32 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

80C
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
80.000	6.862	19.035	5.548	0.000	0.000	14.575
79.000	7.046	20.646	5.860	11.018	22.561	14.305
78.000	7.285	22.871	6.279	44.406	84.868	14.035
77.000	7.523	25.240	6.710	100.878	180.408	13.765
76.000	7.716	23.591	6.115	181.153	355.501	13.496
75.000	8.056	35.267	8.756	285.994	391.974	13.227
74.000	8.316	38.877	9.350	416.299	534.291	12.958
73.000	8.544	42.238	9.887	572.930	695.355	12.689
72.000	8.763	45.645	10.418	756.628	871.562	12.421
71.000	8.948	42.910	9.591	968.067	1211.236	12.154
70.000	9.174	46.306	10.095	1207.892	1435.838	11.887
69.000	9.517	65.629	13.792	1476.880	1284.997	11.621
68.000	9.744	70.546	14.480	1775.933	1471.786	11.356
67.000	9.897	66.236	13.385	2105.804	1887.896	11.092
66.000	10.089	70.241	13.924	2467.067	2126.123	10.829
65.000	10.284	74.471	14.483	2860.302	2369.945	10.568
64.000	10.488	79.074	15.079	3286.131	2615.135	10.308
63.000	10.699	93.924	17.557	3745.200	2559.734	10.049
62.000	10.878	98.812	18.167	4238.145	2799.411	9.792
61.000	11.077	104.442	18.858	4765.577	3032.578	9.536
60.000	11.276	110.283	19.561	5328.108	3268.674	9.282
59.000	11.475	116.337	20.277	5926.371	3507.316	9.029
58.000	11.700	136.350	23.308	6561.015	3377.961	8.779
57.000	11.899	143.568	24.131	7232.712	3596.702	8.530
56.000	12.078	150.275	24.884	7942.101	3829.959	8.283
55.000	12.292	173.438	28.220	8689.786	3695.208	8.038
54.000	12.432	179.557	28.886	9476.365	3936.686	7.795
53.000	12.541	184.420	29.411	10302.313	4203.485	7.553
52.000	12.615	171.643	27.213	11167.974	4924.774	7.314
51.000	12.741	176.934	27.774	12073.647	5216.529	7.077
50.000	12.874	182.636	28.373	13019.701	5506.554	6.842
49.000	13.002	188.238	28.955	14004.086	5803.766	6.610
48.000	13.132	194.043	29.553	15024.726	6100.857	6.381
47.000	13.297	220.585	33.178	16082.011	5816.590	6.154
46.000	13.417	226.728	33.797	17176.342	6098.630	5.930
45.000	13.550	233.668	34.490	18308.098	6369.929	5.709
44.000	13.677	240.426	35.158	19477.635	6648.096	5.491
43.000	13.765	245.184	35.624	20685.273	6967.814	5.275
42.000	13.815	247.915	35.891	21931.275	7332.679	5.063
41.000	13.868	250.833	36.174	23215.801	7701.313	4.854
40.000	13.928	254.163	36.497	24539.008	8068.362	4.648
39.000	13.936	254.609	36.540	25901.012	8506.143	4.446
38.000	13.936	254.609	36.540	27301.875	8966.199	4.247
37.000	14.053	261.195	37.173	28741.678	9278.296	4.052
36.000	14.094	263.529	37.396	30220.605	9697.508	3.861
35.000	14.133	265.762	37.609	31738.844	10127.052	3.674
34.000	14.210	293.338	41.286	33296.520	9677.794	3.492
33.000	14.259	296.442	41.580	34893.805	10070.439	3.313
32.000	14.305	299.377	41.856	36530.828	10473.225	3.139
31.000	14.368	303.427	42.237	38207.766	10855.372	2.969
30.000	14.354	278.657	38.826	39924.723	12339.444	2.804

29.000	14.499	336.348	46.396	41679.973	10780.216	2.644
28.000	14.563	340.915	46.819	43471.938	11142.035	2.488
27.000	14.675	374.079	50.982	45300.852	10662.826	2.337
26.000	14.729	378.316	51.370	47166.922	11018.125	2.190
25.000	14.756	380.446	51.565	49070.320	11419.466	2.048
24.000	14.789	383.061	51.803	51011.113	11816.463	1.911
23.000	14.880	416.264	55.950	52989.465	11365.128	1.778
22.000	14.940	421.439	56.418	55005.496	11699.662	1.650
21.000	15.034	456.160	60.684	57059.414	11283.295	1.526
20.000	15.095	461.873	61.196	59151.426	11599.170	1.407
19.000	15.190	498.009	65.571	61281.727	11215.082	1.293
18.000	15.234	502.463	65.966	63450.516	11542.413	1.183
17.000	15.337	540.709	70.510	65657.945	11174.167	1.077
16.000	15.344	513.711	66.959	67904.195	12169.344	0.976
15.000	15.464	554.625	71.731	70189.422	11742.093	0.880
14.000	15.510	559.723	72.176	72509.836	12055.536	0.788
13.000	15.559	565.189	72.651	74861.758	12365.152	0.701
12.000	15.645	604.111	77.227	77245.242	12002.775	0.619
11.000	15.695	610.086	77.743	79660.461	12296.014	0.541
10.000	15.801	652.785	82.626	82107.484	11924.729	0.468
9.000	15.840	657.773	83.052	84586.539	12221.699	0.400
8.000	15.926	699.242	87.811	87097.750	11902.479	0.336
7.000	15.976	706.051	88.389	89641.219	12170.006	0.277
6.000	16.080	751.398	93.457	92217.125	11840.736	0.222
5.000	16.131	758.799	94.080	94825.625	12095.157	0.171
4.000	16.191	767.568	94.814	97466.828	12335.734	0.126
3.000	16.270	811.155	99.712	100140.906	12051.646	0.084
2.000	16.317	818.437	100.317	102847.930	12302.746	0.047
1.000	16.408	865.180	105.458	105588.078	12014.764	0.015
0.000	16.502	880.646	106.732	108361.500	12183.198	0.000
-1.000	16.423	768.903	93.637	94816.312	12151.084	0.000
-2.000	16.345	691.379	84.598	81271.125	11528.055	0.000
-3.000	16.220	542.283	66.866	67725.938	12154.333	0.000
-4.000	16.149	467.708	57.924	54180.750	11224.503	0.000
-5.000	16.198	472.057	58.286	40635.562	8366.121	0.000
-6.000	16.239	475.719	58.590	27090.375	5548.497	0.000
-7.000	16.292	480.478	58.983	13545.188	2755.734	0.000
-8.000	16.320	483.005	59.192	0.000	0.000	0.000

Maximum stress is 12365.15 PSI, located at 13 FT above ground.