

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.....	50 ADM
Nautical yardarm.....	16 feet long, 30 feet above ground
Gaff.....	12.5 feet long, 30 feet above ground
Height of pole.....	50 feet
Depth of bury in ground.....	6 feet
Base diameter.....	10.076 inches
Tip diameter.....	5.359 inches
Flag size, hoist x fly.....	0 feet x 0 feet (polyester fabric)
Flags, nautical yardarm (2)...	0 feet x 0 feet (polyester fabric)
Flag, gaff.....	0 feet x 0 feet (polyester fabric)
Wind speed.....	150 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

50 ADM
FLAGPOLE
with 16 foot nautical yardarm and 12.5 foot gaff

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
50.000	5.359	7.718	2.880	0.000	0.000	9.801
49.000	5.598	8.827	3.153	10.999	41.856	9.501
48.000	5.807	9.879	3.402	44.447	156.757	9.200
47.000	6.006	10.956	3.648	101.202	332.871	8.900
46.000	6.119	9.778	3.196	181.988	683.335	8.600
45.000	6.258	10.473	3.347	287.370	1030.328	8.300
44.000	6.377	11.093	3.479	417.861	1441.302	8.002
43.000	6.483	11.666	3.599	573.945	1913.762	7.705
42.000	6.717	17.826	5.308	756.190	1709.589	7.410
41.000	6.822	18.696	5.481	965.277	2113.275	7.116
40.000	6.936	19.673	5.673	1201.766	2542.262	6.824
39.000	7.026	20.467	5.826	1466.082	3019.747	6.534
38.000	7.146	21.558	6.034	1758.641	3497.638	6.247
37.000	7.245	22.488	6.208	2079.873	4020.498	5.963
36.000	7.367	23.669	6.426	2430.220	4538.384	5.682
35.000	7.464	24.638	6.602	2810.124	5107.950	5.405
34.000	7.576	25.788	6.808	3220.014	5675.760	5.132
33.000	7.629	22.788	5.974	3660.266	7352.325	4.864
32.000	7.740	23.816	6.154	4131.209	8055.689	4.601
31.000	7.796	24.346	6.246	4633.179	8901.743	4.345
30.000	7.905	25.400	6.426	5166.503	9647.456	4.095
29.000	8.080	35.591	8.810	6313.328	8599.735	3.853
28.000	8.186	37.043	9.050	7489.587	9930.632	3.617
27.000	8.246	37.882	9.188	8695.685	11357.054	3.388
26.000	8.430	49.839	11.824	9931.997	10079.617	3.168
25.000	8.482	50.793	11.977	11198.960	11220.792	2.954
24.000	8.646	63.624	14.717	12496.991	10189.518	2.749
23.000	8.697	64.793	14.900	13826.478	11135.377	2.551
22.000	8.860	78.814	17.791	15187.814	10244.194	2.360
21.000	8.880	79.368	17.876	16581.365	11131.059	2.176
20.000	9.007	88.191	19.583	18007.430	11034.697	2.000
19.000	9.053	89.602	19.795	19466.297	11800.788	1.832
18.000	9.223	105.990	22.984	20958.324	10942.463	1.670
17.000	9.287	108.308	23.325	22483.926	11567.484	1.517
16.000	9.408	124.192	26.401	24043.479	10928.280	1.370
15.000	9.468	126.697	26.763	25637.316	11495.205	1.231
14.000	9.554	136.205	28.513	27262.266	11473.742	1.099
13.000	9.621	139.233	28.943	28915.109	11988.235	0.974
12.000	9.765	158.197	32.401	30596.102	11331.588	0.856
11.000	9.808	160.407	32.709	32305.537	11851.820	0.746
10.000	9.938	173.587	34.934	34043.676	11694.166	0.642
9.000	10.078	194.490	38.597	35810.855	11133.773	0.546
8.000	10.161	199.618	39.291	37607.414	11485.781	0.457
7.000	10.190	201.431	39.535	39433.605	11969.198	0.374
6.000	10.307	215.740	41.863	41289.621	11835.712	0.298
5.000	10.423	237.525	45.577	43175.734	11367.740	0.229
4.000	10.495	242.795	46.269	45092.266	11694.884	0.167
3.000	10.558	254.611	48.231	47039.434	11703.543	0.111
2.000	10.727	282.598	52.689	49017.504	11163.789	0.062
1.000	10.762	285.562	53.068	51026.809	11538.328	0.020
0.000	10.878	303.103	55.728	53067.609	11427.182	0.000

-1.000	10.692	250.045	46.772	44223.008	11345.933	0.000
-2.000	10.492	198.381	37.816	35378.406	11226.595	0.000
-3.000	10.293	149.308	29.012	26533.805	10975.138	0.000
-4.000	10.141	104.136	20.538	17689.203	10335.685	0.000
-5.000	9.993	68.219	13.653	8844.602	7773.555	0.000
-6.000	10.076	69.965	13.887	0.000	0.000	0.000

Maximum stress is 11988.24 PSI, located at 13 FT above ground.