

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

DATE: 03-31-2014

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.....	35 <i>NSM</i>
Nautical yardarm.....	9.5 feet long, 23 feet above ground
Gaff.....	6.5 feet long, 23 feet above ground
Height of pole.....	35 feet
Depth of bury in ground.....	4 feet
Base diameter.....	6.722 inches
Tip diameter.....	3.156 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

35 NSM

FLAGPOLE

with 9.5 foot nautical yardarm and 6.5 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
35.000	3.156	1.493	0.946	0.000	0.000	6.971
34.000	3.126	1.449	0.927	11.868	153.646	6.637
33.000	3.150	1.264	0.803	47.476	709.712	6.303
32.000	3.380	1.574	0.931	106.688	1374.785	5.971
31.000	3.580	1.881	1.051	189.139	2160.072	5.641
30.000	3.734	1.746	0.935	294.438	3777.229	5.315
29.000	3.934	2.050	1.042	421.238	4850.023	4.995
28.000	4.124	2.369	1.149	568.215	5933.983	4.682
27.000	4.304	2.701	1.255	735.083	7028.119	4.378
26.000	4.464	3.021	1.353	921.593	8172.084	4.084
25.000	4.634	3.387	1.462	1127.519	9256.843	3.800
24.000	4.942	6.917	2.799	1352.608	5798.166	3.528
23.000	5.102	7.635	2.993	1596.577	6401.609	3.263
22.000	5.176	6.935	2.680	2193.527	9823.093	3.007
21.000	5.326	7.573	2.844	2809.441	11855.645	2.762
20.000	5.584	12.656	4.533	3444.895	9119.649	2.528
19.000	5.734	13.744	4.794	4100.635	10264.825	2.306
18.000	5.834	14.503	4.972	4777.260	11530.476	2.094
17.000	6.072	21.151	6.967	5475.309	9430.893	1.894
16.000	6.126	20.164	6.583	6195.354	11293.479	1.704
15.000	6.344	27.694	8.731	6937.911	9535.955	1.524
14.000	6.394	28.388	8.880	7701.148	10407.529	1.353
13.000	6.464	29.379	9.090	8483.072	11198.697	1.193
12.000	6.616	35.370	10.692	9283.934	10419.406	1.042
11.000	6.686	36.569	10.939	10104.056	11083.958	0.901
10.000	6.736	37.443	11.117	10943.690	11812.757	0.770
9.000	6.898	44.500	12.902	11803.074	10977.726	0.649
8.000	6.948	45.534	13.107	12682.522	11611.225	0.539
7.000	7.106	55.396	15.591	13582.341	10453.822	0.437
6.000	7.146	56.402	15.786	14502.823	11024.862	0.345
5.000	7.278	64.253	17.657	15444.238	10496.269	0.262
4.000	7.308	65.110	17.819	16406.842	11049.044	0.188
3.000	7.338	65.975	17.982	17390.781	11605.608	0.123
2.000	7.450	73.888	19.836	18396.213	11129.143	0.068
1.000	7.470	74.532	19.955	19423.332	11680.304	0.021
0.000	7.628	86.883	22.780	20472.365	10784.334	0.000
-1.000	7.280	57.563	15.814	15354.273	11651.148	0.000
-2.000	7.080	41.498	11.723	10236.183	10478.320	0.000
-3.000	6.722	17.867	5.316	5118.091	11553.124	0.000
-4.000	6.722	17.867	5.316	0.000	0.000	0.000

Maximum stress is 11855.64 PSI, located at 21 FT above ground.