

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.....	30 CMDR
Nautical yardarm.....	8 feet long, 20 feet above ground
Gaff.....	5.5 feet long, 20 feet above ground
Height of pole.....	30 feet
Depth of bury in ground.....	3 feet
Base diameter.....	6.53 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

30 CMDR
FLAGPOLE
with 8 foot nautical yardarm and 5.5 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
30.000	3.156	1.493	0.946	0.000	0.000	5.059
29.000	3.126	1.449	0.927	10.789	139.678	4.781
28.000	3.150	1.264	0.803	43.160	645.193	4.504
27.000	3.380	1.574	0.931	96.989	1249.805	4.228
26.000	3.580	1.881	1.051	171.944	1963.701	3.954
25.000	3.734	1.746	0.935	267.671	3433.845	3.684
24.000	3.934	2.050	1.042	383.868	4419.750	3.419
23.000	4.124	2.369	1.149	520.241	5432.981	3.161
22.000	4.304	2.701	1.255	676.506	6468.061	2.911
21.000	4.464	3.021	1.353	852.412	7558.634	2.669
20.000	4.634	3.387	1.462	1047.735	8601.821	2.438
19.000	4.942	6.917	2.799	1544.226	6619.568	2.217
18.000	5.102	7.635	2.993	2059.597	8258.130	2.005
17.000	5.176	6.935	2.680	2593.721	11615.248	1.804
16.000	5.464	11.828	4.329	3146.934	8722.310	1.614
15.000	5.584	12.656	4.533	3719.939	9847.771	1.434
14.000	5.734	13.744	4.794	4311.290	10792.144	1.266
13.000	5.834	14.503	4.972	4919.350	11873.426	1.108
12.000	6.072	21.151	6.967	5544.548	9550.153	0.962
11.000	6.126	20.164	6.583	6187.343	11278.876	0.827
10.000	6.344	27.694	8.731	6848.148	9412.579	0.701
9.000	6.394	28.388	8.880	7527.357	10172.663	0.585
8.000	6.464	29.379	9.090	8225.252	10858.343	0.479
7.000	6.524	30.247	9.273	8942.019	11572.297	0.383
6.000	6.686	36.569	10.939	9677.911	10616.485	0.297
5.000	6.736	37.443	11.117	10433.248	11261.779	0.221
4.000	6.806	38.688	11.369	11208.268	11830.506	0.155
3.000	6.948	45.534	13.107	12003.218	10989.301	0.099
2.000	6.968	45.953	13.190	12818.369	11662.244	0.052
1.000	7.146	56.402	15.786	13653.984	10379.586	0.016
0.000	7.140	54.101	15.154	14510.334	11490.110	0.000
-1.000	6.940	38.968	11.230	9673.556	10336.787	0.000
-2.000	6.648	19.531	5.876	4836.778	9877.883	0.000
-3.000	6.530	11.926	3.653	0.000	0.000	0.000

Maximum stress is 11873.42 PSI, located at 13 FT above ground.