

PLP  
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DATE: 04-12-2023

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.....             | V30                                |
| Height of pole.....            | 30 feet                            |
| Depth of bury in ground.....   | 1 feet                             |
| Base diameter.....             | 5.876 inches                       |
| Tip diameter.....              | 3.076 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

V30  
FLAGPOLE

## BENDING MOMENT, STRESS, &amp; DEFLECTION

| POLE<br>HEIGHT<br>feet | OUTSIDE<br>DIAMETER<br>inches | INERTIA<br>MOMENT<br>inch <sup>4</sup> | SECTION<br>MODULUS<br>inch <sup>3</sup> | BENDING<br>MOMENT<br>ft-lbs | STRESS<br>psi | DEFLECTION<br>feet |
|------------------------|-------------------------------|----------------------------------------|-----------------------------------------|-----------------------------|---------------|--------------------|
| 30.000                 | 3.076                         | 1.377                                  | 0.896                                   | 0.000                       | 0.000         | 5.458              |
| 29.000                 | 3.126                         | 1.449                                  | 0.927                                   | 9.533                       | 123.416       | 5.164              |
| 28.000                 | 3.180                         | 1.302                                  | 0.819                                   | 38.085                      | 558.051       | 4.869              |
| 27.000                 | 3.380                         | 1.574                                  | 0.931                                   | 85.497                      | 1101.723      | 4.576              |
| 26.000                 | 3.630                         | 1.963                                  | 1.082                                   | 151.472                     | 1680.318      | 4.285              |
| 25.000                 | 3.814                         | 1.864                                  | 0.977                                   | 235.662                     | 2893.197      | 3.997              |
| 24.000                 | 3.964                         | 2.098                                  | 1.059                                   | 337.784                     | 3828.456      | 3.713              |
| 23.000                 | 4.134                         | 2.387                                  | 1.155                                   | 457.613                     | 4755.079      | 3.435              |
| 22.000                 | 4.304                         | 2.701                                  | 1.255                                   | 594.934                     | 5688.153      | 3.164              |
| 21.000                 | 4.404                         | 2.898                                  | 1.316                                   | 749.557                     | 6834.722      | 2.901              |
| 20.000                 | 4.484                         | 3.062                                  | 1.366                                   | 921.349                     | 8094.961      | 2.647              |
| 19.000                 | 4.604                         | 3.320                                  | 1.442                                   | 1110.199                    | 9237.424      | 2.404              |
| 18.000                 | 4.724                         | 3.592                                  | 1.521                                   | 1315.984                    | 10384.516     | 2.173              |
| 17.000                 | 4.972                         | 7.048                                  | 2.835                                   | 1538.541                    | 6511.973      | 1.953              |
| 16.000                 | 5.042                         | 7.360                                  | 2.920                                   | 1777.692                    | 7306.768      | 1.743              |
| 15.000                 | 5.082                         | 7.542                                  | 2.968                                   | 2033.330                    | 8220.197      | 1.542              |
| 14.000                 | 5.142                         | 7.821                                  | 3.042                                   | 2303.762                    | 9087.219      | 1.350              |
| 13.000                 | 5.182                         | 8.011                                  | 3.092                                   | 2587.304                    | 10041.356     | 1.169              |
| 12.000                 | 5.206                         | 7.059                                  | 2.712                                   | 2883.925                    | 12760.499     | 1.001              |
| 11.000                 | 5.276                         | 7.356                                  | 2.788                                   | 3193.594                    | 13743.592     | 0.846              |
| 10.000                 | 5.444                         | 11.694                                 | 4.296                                   | 3516.251                    | 9821.825      | 0.705              |
| 9.000                  | 5.494                         | 12.032                                 | 4.380                                   | 3851.812                    | 10553.114     | 0.577              |
| 8.000                  | 5.534                         | 12.307                                 | 4.448                                   | 4200.224                    | 11332.565     | 0.460              |
| 7.000                  | 5.584                         | 12.656                                 | 4.533                                   | 4561.453                    | 12075.506     | 0.356              |
| 6.000                  | 5.644                         | 13.084                                 | 4.636                                   | 4935.468                    | 12774.040     | 0.264              |
| 5.000                  | 5.684                         | 13.375                                 | 4.706                                   | 5322.231                    | 13571.244     | 0.186              |
| 4.000                  | 5.744                         | 13.819                                 | 4.811                                   | 5721.707                    | 14270.196     | 0.123              |
| 3.000                  | 5.922                         | 19.554                                 | 6.604                                   | 6133.842                    | 11146.104     | 0.073              |
| 2.000                  | 5.972                         | 20.077                                 | 6.724                                   | 6558.561                    | 11705.263     | 0.036              |
| 1.000                  | 6.052                         | 20.934                                 | 6.918                                   | 6995.805                    | 12135.169     | 0.010              |
| 0.000                  | 6.056                         | 19.452                                 | 6.424                                   | 7445.541                    | 13908.152     | 0.000              |
| -1.000                 | 5.876                         | 10.244                                 | 3.487                                   | 0.000                       | 0.000         | 0.000              |

Maximum stress is 14270.2 PSI, located at 4 FT above ground.