

Wind Loading-5/16in Petrarch

The most common causes of any panel system failure are inadequate fastening and insufficient studs leading to excessive deflection or stress in the panel. This Data Sheet provides a simple step-by-step method of checking the panel's structural integrity.

1. Determine the maximum wind pressure (or suction) to be imposed on the panels.
2. Determine the ideal or desired panel layout, i.e. width and height required to suit the project.
3. From Graph 1 read off the vertical scale the appropriate wind pressure and determine the maximum allowable unsupported panel span limit. Check that this is in excess of proposed stud centers.
(e.g. 40-lbs/sq. ft. (pressure or suction) wind loading — maximum allowed panel span (stud centers) is 24ins.
4. From Diagram 2 for single span and Diagram 3 for double or triple span panels, calculate the maximum load to be carried by the fasteners.

Single span panels (diagram 2)

In this case, one of the edge screws can easily be identified as carrying the maximum load.

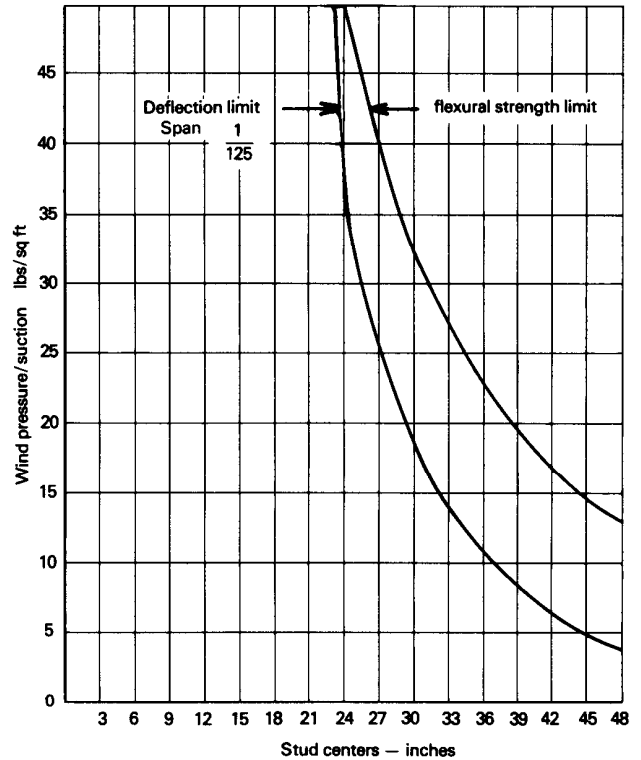
The load on the screw can be determined from —
Load on screw = $A \times B \times \text{Wind load (suction)}/\text{sq. ft.}$
where — $A = \frac{1}{2}$ panel width
 $B = c/c \times 1.25$

Double or triple span panels (diagram 3)

In all such cases it will be found that one of the central screws will carry the most load and can be determined from —

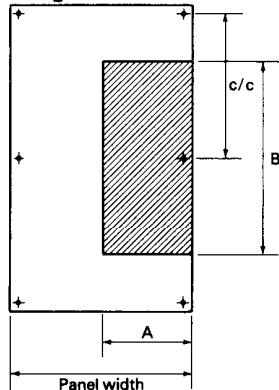
Load on screw = $A \times B \times \text{Wind load (suction)}/\text{sq. ft.}$
where — $A = c/c^1 \times 1.25$
 $B = c/c^2 \times 1.25$

Deflection/flexural strength



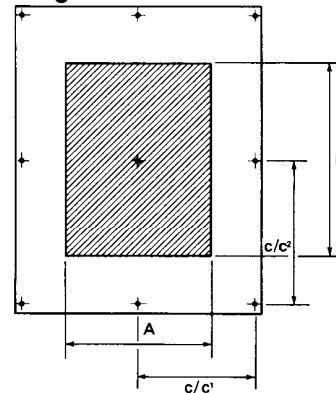
Graph 1

Diagram 2



Indicates area of wind loading imposed on fastener.

Diagram 3



5. From table below, check that the safe working load of the fastener selected exceeds the maximum load calculated from (4) overleaf. If the actual load is greater than the safe working load, reduce the centers (usually the vertical center) of the fasteners and re-check as in (4) above.

Recommended maximum load per screw

Std. No. 10 410 SS into wood	—	142 lbs.
Std. No. 10 410 SS Self-drilling into steel	—	138 lbs.
S-12 Bugle Head Self-drilling into steel	—	151 lbs.
Trim Head Screw into wood	—	84 lbs.
Trim Head Self-drilling Screw into steel	—	57 lbs.

General guidance notes

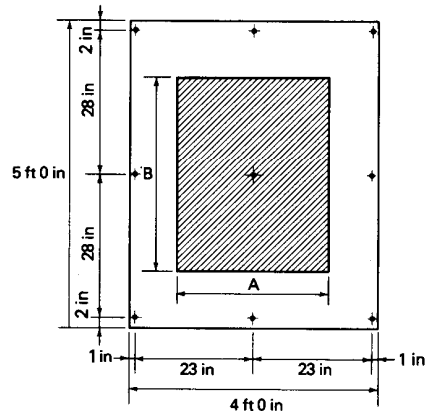
1. The vertical c/c of fasteners should not normally exceed 24 inches max.
2. To ensure that the safe working loads of screws are obtained, holes should be drilled strictly in accordance with our recommendations
3. In each case the safe work load of the screws listed are based on the failure mode being the screwhead pulling through the sheet. It is therefore important to check with the screw manufacturer the relevant pull-out value exceeds the values shown (this is dependent on thickness of stud and, in the case of wood studs, the length of screw).
4. Edge distances from centre of hole to edge of panel should not normally be less than 1 in. and at a corner should be a minimum of 2 in. from one edge and 1 in. from the other.

Example

Step 1

Fascia Panels.
Wind pressure/suction — 30 lbs/sq. ft.
Joints to be caulked

Step 2



Step 3

Check stud supports.
30 lbs. pressure vertical scale graph 1 horizontal scale max.
span 26 in. therefore OK.

Step 4

Load on screw $A = \frac{23'' \times 1.25}{12} = 2.40 \text{ ft.}$
 $B = \frac{28'' \times 1.25}{12} = 2.92 \text{ ft.}$

Wind load = $2.4 \times 2.92 \times 30\text{-lbs/sq. ft.} = 210\text{-lbs. load on screw}$

Step 5

Check screws against recommended maximum load per screw.

No screws will take this load.
Re-check with 3 extra screws to reduce c/c² from 28 in. to 18½ in. —

$B = \frac{18.5 \times 1.25}{12} = 1.93 \text{ ft.}$

Wind load = $1.93 \times 2.4 \times 30\text{-lbs/sq. ft.} = 139\text{-lbs.}$
OK to use No. 10 screws into wood or steel



WIND VELOCITY TO STATIC PRESSURE CONVERSION TABLE

Wind Velocity (MPH)	Static Pressure (Inches of Water)	Reading On Water Manometer	Static Pressure (lbs. per sq. ft.)
5	.01	.005	.062
10	.04	.020	.249
15	.10	.050	.561
20	.19	.095	.998
25	.30	.150	1.560
30	.43	.215	2.246
35	.58	.290	3.057
40	.76	.380	3.993
45	.97	.485	5.054
50	1.20	.600	6.240
55	1.45	.725	7.550
60	1.72	.860	8.985
65	2.02	1.010	10.545
70	2.35	1.175	12.230
75	2.70	1.350	14.040
80	3.07	1.535	15.974
85	3.46	1.730	18.033
90	3.88	1.940	20.217
95	4.33	2.165	22.526
100	4.80	2.400	24.960
105	5.29	2.645	27.510
110	5.80	2.900	30.201
115	6.34	3.170	33.009
120	6.91	3.455	35.942
125	7.50	3.750	39.000
130	8.11	4.055	42.182
135	8.74	4.370	45.489
140	9.40	4.700	48.921
145	10.09	5.045	52.478
150	10.80	5.400	56.160
155	11.53	5.765	59.960
160	12.28	6.140	63.897
165	13.06	6.530	67.953
170	13.87	6.935	72.134
175	14.70	7.350	76.440
180	15.55	7.775	80.870
185	16.42	8.210	85.425
190	17.32	8.660	90.105
195	18.25	9.125	94.910
200	19.20	9.600	99.840

FORMULAS:
P=0.00048 V²

LBS/SQ. FT. - .00048 V² x 5.202 (or)
LBS/SQ. FT. - .0024PG V² as used above

P - Pressure in inches of water
V - Wind velocity (mph)

$$V = \sqrt{\frac{P}{0.00048}}$$