

**STUD WALL CALCULATIONS**

Stud Width (dy)	1.50 in
Stud Depth (dx)	5.50 in
Stud Length (L)	9.00 ft
Stud Spacing	16.00 in

**Design Values**

Fb	700 psi
Fc	850 psi
Fc <sub>⊥</sub>	625 psi
E	1600000 psi
E <sub>min</sub>	510000 psi
CF <sub>b</sub>	1.00
CF <sub>c</sub>	1.00
A	8.25 in <sup>2</sup>
S <sub>x</sub>	7.56 in <sup>3</sup>
I <sub>x</sub>	20.80 in <sup>4</sup>
C <sub>t</sub>	1.00
CM	1.00
C <sub>i</sub>	1.00

**Vertical Loads**

Wall LL (wLL)	500 plf
Wall DL (wDL)	500 plf
Wall DL (wTL)	1000 plf
Trib. Length	1.33 ft
P <sub>c</sub>	1333.33 lbs

**Lateral Loads**

Wind Load (ps)	10.00 psf
Wind Load ASD (pasd)	6.00 psf
Wind Atrib	12.00 ft <sup>2</sup>
W	72.00 lbs
w	8.00 plf

**Load Case 1: Gravity Loads Only**

CD	1.15
(le/d) <sub>y</sub>	0.00 sheathing
(le/d) <sub>x</sub>	19.64
E' <sub>min</sub>	510000 psi
F <sub>cE</sub>	1087.23 psi
F <sub>c</sub> *	977.50 psi
c	0.80 sawn lumber
F <sub>cE</sub> /F <sub>c</sub> *	1.112
1 + F <sub>cE</sub> /F <sub>c</sub> */2c	1.320
C <sub>p</sub>	0.726
F <sub>c</sub> '	710.09 psi
f <sub>c</sub>	161.62 psi
<b>CSI (axial)</b>	<b>0.23 OK</b>

**Bearing on Stud Wall Plates**

l <sub>b</sub>	1.50 in
C <sub>b</sub>	1.00 (conservative)
F <sub>c⊥</sub> '	625.00 psi
f <sub>c⊥</sub>	161.62
<b>CSI (bearing)</b>	<b>0.26 OK</b>

**Load Case 2: Gravity Loads and Lateral Loads**

CD	1.60 (Wind)
M <sub>max</sub>	81.00 ft-lbs
	972.00 in-lbs
CL	1.00
C <sub>r</sub>	1.15 @ 16 O/C
F <sub>b</sub> '	1288.00 psi
f <sub>bx</sub>	128.53 psi
<b>CSI (bending)</b>	<b>0.10 OK</b>

**Combined Stress**

(re-evaluate compression values with CD = 1.6)

F <sub>cE</sub>	1087.23 psi
F <sub>c</sub> *	1360.00 psi
c	0.80 sawn lumber
F <sub>cE</sub> /F <sub>c</sub> *	0.799
1 + F <sub>cE</sub> /F <sub>c</sub> */2c	1.125
C <sub>p</sub>	0.609
F <sub>c</sub> '	828.71 psi

$$\left(\frac{f_c}{F_c'}\right)^2 + \left(\frac{1}{1 - \frac{f_c}{F_{cE}}}\right)\left(\frac{f_b}{F_b'}\right) = 0.16 \text{ OK}$$

Location: Front Wall A

Specification: Use 2 x 6 DF Stud Grade @ 16" o/c