

**L. Roberto Lomas P.E.**

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Manufacturer: Masonite  
Report #: 514009  
Date: 05/01/2017

**Test Report:** N/A

**Product:** Single door 3'x8' (Wood Frame)

**Scope:**

This analysis provides calculations, quantities, and spacing requirements for installing product to substrate, and it applies only to the product described herein. These calculations comply with requirements of the Florida Building Code.

**Anchor capacity in shear condition:**

Solid members w/ & w/out gap:

**a. With threads present in shear plane**

Fastener type: <b>#10 wood screw</b>		(NDS 2012, TR12)	
Nominal diameter:	D: 0.190 in	Gap:	g: 0.0000 in
Root diameter:	Dr: 0.152 in	Moment arm:	0.0000 in
Minimum required penetration:	p: 1.140 in	Screw bending yield strength:	F <sub>yb</sub> = 80,000 psi
Side member:	Douglas Fir-Larch (G=0.50)	Main member:	Spruce-Pine-Fir (G=0.42)
Side member thickness:	t <sub>s</sub> = 1.000 in	Main member thickness:	t <sub>m</sub> = 1.500 in
Side member dowel bearing strength:	F <sub>es</sub> = 4,650 psi	Main member dowel bearing strength:	F <sub>em</sub> = 3,350 psi
Side member dowel bearing length:	l <sub>s</sub> = 1.000 in	Main member dowel bearing length:	l <sub>m</sub> = 1.140 in

Mode I <sub>m</sub>	Mode I <sub>s</sub>	Mode II	Mode III <sub>m</sub>	Mode III <sub>s</sub>	Mode IV
qm = 636.5 lbs/in	qs = 884 lbs/in	A: 0.0007	A: 0.00096	A: 0.00107	A: 0.0014
P = 725.61 lbs	P = 884 lbs	B: 1.07	B: 0.57	B: 0.5	B: 0.000
K <sub>D</sub> = 2.400	K <sub>D</sub> = 2.400	C: -427.67	C: -253.62	C: -267.7	C: -93.6
Z <sub>m</sub> = 302 lbs	Z <sub>s</sub> = 368 lbs	P = 331 lbs	Ms = 46.8 in-lbs	Mm = 46.8 in-lbs	P = 263 lbs
Min. Design value:	Z = 110 lbs	K <sub>D</sub> = 2.400	P = 297 lbs	P = 319 lbs	K <sub>D</sub> = 2.400
Duration Factor:	C <sub>D</sub> = 1.6	Z = 138 lbs	K <sub>D</sub> = 2.400	K <sub>D</sub> = 2.400	Z = 110 lbs
<b>Allowable Design Value (Z<sub>C<sub>D</sub></sub>):</b>		<b>Z' = 175 lbs/anchor</b>	<b>Z = 124 lbs</b>	<b>Z = 133 lbs</b>	<b>Z = 110 lbs</b>

Solid members w/ & w/out gap:

**a. With threads present in shear plane**

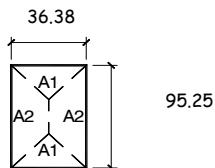
Fastener type: <b>#10 wood screw</b>		(NDS 2012, TR12)	
Nominal diameter:	D: 0.190 in	Gap:	g: 0.0000 in
Root diameter:	Dr: 0.152 in	Moment arm:	0.0000 in
Minimum required penetration:	p: 1.140 in	Screw bending yield strength:	F <sub>yb</sub> = 80,000 psi
Side member:	Douglas Fir-Larch (G=0.50)	Main member:	Steel strap/clip
Side member thickness:	t <sub>s</sub> = 1.000 in	Main member thickness:	t <sub>m</sub> = 0.048 in
Side member dowel bearing strength:	F <sub>es</sub> = 4,650 psi	Main member dowel bearing strength:	F <sub>em</sub> = 61,850 psi
Side member dowel bearing length:	l <sub>s</sub> = 1.000 in	Main member dowel bearing length:	l <sub>m</sub> = 1.140 in

Mode I <sub>m</sub>	Mode I <sub>s</sub>	Mode II	Mode III <sub>m</sub>	Mode III <sub>s</sub>	Mode IV
qm = 11752 lbs/in	qs = 884 lbs/in	A: 0.0003	A: 0.00059	A: 0.00033	A: 0.0006
P = 13397 lbs	P = 884 lbs	B: 1.07	B: 0.57	B: 0.5	B: 0.000
K <sub>D</sub> = 2.400	K <sub>D</sub> = 2.400	C: -4038.9	C: -3864.9	C: -267.7	C: -93.6
Z <sub>m</sub> = 5582 lbs	Z <sub>s</sub> = 368 lbs	P = 2287 lbs	Ms = 46.8 in-lbs	Mm = 46.8 in-lbs	P = 392 lbs
Min. Design value:	Z = 163 lbs	K <sub>D</sub> = 2.400	P = 2126 lbs	P = 420 lbs	K <sub>D</sub> = 2.400
Duration Factor:	C <sub>D</sub> = 1.6	Z = 953 lbs	K <sub>D</sub> = 2.400	K <sub>D</sub> = 2.400	Z = 163 lbs
<b>Allowable Design Value (Z<sub>C<sub>D</sub></sub>):</b>		<b>Z' = 262 lbs/anchor</b>	<b>Z = 886 lbs</b>	<b>Z = 175 lbs</b>	<b>Z = 163 lbs</b>

Fastener type: <b>1/4" ITW Tapcon</b>		N.O.A. 16-1222.06	
Substrate: Hollow block	Minimum embedment:	1.25 in	
Edge distance: 4.00 in	Tabulated shear design value:	Z = 202 lbs	
Edge distance: 2.00 in	Tabulated shear design value:	Z = 161 lbs	
Actual edge distance: 2.50 in	Reduction factor:	0.85	
Spacing: 4.00 in	Tabulated shear design value:	Z = 202 lbs	
Spacing: 2.00 in	Tabulated shear design value:	Z = 164 lbs	
Actual spacing: 3.00 in	Reduction factor:	0.91	
<b>Allowable Design Value (Z<sub>f<sub>AN</sub></sub>):</b>		<b>Z'' = 155 lbs/anchor</b>	
<b>Minimum anchor capacity: 155 lbs/anchor</b>			

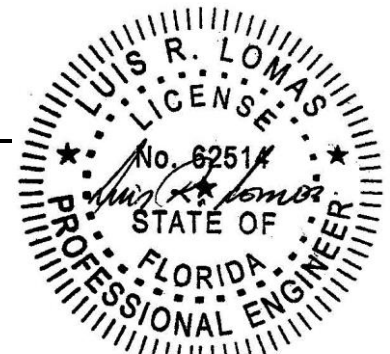
Note: Anchors with the least capacity is used for calculations to qualify anchors with higher capacity.

**Anchor calculations, minimum required anchors**



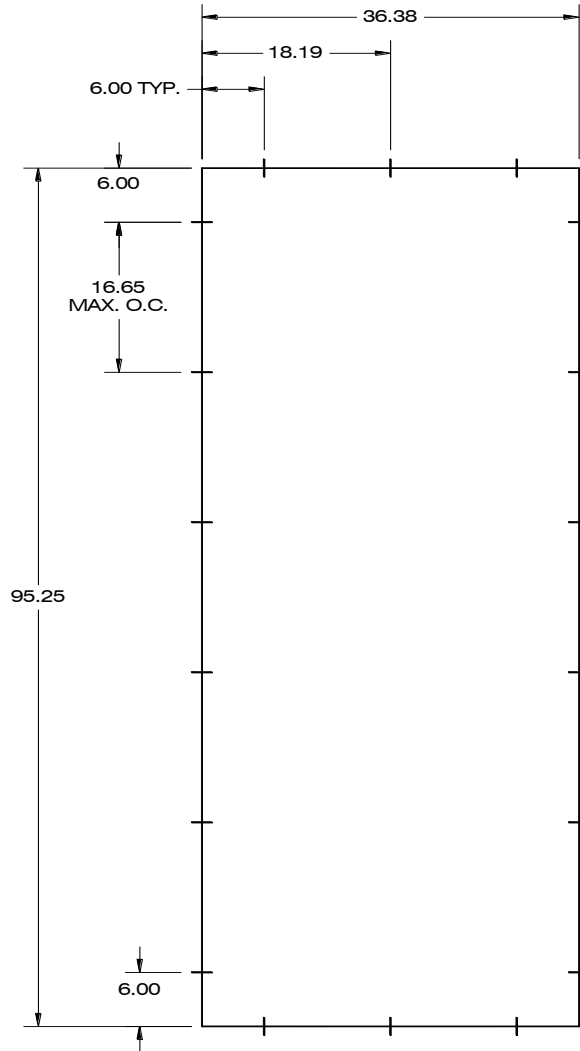
Design pressure: 70.0 psf

Zone	Area (ft <sup>2</sup> )	Load (lbs)	Ind. (in)	Max. O.C. (in)	Anchor			Result
					Cap. (lbs)	Qty	Load (lbs)	
A <sub>1</sub>	2.3	161	N/A	N/A	155	2	80	OK
A <sub>2</sub>	9.7	681	6.00	18.00	155	6	114	OK



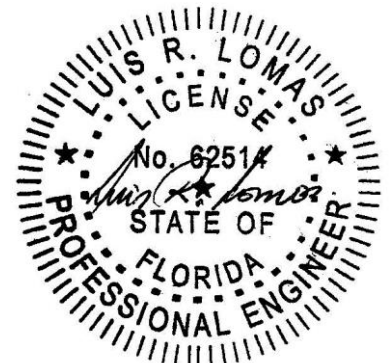
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5/2/2017

**Anchor Locations:**



**Installation instructions:**

1. FOR ANCHORING THROUGH FRAME INTO WOOD FRAMING OR 2X BUCK USE #10 WOOD SCREWS WITH SUFFICIENT LENGTH TO ACHIEVE A 1 1/4" MINIMUM EMBEDMENT INTO SUBSTRATE WITH 1/2" MINIMUM EDGE DISTANCE. LOCATE ANCHORS AS SHOWN BELOW.
2. FOR ANCHORING THROUGH FRAME INTO MASONRY/CONCRETE USE 3/16" TAPCONS WITH SUFFICIENT LENGTH TO ACHIEVE A 1 1/4" MINIMUM EMBEDMENT INTO SUBSTRATE WITH 2 1/2" MINIMUM EDGE DISTANCE. LOCATE ANCHORS AS SHOWN BELOW.
3. FOR ANCHORING THROUGH FRAME INTO METAL STRUCTURE USE #10 SMS OR SELF DRILLING SCREWS WITH SUFFICIENT LENGTH TO ACHIEVE 3 THREADS MINIMUM BEYOND STRUCTURE INTERIOR WALL WITH 1/2" MINIMUM EDGE DISTANCE. LOCATE ANCHORS AS SHOWN BELOW.
4. ALL FASTENERS TO BE CORROSION RESISTANT.
5. INSTALLATION ANCHORS SHALL BE INSTALLED IN ACCORDANCE WITH ANCHOR MANUFACTURER'S INSTALLATION INSTRUCTIONS AND ANCHORS SHALL NOT BE USED IN SUBSTRATES WITH STRENGTHS LESS THAN THE MINIMUM STRENGTH SPECIFIED BELOW:
  - A. WOOD: MINIMUM SPECIFIC GRAVITY OF G=0.42
  - B. CONCRETE: MINIMUM COMPRESSIVE STRENGTH OF 2,000 PSI.
  - C. MASONRY: HOLLOW/FILLED BLOCK PER ASTM C90 WITH Fm=2,000PSI MINIMUM.
  - D. METAL STRUCTURE: STEEL 18GA (.048") FY=33KSI/FU=52KSI OR ALUMINUM 6063-T5 FU=30KSI .052" THICK MINIMUM
6. ANCHOR LOCATIONS SHOWN IN THIS DOCUMENT ARE THE MINIMUM REQUIRED FOR THE DESCRIBED PRODUCT EXPOSED AT THE DESIGN PRESSURE INDICATED HEREIN.



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