

# Luis R. Lomas P.E.

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Manufacturer: Masonite  
Report #: 512746A  
Date: 05/21/2015

**Test Report:** N/A

**Product:** 6'8" and 8'0" opaque door two-piece steel 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 withdrawal or pullout condition:

Fastener type:	#8	Wood screw	(NDS 2012)		
Wood screw length:	1.50	in		Screw diameter:	D= 0.164 in
Thread length:	1.000	in		Embedment:	1.50 in
Main member type:	Spruce-Pine-Fir			Effective embedment:	p <sub>m</sub> = 1.000 in
Tabulated withdrawal design value:	W =	82	lbs/in	Duration Factor:	C <sub>D</sub> = 1.60
Allowable Design Value (W <sub>p</sub> C <sub>D</sub> ):	W' =	131	lbs/anchor		
Fastener type:	#10 Tek screw				
Substrate:	18 GA, Steel				
Tabulated design value:	W =	499	lbs		
Safety factor:	F <sub>S</sub> =	4			
Allowable Design Value (W <sub>F<sub>S</sub></sub> ):	W' =	124	lbs/anchor		
Fastener type:	#10		(Calculations per 2010 Aluminum Design Manual)		
Nominal screw diameter:	D	0.190	in	Nominal hole diameter:	D <sub>h</sub> 0.142 in
Root diameter:	D <sub>r</sub>	0.138	in	Thread stripping area:	A <sub>sn</sub> 0.401 in <sup>2</sup>
Nominal screw head diameter:	D <sub>ws</sub>	0.359	in	Root area:	A <sub>r</sub> 0.0149 in <sup>2</sup>
Screw nominal tensile strength (.75F <sub>u</sub> ):	F <sub>nt</sub>	90	ksi	Full thread engagement:	L <sub>e</sub> 0.060 in
Screw location coefficient:	C	1.0		Safety factor:	Ω 3
Side member material:	Metal framing			Main member material:	Metal framing
Thickness:	t <sub>1</sub>	0.036	in	Thickness:	t <sub>2</sub> 0.060 in
Ultimate tensile strength:	F <sub>tu2</sub>	70.00	ksi	Yield strength:	F <sub>ty2</sub> 50.00 ksi
Thickness coefficient:	K <sub>s</sub>	1.01		Ultimate tensile strength:	F <sub>tu2</sub> 70.00 ksi

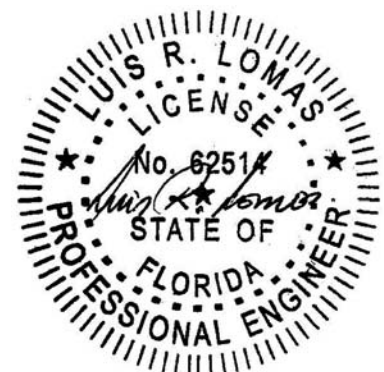
## Screw tension calculations:

Mode 1 (pull out):	If $0.06 \leq L_e \leq 1.25$ then $R_n = K_s D L_e F_{ty2}$	If $0.125 \leq L_e \leq 2.5$ then $R_n = (1.2 D F_{ty2} (0.25 - t_c) + 1.16 A_{sn} F_{tu2} (L_e - 0.125))$
	If $0.25 \leq L_e \leq 0.375$ then $R_n = 0.58 A_{sn} t_c F_{tu2}$	Mode 1: R <sub>n</sub> = 575 lbs
Mode 2 (pull over):	$R_n = C t_1 F_{tu1} (D_{ws} - D_h)$	Mode 2: R <sub>n</sub> = 546 lbs
Mode 3 (ultimate tensile capacity):	$R_n = F_{tu} A_r / 1.25$	Mode 3: R <sub>n</sub> = 1075 lbs

Allowable withdrawal capacity: W: 182 lbs/anchor

Minimum anchor capacity: 124 lbs/anchor for head and jambs anchoring

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



Luis R. Lomas P.E.  
FL No.: 62514  
5/28/2015

**Test Report:** N/A

**Product:** 6'8" and 8'0" opaque door two-piece steel 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.

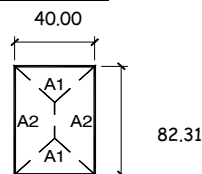
**Anchor capacity in shear condition:**

Fastener type: 1/4" ITW Tapcon				N.O.A. 12-0816.06			
Substrate: Concrete				Minimum embedment:			1.75 in
Edge distance:	3.00 in	Tabulated shear design value:	Z =	421 lbs			
Edge distance:	1.50 in	Tabulated shear design value:	Z =	303 lbs			
Actual edge distance:	6.00 in	Reduction factor:	1.00				
Spacing:	4.00 in	Tabulated shear design value:	Z =	421 lbs			
Spacing:	2.00 in	Tabulated shear design value:	Z =	341 lbs			
Actual spacing:	6.00 in	Reduction factor:	1.00				
Allowable Design Value (Z <sub>fAN</sub> ):	Z'' =	421 lbs/anchor					
Minimum anchor capacity:		421 lbs/anchor for sill anchoring					

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

**Anchor calculations, minimum required anchors**

**Single door 40x82 5/16**

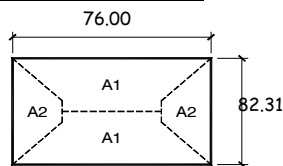


Design pressure: 66.0 psf

Zone	Area (ft²)	Load (lbs)	Ind. (in)	Max. O.C. (in)	Anchor			Result
					Cap. (lbs)	Qty	Load (lbs)	
A <sub>1</sub>	2.8	183	N/A	N/A	124	2	92	OK
					421	2	92	OK
A <sub>2</sub>	8.7	571	6.00	10.13	124	8	71	OK

head  
sill  
jamb

**Double door 76x82 5/16"**



Design pressure: 66.0 psf

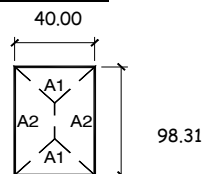
Number of panels: 2

Panel width: 38.0 in

Zone	Area (ft²)	Load (lbs)	Ind. (in)	Max. O.C. (in)	Anchor			Result
					Cap. (lbs)	Qty	Load (lbs)	
A <sub>1</sub>	13.4	882	N/A	N/A	124	8	110	OK
					421	4	221	OK
A <sub>2</sub>	8.4	552	6.0	10.13	124	8	69	OK

head  
sill  
jamb

**Single door 40x98 5/16**



Design pressure: 55.0 psf

Zone	Area (ft²)	Load (lbs)	Ind. (in)	Max. O.C. (in)	Anchor			Result
					Cap. (lbs)	Qty	Load (lbs)	
A <sub>1</sub>	2.8	153	N/A	N/A	124	2	76	OK
					421	2	76	OK
A <sub>2</sub>	10.9	598	6.00	10.13	124	10	60	OK

head  
sill  
jamb

**ANCHOR UNITS AS FOLLOWS:**

1. FOR ANCHORING HEAD AND JAMBS INTO WOOD FRAMING OR 2X BUCK USE #8 WOOD SCREWS WITH SUFFICIENT LENGTH TO ACHIEVE A 1 1/4" MINIMUM EMBEDMENT INTO SUBSTRATE. LOCATE ANCHORS AS SHOWN IN INSTALLATION DRAWING DWG-MA-FL0178-11 AND DWG-MA-FL0179-11
2. FOR ANCHORING HEAD AND JAMBS INTO METAL FRAMING USE #10 SELF DRILLING SCREWS WITH SUFFICIENT LENGTH TO ACHIEVE 3 THREADS MINIMUM BEYOND STRUCTURE INTERIOR WALL. LOCATE ANCHORS AS SHOWN IN INSTALLATION DRAWING DWG-MA-FL0178-11 AND DWG-MA-FL0179-11
3. FOR ANCHORING SILL INTO MASONRY/CONCRETE USE 1/4" 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 IN INSTALLATION DRAWING DWG-MA-FL0178-11 AND DWG-MA-FL0179-11

