

L. Roberto Lomas P.E.

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Client: Masonite
Report: 514473-1B
Date: 10/4/2023

Test Report: N/A

Product: Double Door with and without Sidelites 9' x 8' (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 8th edition (2023).

Anchor capacity in shear condition:

Solid members w/ & w/out gap:

a. With threads present in shear plane

Fastener type: #10 wood screw		(NDS 2018, TR12)	Gap: g: 0.0000 in	
Nominal diameter:	D: 0.190 in		Moment arm:	0.0000 in
Root diameter:	Dr: 0.152 in		Screw bending yield strength:	F _{yb} = 80,000 psi
Minimum required penetration:	p: 1.140 in		Main member:	Spruce-Pine-Fir (G=0.42)
Side member:	Douglas Fir-Larch (G=0.50)		Main member thickness:	t _m = 1.500 in
Side member thickness:	t _s = 1.000 in		Main member dowel bearing strength:	F _{em} = 3,350 psi
Side member dowel bearing strength:	F _{es} = 4,650 psi		Main member dowel bearing length:	l _m = 1.140 in
Side member dowel bearing length:	l _s = 1.000 in			

Mode I _m	Mode I _s	Mode II	Mode III _m	Mode III _s	Mode IV
q _m = 636.5 lbs/in	q _s = 884 lbs/in	A: 0.0007	A: 0.00096	A: 0.00107	A: 0.00135
P = 725.61 lbs	P = 884 lbs	B: 1.07	B: 0.57	B: 0.5	B: 0.000
K _D = 2.400	K _D = 2.400	C: -427.674	C: -253.623	C: -267.699	C: -93.6
Z _m = 302 lbs	Z _s = 368 lbs	P = 331 lbs	M _s = 46.8 in-lbs	M _m = 46.8 in-lbs	
		K _D = 2.400	P = 297 lbs	P = 319 lbs	P = 263 lbs
Min. Design value:	Z = 110 lbs	Z = 138 lbs	K _D = 2.400	K _D = 2.400	K _D = 2.400
Duration Factor:	C _D = 1.6		Z = 124 lbs	Z = 133 lbs	Z = 110 lbs
Allowable Design Value (ZC _D):	Z' = 175 lbs/anchor				

Fastener type: 1/4 ITW Tapcon

N.O.A. 21-0201.06

Substrate: Hollow block

Minimum embedment: 1.25 in

Actual edge distance: 2.50 in

Actual C To C spacing: 3.00 in

Allowable Design Value: Z'' = 155 lbs/anchor (per interpolation when needed)

Tabulated values

edge distance	spacing (in)	
	2.00	4.00
2.00	130	161
4.00	163	202

Fastener type: #10 Tek screw

Substrate: 18 GA, Steel

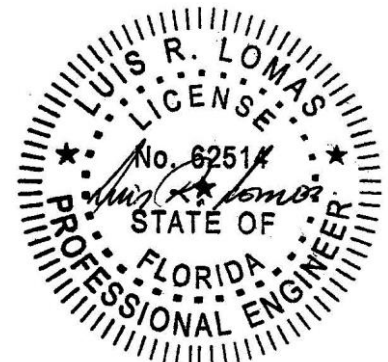
Tabulated design value: Z = 1266 lbs

Safety factor: F_s = 4

Allowable Design Value (ZF_s): Z' = 316 lbs/anchor

Minimum anchor capacity: 155 lbs/anchor

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



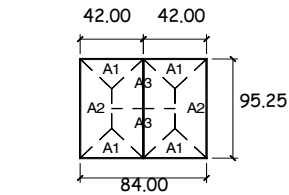
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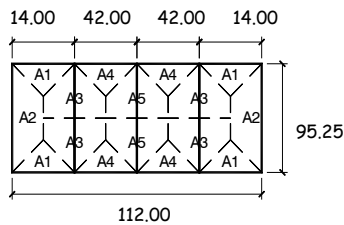
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Anchor calculations, minimum required anchors



Design pressure: 55.0 psf

Zone	Area (ft ²)	Load (lbs)	Ind. (in)	Max. O.C. (in)	Anchor			Result
					Cap. (lbs)	Qty	Load (lbs)	
A ₁	3.1	168	N/A	N/A	155	2	84	OK
A ₂	10.8	596	6.00	18.00	155	6	99	OK
A ₃	10.8	596	N/A	N/A	155	4	149	OK

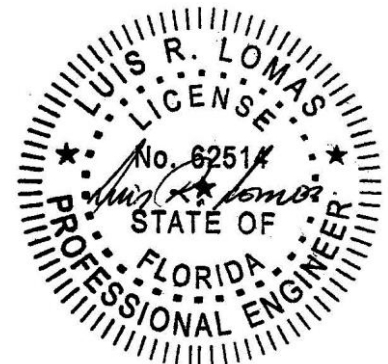
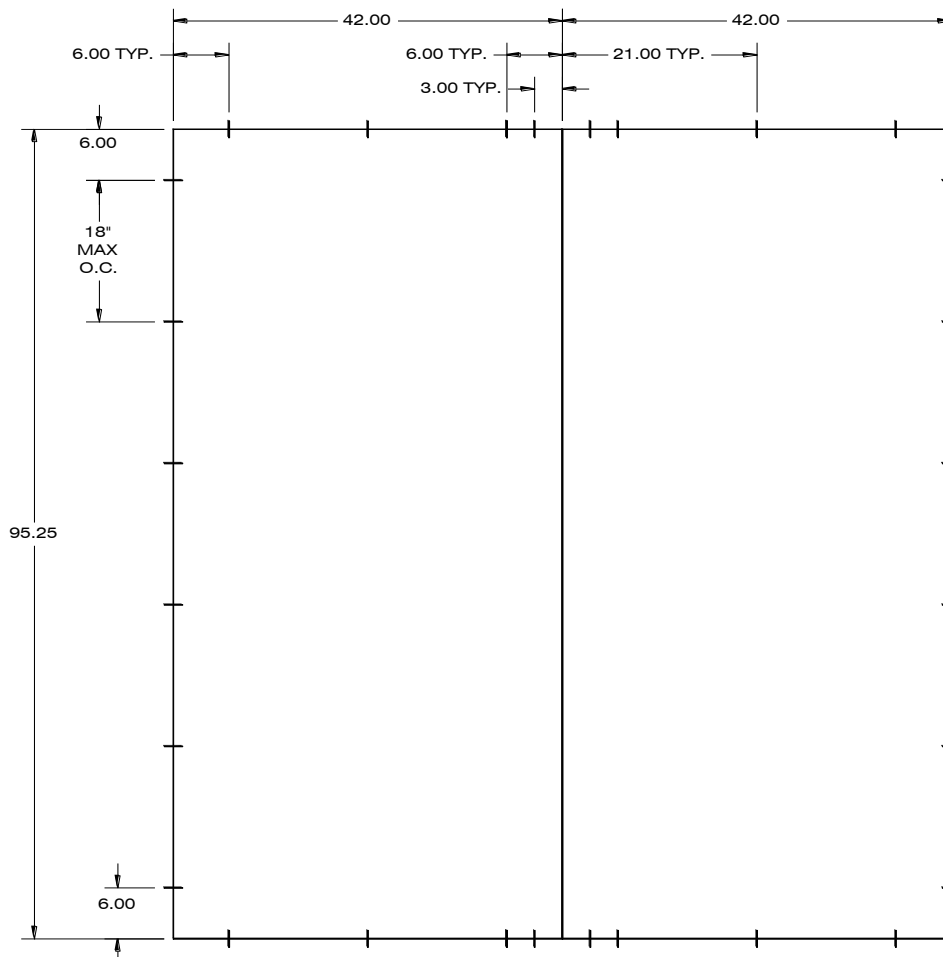


Design pressure: 55.0 psf

Zone	Area (ft ²)	Load (lbs)	Ind. (in)	Max. O.C. (in)	Anchor			Result
					Cap. (lbs)	Qty	Load (lbs)	
A ₁	0.3	19	N/A	N/A	155	1	19	OK
A ₂	4.3	236	6.00	18.00	155	6	39	OK
A ₃	7.6	416	N/A	N/A	155	3	139	OK
A ₄	3.1	168	N/A	N/A	155	2	84	OK
A ₅	10.8	596	N/A	N/A	155	4	149	OK

Anchor Locations:

Double door



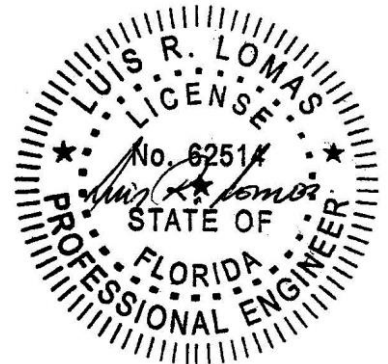
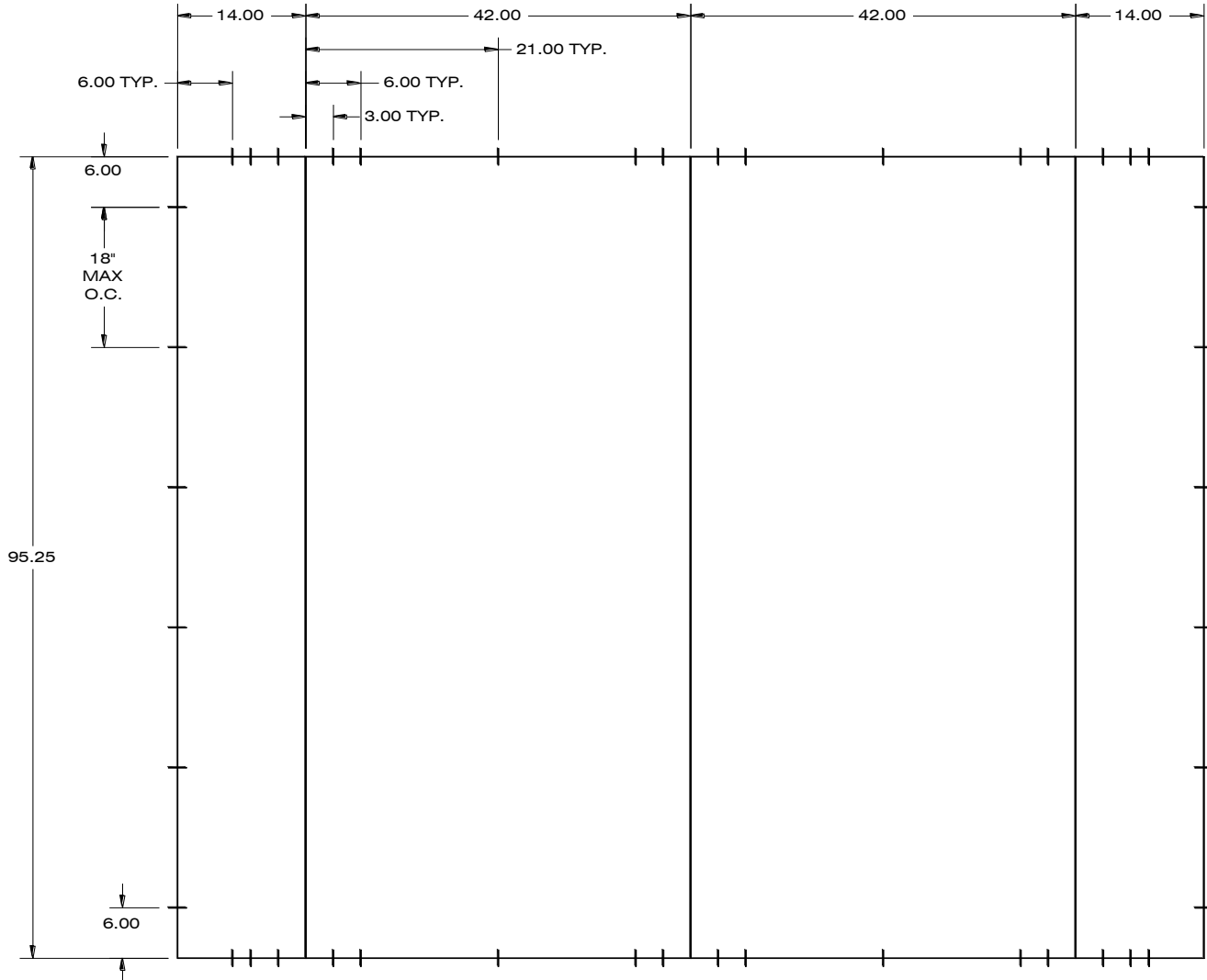
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Double door with sidelites



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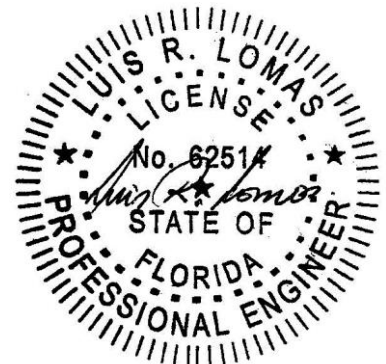
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Installation instructions:

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 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 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 .054" THICK MINIMUM
6. ANCHOR LOCATIONS SHOWN IN THIS DOCUMENT ARE THE MINIMUM REQUIRED FOR THE DESCRIBED PRODUCT EXPOSED AT THE DESIGN PRESSURE INDICATED HEREIN.
7. WOOD FRAMING AND MASONRY OPENING TO BE DESIGNED AND ANCHORED TO PROPERLY TRANSFER ALL LOADS TO STRUCTURE. FRAMING AND MASONRY OPENING IS THE RESPONSIBILITY OF THE ARCHITECT OR ENGINEER OF RECORD.
8. WHERE SHIM OR BUCK THICKNESS IS LESS THAN 1-1/2" UNITS MUST BE ANCHORED THROUGH FRAME IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED INSTALLATION INSTRUCTIONS. ANCHORS SHALL BE SECURELY FASTENED DIRECTLY INTO MASONRY, CONCRETE OR OTHER STRUCTURAL SUBSTRATE MATERIAL.
9. WHERE WOOD BUCK THICKNESS IS 1-1/2" OR GREATER, BUCK SHALL BE SECURELY FASTENED TO MASONRY, CONCRETE OR OTHER STRUCTURAL SUBSTRATE. UNITS MAY BE ANCHORED THROUGH FRAME TO SECURED WOOD BUCK IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED INSTALLATION INSTRUCTIONS.
10. WHERE 1X BUCK IS NOT USED DISSIMILAR MATERIALS MUST BE SEPARATED WITH APPROVED COATING OR MEMBRANE. SELECTION OF COATING OR MEMBRANE IS THE RESPONSIBILITY OF THE ARCHITECT OR ENGINEER OF RECORD.
11. BUCKS SHALL EXTEND BEYOND WINDOW INTERIOR FACE SO THAT FULL FRAME SUPPORT IS PROVIDED.



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