

Micah Swartz, P.E.	Project Number:	MS24-05001
	Project Name:	LaCantina 99x120
	Date:	9/8/2025

**Product Approval Supporting Calculations
Alternative Anchorage Analysis & Design
R2 - Admin Update**

Project Number: MS24-05001

Drawing Number: D1000834

Reference Test Report: q9099.01-303-44-r1

Product Name: LaCantina - Aluminum Swinging Door

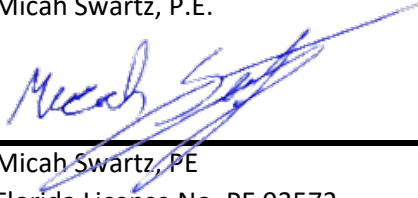
Prepared for:

Jeld-Wen Windows & Doors
3737 Lakeport Blvd.
Klamath Falls, OR



09/11/25

Prepared by:
Micah Swartz, P.E.


Micah Swartz, PE
Florida License No. PE 93573

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Micah Swartz, P.E.	Project Number:	MS24-05001
	Project Name:	LaCantina 99x120
	Date:	5/31/2024
	Page:	2 of 8

Scope:

Micah Swartz, P.E. is contracted by Jeld-Wen Windows & Doors to evaluate alternative anchorage for the product: LaCantina - Aluminum Swinging Door. This evaluation is based on testing performed by Intertek in Lake Forest, CA, test report no.: q9099.01-303-44-r1 and dated 1/30/2024.

This evaluation does not include the air infiltration, water resistance or water penetration of the installation method or the installed product. In addition, the design of the building substrate to resist the superimposed loads is by others.

Reference Standards:

Current edition of the Florida Building Code, Building

ANSI/AWC NDS - National Design Specification (NDS) for Wood Construction

AISI S100 North American Specification for the Design of Cold-Formed Steel Structural Members

ICC-ES Report ESR-1976 ITW Buildex TEKS Self-Drilling Fasteners

ICC-ES Report ESR-2196 Hilti Self Drilling Screws to connect cold-formed steel

NOA 24-0102.06 Tapcon Concrete and Masonry Anchors with Advanced Threadform Technology

Certification of Independence:

In accordance with Rule 61G20-3 Florida Administrative Code, Micah Swartz, P.E. hereby certifies the following:

(1) Micah Swartz, P.E. does not have, nor does it intend to acquire or will it acquire, a financial interest in any company manufacturing or distributing products tested or labeled by the agency.

(2) Micah Swartz, P.E. is not owned, operated or controlled by any company manufacturing or distributing products it tests or labels.

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(4) Micah Swartz, P.E. does not have, nor will acquire, a financial interest in any other entity involved in the approval process of the product.

Micah Swartz, P.E.	Project Number:	MS24-05001
	Project Name:	LaCantina 99x120
	Date:	5/31/2024
	Page:	3 of 8

Design Summary:

The table below summarizes the product: LaCantina - Aluminum Swinging Door and their corresponding performance levels as established by testing.

Table 1: Summary of Test Results

Series/Model	Test Report Number	Size (W x H)	Performance
LaCantina - Aluminum Swinging Door	q9099.01-303-44-r1 (1/30/24)	99 x 120	+ 40 psf / - 50 psf

As Tested Design:

Screw Information:

Screw Size: 10 Screw Embed: 1.5 in Edge Distance: 3/4 in (minimum)

Wood Screw Lateral: 149 lbs

Alternative Fasteners:

Screw Information:

Screw Size: 10 Screw Embed: 1.5 in Edge Distance: 3/4 in (minimum)

Wood Screw Lateral: 149 lbs

Tapcon Information:

Tapcon Size: 1/4 Embedment: 1-1/4 in (minimum) Edge Distance: 2-1/2 in (minimum)

Tapcon Lateral (Concrete): 203 lbs

Tapcon Lateral (CMU): 161 lbs

Micah Swartz, P.E.	Project Number:	MS24-05001
	Project Name:	LaCantina 99x120
	Date:	5/31/2024
		Page: 4 of 8

Subject: As Tested - Wood Screw Lateral Design - Single Shear

Input:

Calculation:

Screw Information:

Screw Size:

Root Diameter: in

Screw Embed: in

Main Member Type:

G:

F_{em}: psi

thickness (t_m): in

Side Member Type:

G:

F_{es}: psi

thickness (t_s): in

Lateral Design Factors - Table 12.3.1A (NDS)

D:	0.152 in	Diameter
F _{yb} :	90 ksi	Dowel Bending Yield Strength
F _{em} :	3,350 psi	Main Member dowel bearing strength
F _{es} :	13,750 psi	Side Member dowel bearing strength
l _m :	1.5 in	Main Member dowel bearing length
l _s :	0.125 in	Side Member dowel bearing length
R _d :	2.2	Reduction term - Table 12.3.1B (NDS)
R _e :	0.2436	= F _{em} /F _{es}
R _t :	12.0	= l _m /l _s
k ₁ :	1.135	See Table
k ₂ :	0.662	See Table

Reference Lateral Design Values - Table 12.3.1A (NDS)

Z_{I_m}: lbs

$Z_{Im} = \frac{Dl_mF_{em}}{R_d}$
(EQ 12.3 – 1)

Z_{II}: lbs

$Z_{II} = \frac{k_1Dl_sF_{es}}{R_d}$
(EQ 12.3 – 3)

Z_{III_m}: lbs

$Z_{III_m} = \frac{k_2Dl_mF_{em}}{(1 + 2R_e)R_d}$
(EQ 12.3 – 4)

Z_{IV}: lbs

$Z_{IV} = \frac{D^2}{R_d} \sqrt{\frac{2F_{em}F_{yb}}{3(1 + R_e)}}$
(EQ 12.3 – 6)

Z_{MIN}: lbs

Note: Side member is part of the Jeld-Wen assembly and verified during testing. Modes Z_{Is} and Z_{IIIs} are not applicable to the calculation.

Micah Swartz, P.E.	Project Number:	MS24-05001
	Project Name:	LaCantina 99x120
	Date:	5/31/2024
	Page:	5 of 8

Subject: As Tested - Wood Screw Lateral Design - Single Shear Cont.

Adjusted Lateral Design Values

$Z' = Z * C_D * C_M * C_t * C_g * C_{\Delta}$ – As per table 11.3.1 NDS

C _D :	1.6	Load Duration Factor - Table 2.3.2 (NDS)
C _M :	1.0	Wet Service Factor - Table 11.3.3 (NDS)
C _t :	1.0	Temperature Factor - Table 11.3.4 (NDS)
C _g :	1.0	Group Action Factor - Section 11.3.6 (NDS)
C _Δ :	1.0	Geometry Factor - Section 12.5.1.1 (NDS)

Z': 214 lbs

Fastener Bending Across Shim Space

Ω:	1.67	
L:	0.25	in Maximum Shim Gap
D:	0.152	in Diameter
F _{yb} :	90	ksi Dowel Bending Yield Strength

$\frac{F_{yb}}{\Omega} = \frac{M}{S} = \frac{16ZL}{\pi D^3} \Leftrightarrow Z = \frac{F_{yb}\pi D^3}{16\Omega L}$ Where $M = \frac{ZL}{2}$ (Guided Bending)

Z_n/Ω: 149 lbs

Bearing on Masonry Strap

Ω:	3.00	
F _u :	33	ksi Tensile Strength of strap
t:	20	GA
t:	0.036	in thickness of strap
D:	0.152	in

$\frac{P_{nv}}{\Omega} = 2.7 * t * D * F_u$ – (EQ.J4.3.1 – 4, AISI S100)

P_{nv}/Ω: 162 lbs

Micah Swartz, P.E.	Project Number:	MS24-05001
	Project Name:	LaCantina 99x120
	Date:	5/31/2024
	Page:	6 of 8

Subject: Wood Screw Lateral Design - Single Shear

Input:

Calculation:

Screw Information:

Screw Size: Root Diameter: in

Screw Embed: in

Main Member Type: G: F_{em}: psi thickness (t_m): in

Side Member Type: G: F_{es}: psi thickness (t_s): in

Lateral Design Factors - Table 12.3.1A (NDS)

D:	0.152	in	Diameter
F _{yb} :	90	ksi	Dowel Bending Yield Strength
F _{em} :	3,350	psi	Main Member dowel bearing strength
F _{es} :	13,750	psi	Side Member dowel bearing strength
l _m :	1.5	in	Main Member dowel bearing length
l _s :	0.125	in	Side Member dowel bearing length
R _d :	2.2		Reduction term - Table 12.3.1B (NDS)
R _e :	0.2436		= F _{em} /F _{es}
R _t :	12.0		= l _m /l _s
k ₁ :	1.135		See Table
k ₂ :	0.662		See Table

Reference Lateral Design Values - Table 12.3.1A (NDS)

Z_I: lbs $Z_{Im} = \frac{Dl_mF_{em}}{R_d}$ (EQ 12.3 – 1)

Z_{II}: lbs $Z_{II} = \frac{k_1Dl_sF_{es}}{R_d}$ (EQ 12.3 – 3)

Z_{III}: lbs $Z_{III_m} = \frac{k_2Dl_mF_{em}}{(1 + 2R_e)R_d}$ (EQ 12.3 – 4)

Z_{IV}: lbs $Z_{IV} = \frac{D^2}{R_d} \sqrt{\frac{2F_{em}F_{yb}}{3(1 + R_e)}}$ (EQ 12.3 – 6)

Z_{MIN}: lbs

Note: Side member is part of the Jeld-Wen assembly and verified during testing. Modes Z_{Is} and Z_{IIIs} are not applicable to the calculation.

Micah Swartz, P.E.	Project Number:	MS24-05001
	Project Name:	LaCantina 99x120
	Date:	5/31/2024
		Page: 7 of 8

Subject: Wood Screw Lateral Design - Single Shear Cont.

Adjusted Lateral Design Values

$Z' = Z * C_D * C_M * C_t * C_g * C_{\Delta}$ – As per table 11.3.1 NDS

C _D :	1.6	Load Duration Factor - Table 2.3.2 (NDS)
C _M :	1.0	Wet Service Factor - Table 11.3.3 (NDS)
C _t :	1.0	Temperature Factor - Table 11.3.4 (NDS)
C _g :	1.0	Group Action Factor - Section 11.3.6 (NDS)
C _Δ :	1.0	Geometry Factor - Section 12.5.1.1 (NDS)

Z': 214 lbs

Fastener Bending Across Shim Space

Ω:	1.67	
L:	0.25	in Maximum Shim Gap
D:	0.152	in Diameter
F _{yb} :	90	ksi Dowel Bending Yield Strength

$\frac{F_{yb}}{\Omega} = \frac{M}{S} = \frac{16ZL}{\pi D^3} \Leftrightarrow Z = \frac{F_{yb}\pi D^3}{16\Omega L}$ Where $M = \frac{ZL}{2}$ (Guided Bending)

Z_n/Ω: 149 lbs

Bearing on Masonry Strap

Ω:	3.00	
F _u :	33	ksi Tensile Strength of strap
t:	20	GA
t:	0.036	in thickness of strap
D:	0.152	in

$\frac{P_{nv}}{\Omega} = 2.7 * t * D * F_u$ – (EQ.J4.3.1 – 4, AISI S100)

P_{nv}/Ω: 162 lbs

Micah Swartz, P.E.	Project Number:	MS24-05001
	Project Name:	LaCantina 99x120
	Date:	5/31/2024
	Page:	8 of 8

Subject: Tapcon Lateral Design

Input:	
Calculation:	

Tapcon Size:

Size:	1/4	
D:	0.25	in Nominal Diameter
D _{sh} :	0.19	in Shank Diameter

Fastener Shear Capacity - 3,000 psi Concrete

P_{nv}/Ω: 237 lbs See Table 1B of NOA 24-0102.06

Fastener Shear Capacity - Medium-Weight CMU

P_{nv}/Ω: 161 lbs See Table 3 of NOA 24-0102.06

- Note:
- Critical anchor spacing is 16D
 - Minimum Anchor Embedment is 1-1/4"
 - Minimum Edge Distance is 2-1/4"

Fastener Bending Across Shim Space

L:	0.25	in Maximum Shim Gap
D _{sh} :	0.19	in Shank Diameter of Tapcon
F _{yb} :	100	ksi Yield Strength of Tapcon

Ω: 3.00

$$\frac{F_{yb}}{\Omega} = \frac{M}{S} = \frac{16P_n L}{\pi D^3} \Leftrightarrow P_n = \frac{F_{yb} \pi D^3}{16 \Omega L}$$

Where $M = \frac{P_n L}{2}$ (Guided Bending)

P_n/Ω: 539 lbs

Bearing Strength of Masonry Straps - AISI S100

Size:	1/4	Tapcon Size
D _{sh} :	0.19	in Shank Diameter of Tapcon Screw
F _u :	33	ksi Tensile Strength of Masonry Strap
t:	20	GA
t:	0.0359	in Thickness of Masonry Strap

Ω: 3.00

$$\frac{P_{nv}}{\Omega} = 2.7 * t * D * F_u - (EQ.J4.3.1 - 3, AISI S100)$$

P_{nv}/Ω: 203 lbs