

|                           |                 |                       |
|---------------------------|-----------------|-----------------------|
| <b>Micah Swartz, P.E.</b> | Project Number: | MS24-05002            |
|                           | Project Name:   | LaCantina 89.76 x 144 |
|                           | Date:           | 9/8/2025              |

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

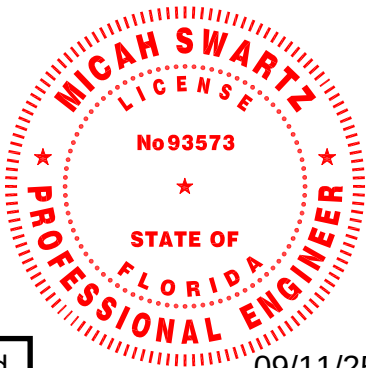
**Project Number:** MS24-05002

**Drawing Number:** D1000384

**Reference Test Report:** q9100.01-303-44-r2

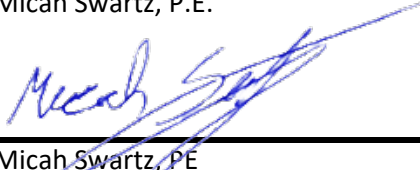
**Product Name:** LaCantina - Aluminum Swinging Door

**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

This item has been digitally signed and sealed by Micah Swartz, P.E. on the date adjacent to the seal.

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|---------------------------|-----------------|-----------------------|
| <b>Micah Swartz, P.E.</b> | Project Number: | MS24-05002            |
|                           | Project Name:   | LaCantina 89.76 x 144 |
|                           | Date:           | 5/23/2024             |
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**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.: q9100.01-303-44-r2 and dated 2/23/2024.

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.

(3) Micah Swartz, P.E. does not have, nor will acquire, a financial interest in any company manufacturing or distributing products for which the reports are being issued.

(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.

|                           |                 |                       |       |
|---------------------------|-----------------|-----------------------|-------|
| <b>Micah Swartz, P.E.</b> | Project Number: | MS24-05002            |       |
|                           | Project Name:   | LaCantina 89.76 x 144 |       |
|                           | Date:           | 6/29/2024             | Page: |

**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 | q9100.01-303-44-r2<br>(2/23/24) | 89.76 x 144  | + 35 psf / - 35 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

|                                                |                                     |
|------------------------------------------------|-------------------------------------|
| <h1 style="margin: 0;">Micah Swartz, P.E.</h1> | Project Number: MS24-05002          |
|                                                | Project Name: LaCantina 89.76 x 144 |
|                                                | Date: 5/23/2024      Page: 4 of 8   |

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

Input:    
 Calculation:

**Screw Information:**

Screw Size: 10  
 Screw Embed: 1.5 in

Root Diameter: 0.152 in

Main Member Type: S-P-F    G: 0.42    F<sub>em</sub>: 3,350 psi    thickness (t<sub>m</sub>): 1.5 in

Side Member Type: Alum    G: N/A    F<sub>es</sub>: 22,000 psi    thickness (t<sub>s</sub>): 0.0625 in

**Lateral Design Factors - Table 12.3.1A (NDS)**

|                   |        |     |                                      |
|-------------------|--------|-----|--------------------------------------|
| D:                | 0.152  | in  | Diameter                             |
| F <sub>yb</sub> : | 90     | ksi | Dowel Bending Yield Strength         |
| F <sub>em</sub> : | 3,350  | psi | Main Member dowel bearing strength   |
| F <sub>es</sub> : | 22,000 | psi | Side Member dowel bearing strength   |
| l <sub>m</sub> :  | 1.5    | in  | Main Member dowel bearing length     |
| l <sub>s</sub> :  | 0.0625 | in  | Side Member dowel bearing length     |
| R <sub>d</sub> :  | 2.2    |     | Reduction term - Table 12.3.1B (NDS) |
| R <sub>e</sub> :  | 0.1523 |     | = F <sub>em</sub> /F <sub>es</sub>   |
| R <sub>t</sub> :  | 24.0   |     | = l <sub>m</sub> /l <sub>s</sub>     |
| k <sub>1</sub> :  | 1.454  |     | See Table                            |
| k <sub>2</sub> :  | 0.595  |     | See Table                            |

**Reference Lateral Design Values - Table 12.3.1A (NDS)**

Z<sub>I<sub>m</sub></sub>: 347 lbs

$$Z_{I_m} = \frac{D l_m F_{em}}{R_d} \text{ (EQ 12.3 - 1)}$$

Z<sub>II</sub>: 138 lbs

$$Z_{II} = \frac{k_1 D l_s F_{es}}{R_d} \text{ (EQ 12.3 - 3)}$$

Z<sub>III<sub>m</sub></sub>: 158 lbs

$$Z_{III_m} = \frac{k_2 D l_m F_{em}}{(1 + 2 R_e) R_d} \text{ (EQ 12.3 - 4)}$$

Z<sub>IV</sub>: 139 lbs

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

Z<sub>MIN</sub>: 138 lbs

Note: Side member is part of the Jeld-Wen assembly and verified during testing. Modes Z<sub>Is</sub> and Z<sub>III<sub>s</sub></sub> are not applicable to the calculation.

|                           |                 |                       |
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|                           | Project Name:   | LaCantina 89.76 x 144 |
|                           | Date:           | 5/23/2024             |
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**Subject:** As Tested - Wood Screw Lateral Design - Single Shear Cont.

**Adjusted Lateral Design Values**

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

|                  |     |                                            |
|------------------|-----|--------------------------------------------|
| C <sub>D</sub> : | 1.6 | Load Duration Factor - Table 2.3.2 (NDS)   |
| C <sub>M</sub> : | 1.0 | Wet Service Factor - Table 11.3.3 (NDS)    |
| C <sub>t</sub> : | 1.0 | Temperature Factor - Table 11.3.4 (NDS)    |
| C <sub>g</sub> : | 1.0 | Group Action Factor - Section 11.3.6 (NDS) |
| C <sub>Δ</sub> : | 1.0 | Geometry Factor - Section 12.5.1.1 (NDS)   |

$$Z': \quad 221 \text{ lbs}$$

**Fastener Bending Across Shim Space**

|                   |       |                                       |
|-------------------|-------|---------------------------------------|
| Ω:                | 1.67  |                                       |
| L:                | 0.25  | in      Maximum Shim Gap              |
| D:                | 0.152 | in      Diameter                      |
| F <sub>yb</sub> : | 90    | ksi      Dowel Bending Yield Strength |

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

$$Z_n/\Omega: \quad 149 \text{ lbs}$$

**Bearing on Masonry Strap**

|                  |       |                                    |
|------------------|-------|------------------------------------|
| Ω:               | 3.00  |                                    |
| F <sub>u</sub> : | 33    | ksi      Tensile Strength of strap |
| t:               | 20    | GA                                 |
| t:               | 0.036 | in      thickness of strap         |
| D:               | 0.152 | in                                 |

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

$$P_{nv}/\Omega: \quad 162 \text{ lbs}$$

|                                                |                                     |
|------------------------------------------------|-------------------------------------|
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|                                                | Project Name: LaCantina 89.76 x 144 |
|                                                | Date: 5/23/2024      Page: 6 of 8   |

**Subject:** Wood Screw Lateral Design - Single Shear

Input:    
 Calculation:  

**Screw Information:**

Screw Size: 10      Root Diameter: 0.152 in  
 Screw Embed: 1.5 in

Main Member Type: S-P-F      G: 0.42      F<sub>em</sub>: 3,350 psi      thickness (t<sub>m</sub>): 1.5 in

Side Member Type: Alum      G: N/A      F<sub>es</sub>: 22,000 psi      thickness (t<sub>s</sub>): 0.0625 in

**Lateral Design Factors - Table 12.3.1A (NDS)**

|                   |                                                                             |                                      |
|-------------------|-----------------------------------------------------------------------------|--------------------------------------|
| D:                | <span style="border: 1px solid black; padding: 2px 10px;">0.152</span> in   | Diameter                             |
| F <sub>yb</sub> : | <span style="border: 1px solid black; padding: 2px 10px;">90</span> ksi     | Dowel Bending Yield Strength         |
| F <sub>em</sub> : | <span style="border: 1px solid black; padding: 2px 10px;">3,350</span> psi  | Main Member dowel bearing strength   |
| F <sub>es</sub> : | <span style="border: 1px solid black; padding: 2px 10px;">22,000</span> psi | Side Member dowel bearing strength   |
| l <sub>m</sub> :  | <span style="border: 1px solid black; padding: 2px 10px;">1.5</span> in     | Main Member dowel bearing length     |
| l <sub>s</sub> :  | <span style="border: 1px solid black; padding: 2px 10px;">0.0625</span> in  | Side Member dowel bearing length     |
| R <sub>d</sub> :  | <span style="border: 1px solid black; padding: 2px 10px;">2.2</span>        | Reduction term - Table 12.3.1B (NDS) |
| R <sub>e</sub> :  | <span style="border: 1px solid black; padding: 2px 10px;">0.1523</span>     | = F <sub>em</sub> /F <sub>es</sub>   |
| R <sub>t</sub> :  | <span style="border: 1px solid black; padding: 2px 10px;">24.0</span>       | = l <sub>m</sub> /l <sub>s</sub>     |
| k <sub>1</sub> :  | <span style="border: 1px solid black; padding: 2px 10px;">1.454</span>      | See Table                            |
| k <sub>2</sub> :  | <span style="border: 1px solid black; padding: 2px 10px;">0.595</span>      | See Table                            |

**Reference Lateral Design Values - Table 12.3.1A (NDS)**

Z<sub>I<sub>m</sub></sub>: 347 lbs       $Z_{Im} = \frac{D l_m F_{em}}{R_d}$  (EQ 12.3 – 1)

Z<sub>II</sub>: 138 lbs       $Z_{II} = \frac{k_1 D l_s F_{es}}{R_d}$  (EQ 12.3 – 3)

Z<sub>III<sub>m</sub></sub>: 158 lbs       $Z_{III_m} = \frac{k_2 D l_m F_{em}}{(1 + 2R_e) R_d}$  (EQ 12.3 – 4)

Z<sub>IV</sub>: 139 lbs       $Z_{IV} = \frac{D^2}{R_d} \sqrt{\frac{2 F_{em} F_{yb}}{3(1 + R_e)}}$  (EQ 12.3 – 6)

Z<sub>MIN</sub>: 138 lbs

Note: Side member is part of the Jeld-Wen assembly and verified during testing. Modes Z<sub>I<sub>s</sub></sub> and Z<sub>III<sub>s</sub></sub> are not applicable to the calculation.

|                           |                 |                       |
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**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 <sub>D</sub> : | 1.6 | Load Duration Factor - Table 2.3.2 (NDS)   |
| C <sub>M</sub> : | 1.0 | Wet Service Factor - Table 11.3.3 (NDS)    |
| C <sub>t</sub> : | 1.0 | Temperature Factor - Table 11.3.4 (NDS)    |
| C <sub>g</sub> : | 1.0 | Group Action Factor - Section 11.3.6 (NDS) |
| C <sub>Δ</sub> : | 1.0 | Geometry Factor - Section 12.5.1.1 (NDS)   |

Z': 221 lbs

**Fastener Bending Across Shim Space**

|                   |       |                                  |
|-------------------|-------|----------------------------------|
| Ω:                | 1.67  |                                  |
| L:                | 0.25  | in Maximum Shim Gap              |
| D:                | 0.152 | in Diameter                      |
| F <sub>yb</sub> : | 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<sub>n</sub>/Ω: 149 lbs

**Bearing on Masonry Strap**

|                  |       |                               |
|------------------|-------|-------------------------------|
| Ω:               | 3.00  |                               |
| F <sub>u</sub> : | 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<sub>nv</sub>/Ω: 162 lbs

|                           |                 |                       |
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Subject: Tapcon Lateral Design

Input:

Calculation:

Tapcon Size:

|                   |      |                     |
|-------------------|------|---------------------|
| Size:             | 1/4  |                     |
| D:                | 0.25 | in Nominal Diameter |
| D <sub>sh</sub> : | 0.19 | in Shank Diameter   |

Fastener Shear Capacity - 3,000 psi Concrete

P<sub>nv</sub>/Ω: 237 lbs      See Table 1B of NOA 24-0102.06

Fastener Shear Capacity - Medium-Weight CMU

P<sub>nv</sub>/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 <sub>sh</sub> : | 0.19 | in Shank Diameter of Tapcon  |
| F <sub>yb</sub> : | 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<sub>n</sub>/Ω: 539 lbs

Bearing Strength of Masonry Straps - AISI S100

|                   |        |                                       |
|-------------------|--------|---------------------------------------|
| Size:             | 1/4    | Tapcon Size                           |
| D <sub>sh</sub> : | 0.19   | in Shank Diameter of Tapcon Screw     |
| F <sub>u</sub> :  | 33     | ksi Tensile Strength of Masonry Strap |
| t:                | 20     | GA                                    |
| t:                | 0.0359 | in Thickness of Masonry Strap         |

Ω: 3.00

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

P<sub>nv</sub>/Ω: 203 lbs