

**SWARTZ**  
CONSULTING ENGINEERS LLC

|                 |                             |
|-----------------|-----------------------------|
| Project Number: | SCE 26-06001                |
| Project Name:   | Premium Atlantic Vinyl Tilt |
| Date:           | 5/12/2026                   |
| Page:           | 1 of 18                     |

## Product Approval Supporting Calculations Alternative Anchorage Analysis & Design

**Project Number:** SCE 26-06001

**Drawing Number:** D008729

**Reference Test Report:** 32931.01-201-12

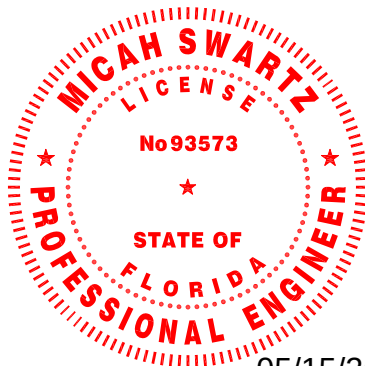
**Product Name:** Premium Atlantic Vinyl Tilt 36 x 72

**Impact:** Yes - HVHZ

**Design Pressure:** +65 psf / -70 psf

**Prepared for:**

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

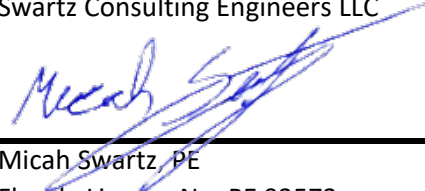


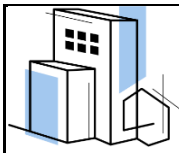
05/15/26

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

Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

Prepared by:  
Swartz Consulting Engineers LLC

  
Micah Swartz, PE  
Florida License No. PE 93573  
Florida Registry No. 38420



**Scope:**

Swartz Consulting Engineers LLC is contracted by Jeld-Wen Windows & Doors to evaluate alternative anchorage for the product: Premium Atlantic Vinyl Tilt 36 x 72. This evaluation is based on testing observed by Molimo in Klamath Falls, OR, test report no.: 32931.01-201-12 and dated 4/23/26.

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:**

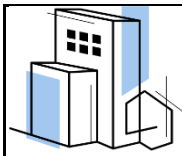
In accordance with Rule 61G20-3 Florida Administrative Code, Swartz Consulting Engineers LLC hereby certifies the following:

(1) Swartz Consulting Engineers LLC 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) Swartz Consulting Engineers LLC 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.



**Design Summary:**

The table below summarizes the product: Premium Atlantic Vinyl Tilt 36 x 72 and their corresponding performance levels as established by testing.

**Table 1:** Summary of Test Results

| Series/Model                        | Test Report Number        | Size<br>(W x H) | Performance       |
|-------------------------------------|---------------------------|-----------------|-------------------|
| Premium Atlantic Vinyl Tilt 36 x 72 | 32931.01-201-12 (4/23/26) | 36 x 72         | +65 psf / -70 psf |

**As Tested Design:**

Applied Load (psf): 70 psf Width: 36 in Height: 72 in  
Max ULD (along jamb): 105 plf

**Screw Information:**

Screw Size: 10 Screw Embed: 1 in Edge Distance: 3/4 in (minimum)  
qty: 1 Spacing: 14 in O.C. (Nail Fin)  
qty: 1 Spacing: 14 in O.C. (Thru Frame)

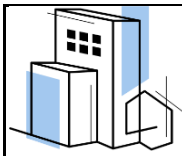
Wood Screw Withdrawal: 152 lbs Per ft. Capacity: 130 plf Unity: 0.81  
Wood Screw Lateral: 149 lbs Per ft. Capacity: 127 plf Unity: 0.82

**Alternative Fasteners:**

**Screw Information:**

Screw Size: 10 Screw Embed: 1.5 in Edge Distance: 3/4 in (minimum)  
qty: 1 Spacing: 14 in O.C. (Nail Fin)  
qty: 1 Spacing: 14 in O.C. (Thru Frame)

Wood Screw Withdrawal: 228 lbs Per ft. Capacity: 195 plf Unity: 0.54  
Wood Screw Lateral: 149 lbs Per ft. Capacity: 127 plf Unity: 0.82



**Design Summary Continued:**

**Nail Information:**

Nail Size: 6d      Nail Type: Common      Edge Distance: 3/4 in (minimum)  
qty: 1      Spacing: 6 in O.C. (Nail Fin)  
qty: 2      Spacing: 14 in O.C. (Strap)

|                  |     |     |                   |     |     |        |      |
|------------------|-----|-----|-------------------|-----|-----|--------|------|
| Nail Withdrawal: | 55  | lbs | Per ft. Capacity: | 111 | plf | Unity: | 0.95 |
| Nail Lateral:    | 113 | lbs | Per ft. Capacity: | 194 | plf | Unity: | 0.54 |

**TEK Screw Information:**

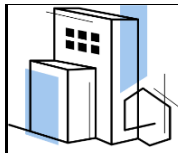
Screw Size: 10-16      qty: 1      Spacing: 14 in O.C. (Thru Frame)  
qty: 1      Spacing: 14 in O.C. (Nail Fin)

|                 |     |     |                   |     |     |        |      |
|-----------------|-----|-----|-------------------|-----|-----|--------|------|
| TEK Withdrawal: | 145 | lbs | Per ft. Capacity: | 124 | plf | Unity: | 0.84 |
| TEK Lateral:    | 147 | lbs | Per ft. Capacity: | 126 | plf | Unity: | 0.83 |

**Tapcon Information:**

Tapcon Size: 1/4      Embedment: 1-1/4 in (minimum)      Edge Distance: 2-1/2 in (minimum)  
qty: 1      Spacing: 14 in O.C.

|                            |     |     |                   |     |     |        |      |
|----------------------------|-----|-----|-------------------|-----|-----|--------|------|
| Tapcon Lateral (Concrete): | 203 | lbs | Per ft. Capacity: | 174 | plf | Unity: | 0.60 |
| Tapcon Lateral (CMU):      | 161 | lbs | Per ft. Capacity: | 138 | plf | Unity: | 0.76 |

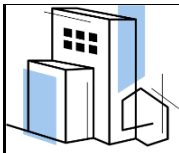


### Summary of Test Results - Plastics Checklist

**Table 2:** Summary of Test Results - Plastics Checklist

| Product             | Test Report Number | Test Standard                     | Performance        |
|---------------------|--------------------|-----------------------------------|--------------------|
| White PVC 1476 5110 | P6504.04-106-18 R0 | ASTM D638 (before and after G155) | +9.5%              |
|                     |                    | ASTM D1929                        | 824 °F (440 °C)    |
|                     |                    | ASTM D2843                        | 71.8               |
|                     |                    | ASTM D635                         | Classification CC1 |
|                     |                    | ASTM 256                          | -3.3%              |
| White PVC 1476 5290 | P6504.04-106-18 R0 | ASTM D638 (before and after G155) | +9.5%              |
|                     |                    | ASTM D1929                        | 806 °F (430 °C)    |
|                     |                    | ASTM D2843                        | 72.6               |
|                     |                    | ASTM D635                         | Classification CC1 |
|                     |                    | ASTM 256                          | -35.5%             |

The testing summarized in the table above was conducted by Intertek in York, PA dated 08/23/23 and meets the requirements listed in Miami-Dade County Checklist #0445, For the approval of: Plastic and Foam Plastic.



**Subject:** As Tested - Wood Screw Withdrawal

Input:

Calculation:

**Screw Information:**

Screw Size: 10

Root Diameter: 0.152 in

Screw Embed: 1 in

Main Member Type: S-P-F

G: 0.42

F<sub>em</sub>: 3,350 psi

$$W' = W * C_D * C_M^2 * C_t - \text{As per table 11.3.1 NDS}$$

C<sub>D</sub>: 1.6 Load Duration Factor - Table 2.3.2 (NDS)

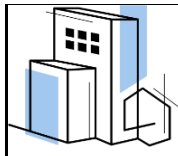
C<sub>M</sub>: 1.0 Wet Service Factor - Table 11.3.3 (NDS)

C<sub>t</sub>: 1.0 Temperature Factor - Table 11.3.4 (NDS)

W: 95 lbs/in - Table 12.2B (NDS)

W: 95 lbs

W': 152 lbs



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

Input:

Calculation:

**Screw Information:**

Screw Size: 10

Root Diameter: 0.152 in

Screw Embed: 1 in

Main Member Type: S-P-F

G: 0.42

$F_{em}$ : 3,350 psi

thickness ( $t_m$ ): 1.5 in

Side Member Type: S-P-F

G: 0.42

$F_{es}$ : 3,350 psi

thickness ( $t_s$ ): 1.25 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   |
| $F_{es}$ : | 3,350 | psi | Side Member dowel bearing strength   |
| $l_m$ :    | 1     | in  | Main Member dowel bearing length     |
| $l_s$ :    | 1.25  | in  | Side Member dowel bearing length     |
| $R_d$ :    | 2.2   |     | Reduction term - Table 12.3.1B (NDS) |
| $R_e$ :    | 1     |     | $= F_{em}/F_{es}$                    |
| $R_t$ :    | 0.8   |     | $= l_m/l_s$                          |
| $k_1$ :    | 0.377 |     | See Table                            |
| $k_2$ :    | 1.289 |     | See Table                            |

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

$Z_{Im}$ : 231 lbs  $Z_{Im} = \frac{D l_m F_{em}}{R_d}$  (EQ 12.3 - 1)

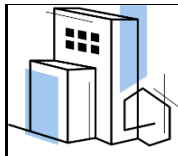
$Z_{II}$ : 109 lbs  $Z_{II} = \frac{k_1 D l_s F_{es}}{R_d}$  (EQ 12.3 - 3)

$Z_{III}$ : 99 lbs  $Z_{III} = \frac{k_2 D l_m F_{em}}{(1 + 2R_e) R_d}$  (EQ 12.3 - 4)

$Z_{IV}$ : 105 lbs  $Z_{IV} = \frac{D^2}{R_d} \sqrt{\frac{2F_{em}F_{yb}}{3(1 + R_e)}}$  (EQ 12.3 - 6)

$Z_{MIN}$ : 99 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.



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

### Adjusted Lateral Design Values

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

|                |     |                                            |
|----------------|-----|--------------------------------------------|
| $C_D$ :        | 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) |
| $C_{\Delta}$ : | 1.0 | Geometry Factor - Section 12.5.1.1 (NDS)   |

$$Z': \boxed{159} \text{ lbs}$$

### Fastener Bending Across Shim Space

|            |       |                                  |
|------------|-------|----------------------------------|
| $\Omega$ : | 1.67  |                                  |
| L:         | 0.25  | in Maximum Shim Gap              |
| D:         | 0.152 | in Diameter                      |
| $F_{yb}$ : | 90    | ksi Dowel Bending Yield Strength |

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

$$\text{Where } M = \frac{ZL}{2} \text{ (Guided Bending)}$$

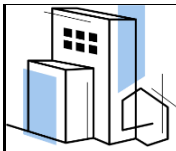
$$Z_n/\Omega: \boxed{149} \text{ lbs}$$

### Bearing on Masonry Strap

|            |       |                               |
|------------|-------|-------------------------------|
| $\Omega$ : | 3.00  |                               |
| $F_u$ :    | 33    | ksi Tensile Strength of strap |
| t:         | 20    | GA                            |
| t:         | 0.036 | in thickness of strap         |
| D:         | 0.152 | in                            |

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

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



**Subject:** Wood Screw Withdrawal

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

$$W' = W * C_D * C_M^2 * C_t - \text{As per table 11.3.1 NDS}$$

C<sub>D</sub>: 1.6 Load Duration Factor - Table 2.3.2 (NDS)

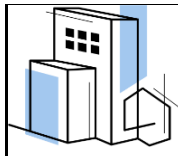
C<sub>M</sub>: 1.0 Wet Service Factor - Table 11.3.3 (NDS)

C<sub>t</sub>: 1.0 Temperature Factor - Table 11.3.4 (NDS)

W: 95 lbs/in - Table 12.2B (NDS)

W: 143 lbs

W': 228 lbs



**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

$F_{em}$ : 3,350 psi

thickness ( $t_m$ ): 1.5 in

Side Member Type: S-P-F

G: 0.42

$F_{es}$ : 3,350 psi

thickness ( $t_s$ ): 1.25 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   |
| $F_{es}$ : | 3,350 | psi | Side Member dowel bearing strength   |
| $l_m$ :    | 1.5   | in  | Main Member dowel bearing length     |
| $l_s$ :    | 1.25  | in  | Side Member dowel bearing length     |
| $R_d$ :    | 2.2   |     | Reduction term - Table 12.3.1B (NDS) |
| $R_e$ :    | 1     |     | $= F_{em}/F_{es}$                    |
| $R_t$ :    | 1.2   |     | $= l_m/l_s$                          |
| $k_1$ :    | 0.459 |     | See Table                            |
| $k_2$ :    | 1.133 |     | See Table                            |

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

$Z_{Im}$ : 347 lbs  $Z_{Im} = \frac{D l_m F_{em}}{R_d}$  (EQ 12.3 - 1)

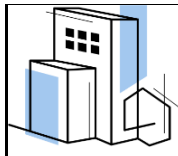
$Z_{II}$ : 133 lbs  $Z_{II} = \frac{k_1 D l_s F_{es}}{R_d}$  (EQ 12.3 - 3)

$Z_{III}$ : 131 lbs  $Z_{III} = \frac{k_2 D l_m F_{em}}{(1 + 2R_e) R_d}$  (EQ 12.3 - 4)

$Z_{IV}$ : 105 lbs  $Z_{IV} = \frac{D^2}{R_d} \sqrt{\frac{2F_{em}F_{yb}}{3(1 + R_e)}}$  (EQ 12.3 - 6)

$Z_{MIN}$ : 105 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.



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

### Adjusted Lateral Design Values

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

|                |     |                                            |
|----------------|-----|--------------------------------------------|
| $C_D$ :        | 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) |
| $C_{\Delta}$ : | 1.0 | Geometry Factor - Section 12.5.1.1 (NDS)   |

$$Z': \boxed{168} \text{ lbs}$$

### Fastener Bending Across Shim Space

|            |       |                                  |
|------------|-------|----------------------------------|
| $\Omega$ : | 1.67  |                                  |
| L:         | 0.25  | in Maximum Shim Gap              |
| D:         | 0.152 | in Diameter                      |
| $F_{yb}$ : | 90    | ksi Dowel Bending Yield Strength |

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

$$\text{Where } M = \frac{ZL}{2} \text{ (Guided Bending)}$$

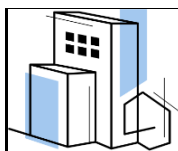
$$Z_n/\Omega: \boxed{149} \text{ lbs}$$

### Bearing on Masonry Strap

|            |       |                               |
|------------|-------|-------------------------------|
| $\Omega$ : | 3.00  |                               |
| $F_u$ :    | 33    | ksi Tensile Strength of strap |
| t:         | 20    | GA                            |
| t:         | 0.036 | in thickness of strap         |
| D:         | 0.152 | in                            |

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

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



**Subject:** Nail Withdrawal

Input:   
Calculation:

**Nail Information:**

Nail Size:  Nail Length:  in  
Nail Type:  Nail Diameter:  in Nail Embedment:  in

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

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

$$W' = W * C_D * C_M^2 * C_t - As \text{ per table 11.3.1 NDS}$$

$C_D$ :  Load Duration Factor - Table 2.3.2 (NDS)

$C_M$ :  Wet Service Factor - Table 11.3.3 (NDS)

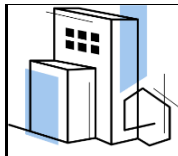
$C_t$ :  Temperature Factor - Table 11.3.4 (NDS)

W:  lbs/in

W:  lbs

$$W = 1380G^{5/2}D - Carbon \text{ Steel Nails (EQ. 12.2 - 3, NDS)}$$

W':  lbs



**Subject:** Nail Lateral Design - Single Shear

Input:

Calculation:

**Nail Information:**

Nail Size: 6d

Nail Length: 2 in

Nail Type: Common

Nail Diameter: 0.113 in

Nail Embedment: 1.69 in

Main Member Type: S-P-F

G: 0.42

$F_{em}$ : 3,350 psi

thickness ( $t_m$ ): 1.5 in

Side Member Type: Alum

G: N/A

$F_{es}$ : 21,000 psi

thickness ( $t_s$ ): 0.0625 in

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

|            |        |     |                                      |
|------------|--------|-----|--------------------------------------|
| D:         | 0.113  | in  | Diameter                             |
| $F_{yb}$ : | 100    | ksi | Dowel Bending Yield Strength         |
| $F_{em}$ : | 3,350  | psi | Main Member dowel bearing strength   |
| $F_{es}$ : | 21,000 | psi | Side Member dowel bearing strength   |
| $l_m$ :    | 1.6875 | in  | Main Member dowel bearing length     |
| $l_s$ :    | 0.0625 | in  | Side Member dowel bearing length     |
| $R_d$ :    | 2.2    |     | Reduction term - Table 12.3.1B (NDS) |
| $R_e$ :    | 0.1595 |     | $= F_{em}/F_{es}$                    |
| $R_t$ :    | 27.0   |     | $= l_m/l_s$                          |
| $k_1$ :    | 1.713  |     | See Table                            |
| $k_2$ :    | 0.561  |     | See Table                            |

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

$$Z_{Im}: 290 \text{ lbs} \quad Z_{Im} = \frac{D l_m F_{em}}{R_d} \text{ (EQ 12.3 - 1)}$$

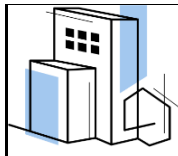
$$Z_{II}: 116 \text{ lbs} \quad Z_{II} = \frac{k_1 D l_s F_{es}}{R_d} \text{ (EQ 12.3 - 3)}$$

$$Z_{III}: 123 \text{ lbs} \quad Z_{III} = \frac{k_2 D l_m F_{em}}{(1 + 2R_e) R_d} \text{ (EQ 12.3 - 4)}$$

$$Z_{IV}: 81 \text{ lbs} \quad Z_{IV} = \frac{D^2}{R_d} \sqrt{\frac{2F_{em}F_{yb}}{3(1 + R_e)}} \text{ (EQ 12.3 - 6)}$$

$$Z_{MIN}: 81 \text{ lbs}$$

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



**Subject:** Nail Lateral Design - Single Shear Cont.

### Adjusted Lateral Design Values

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

|                |     |                                            |
|----------------|-----|--------------------------------------------|
| $C_D$ :        | 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) |
| $C_{\Delta}$ : | 1.0 | Geometry Factor - Section 12.5.1.1 (NDS)   |

$$Z': \boxed{129} \text{ lbs}$$

### Fastener Bending Across Shim Space

|            |       |                                  |
|------------|-------|----------------------------------|
| $\Omega$ : | 1.67  |                                  |
| L:         | 0.25  | in Maximum Shim Gap              |
| D:         | 0.113 | in Diameter                      |
| $F_{yb}$ : | 100   | ksi Dowel Bending Yield Strength |

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

$$\text{Where } M = \frac{ZL}{2} \text{ (Guided Bending)}$$

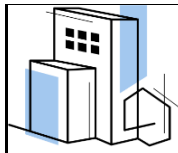
$$Z_n/\Omega: \boxed{113} \text{ lbs}$$

### Bearing on Masonry Strap

|            |       |                               |
|------------|-------|-------------------------------|
| $\Omega$ : | 3.00  |                               |
| $F_u$ :    | 33    | ksi Tensile Strength of strap |
| t:         | 20    | GA                            |
| t:         | 0.036 | in thickness of strap         |
| D:         | 0.113 | in                            |

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

$$P_{nv}/\Omega: \boxed{120} \text{ lbs}$$



Subject: TEK Withdrawal

Input:

Calculation:

**Shear Strength of Fastener - ESR 1976**

Screw Size: 10-16

$P_{nv}/\Omega$ : 885 lbs See ESR 2196

**Tensile Pullout - ESR 1976**

Screw Size: 10-16

$F_u$ : 45 ksi Tensile Strength of material NOT in contact with screw head

t: 16 GA

t: 0.0598 in Thickness of material NOT in contact with screw head

$P_{nv}/\Omega$ : 145 lbs See ESR 2196

**Tensile Pullover**

Note: The tensile pullover analysis checks the material IN contact with the screw head. This material is part of the Jeld-Wen assembly and has been verified by testing. Below is a check to ensure the head size of the TEK screw is equal to or larger than the head of the tested fastener, ensuring compliance.

*Tested Fastener Head Size:*

Screw Size: 8

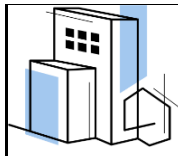
Head Size: 0.312 in

Tested fastener is a

*TEK Screw Head Size:*

Screw Size: 10-16

Head Size: 0.365 in



Subject: TEK Lateral Design

Input:   
Calculation:

### Shear Strength of Fastener - ESR 1976

Screw Size: 10-16

$P_{nv}/\Omega$ : 573 lbs See ESR 2196

### Bearing Strength of Material NOT in Contact with Screw Head - AISI S100

Screw Size: 10-16

$\Omega$ : 3.00

D: 0.138 in Root Diameter of TEK Screw  
 $F_u$ : 45 ksi Tensile Strength of material NOT in contact with screw head  
t: 18 GA  
t: 0.0478 in Thickness of material NOT in contact with screw head

$$\frac{P_{nv1}}{\Omega} = 2.7 * t * D * F_u - (EQ. J4.3.1 - 3, AISI S100)$$

$$\frac{P_{nv2}}{\Omega} = 4.2 \sqrt{t^3 * D} * F_u - (EQ. J4.3.1 - 1, AISI S100)$$

$P_{nv1}/\Omega$ : 267 lbs

$P_{nv2}/\Omega$ : 245 lbs

$P_{nv}/\Omega$ : 245 lbs  $\frac{P_{nv}}{\Omega} = \text{smallest of } \frac{P_{nv1}}{\Omega} \text{ and } \frac{P_{nv2}}{\Omega}$

### Bearing Strength of Material IN in Contact with Screw Head

Note: Material IN contact with the screw head is part of the Jeld-Wen assembly and has been verified by testing.

### Fastener Bending Across Shim Space

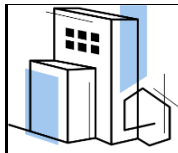
L: 0.25 in Maximum Shim Gap  
D: 0.138 in Root Diameter of TEK Screw  
 $F_{yb}$ : 100 ksi Yield Strength of TEK Screw

$\Omega$ : 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)

$P_n/\Omega$ : 206 lbs



**Bearing Strength of Masonry Straps - AISI S100**

Screw Size: 10-16

TEK Screw

$\Omega$ : 3.00

D: 0.138 in

Root Diameter of TEK Screw

$F_u$ : 33 ksi

Tensile Strength of Masonry Strap

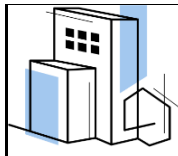
t: 20 GA

t: 0.0359 in

Thickness of Masonry Strap

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

$P_{nv}/\Omega$ : 147 lbs



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

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

P<sub>nv</sub>/Ω: 203 lbs