

**SWARTZ**  
CONSULTING ENGINEERS LLC

|                 |                              |       |         |
|-----------------|------------------------------|-------|---------|
| Project Number: | SCE 25-09003                 |       |         |
| Project Name:   | Custom Wood Fixed Direct Set |       |         |
| Date:           | 11/2/2025                    | Page: | 1 of 17 |

## Product Evaluation Report: R1 Method 1D

**Project Number:** SCE 25-09003

**Product Name:** Custom Wood Fixed Direct Set

**Product Dimensions:** 60.039" x 96.064"

**Design Pressure:** +60 psf / -65 psf

**Impact:** Windzone 3 - Level D Missile

**Installation Instructions:** D015293

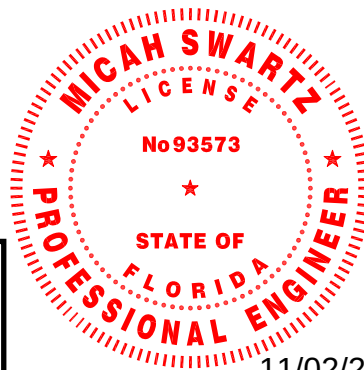
**Method:** 1-D (Engineering Evaluation)

**Category:** Windows

**Subcategory:** Fixed

### Prepared for:

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



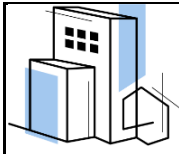
Prepared by:  
Swartz Consulting Engineers LLC

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

11/02/25

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.



**Scope:**

This is a product evaluation report issued by Micah Swartz, P.E. (FL# 93573) for Jeld-Wen Windows & Doors based on Method 1D of the State of Florida Product Approval, Florida Department of Business and Professional Regulation - Florida Building Commission.

This product has been evaluated for use in locations adhering to the current Florida Building Code.

See Installation Instructions D015293, signed and sealed by Micah Swartz, P.E. (FL# 93573) for specific use parameters including size and design pressure limitations.

**Reference Standards:**

*Current edition of the Florida Building Code, Building*

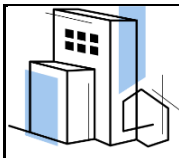
*ANSI/AWC NDS - National Design Specification (NDS) for Wood Construction*

*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*



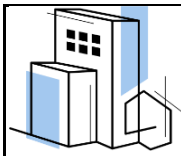
**Limits of Use:**

- (1) Product anchors shall be as listed and spaced on installation instructions. Anchors shall be embedded into the substrate the full embedment depth beyond stucco or wall cladding.
- (2) Site conditions that deviate from the details of drawing D015293 must be verified and designed by a licensed engineer or registered architect.

**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: Custom Wood Fixed Direct Set 60.039" x 96.064" and their corresponding performance levels as established by testing.

**Table 1:** Summary of Test Results

| Series/Model                                   | Test Report Number                 | Standards Tested                                                                                                                         | Size (W x H)      | Performance       |
|------------------------------------------------|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------|
| Custom Wood Fixed Direct Set 60.039" x 96.064" | 310-18-029 & 310-18-033 (07/06/18) | AAMA/WDMA/CSA 101/I.S.2/A440-22<br><br>ASTM E283-19<br>ASTM E330 -14(2021)<br>ASTM E547-00(2016)<br>ASTM F842-17<br>ASTM 1886-19/1996-20 | 60.039" x 96.064" | +60 psf / -65 psf |

**As Tested Design:**

**Screw Information:**

Screw Size: 8 Screw Embed: 1 in Edge Distance: 3/4 in (minimum)  
qty: 1 Spacing: 17 in O.C. (Thru Frame)

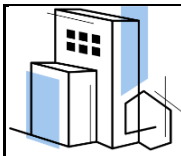
Wood Screw Withdrawal: 131 lbs Per ft. Capacity: 197 plf  
Wood Screw Lateral: 106 lbs Per ft. Capacity: 75 plf

**Alternative Fasteners:**

**Screw Information:**

Screw Size: 8 Screw Embed: 1.25 in Edge Distance: 3/4 in (minimum)  
qty: 1 Spacing: 17 in O.C. (Nail Fin)  
qty: 1 Spacing: 17 in O.C. (Thru Frame)

Wood Screw Withdrawal: 164 lbs Per ft. Capacity: 116 plf Unity: 0.64  
Wood Screw Lateral: 106 lbs Per ft. Capacity: 75 plf Unity: 1.00



**Design Summary Continued:**

**Nail Information:**

Nail Size: 6d      Nail Type: Common      Edge Distance: 3/4 in (minimum)  
qty: 1      Spacing: 8 in O.C. (Nail Fin)  
qty: 2      Spacing: 17 in O.C. (Strap)

|                  |     |     |                   |     |     |        |      |
|------------------|-----|-----|-------------------|-----|-----|--------|------|
| Nail Withdrawal: | 55  | lbs | Per ft. Capacity: | 83  | plf | Unity: | 0.90 |
| Nail Lateral:    | 113 | lbs | Per ft. Capacity: | 160 | plf | Unity: | 0.47 |

**TEK Screw Information:**

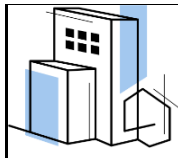
Screw Size: 10-16      qty: 1      Spacing: 17 in O.C. (Thru Frame)  
qty: 1      Spacing: 17 in O.C. (Nail Fin)

|                 |     |     |                   |     |     |        |      |
|-----------------|-----|-----|-------------------|-----|-----|--------|------|
| TEK Withdrawal: | 145 | lbs | Per ft. Capacity: | 102 | plf | Unity: | 0.73 |
| TEK Lateral:    | 147 | lbs | Per ft. Capacity: | 104 | plf | Unity: | 0.72 |

**Tapcon Information:**

Tapcon Size: 3/16      Embedment: 1-1/4 in (minimum)      Edge Distance: 2-1/2 in (minimum)  
qty: 1      Spacing: 17 in O.C.

|                            |     |     |                   |     |     |        |      |
|----------------------------|-----|-----|-------------------|-----|-----|--------|------|
| Tapcon Lateral (Concrete): | 155 | lbs | Per ft. Capacity: | 109 | plf | Unity: | 0.68 |
| Tapcon Lateral (CMU):      | 135 | lbs | Per ft. Capacity: | 95  | plf | Unity: | 0.78 |



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

Input:

Calculation:

**Screw Information:**

Screw Size: 8

Root Diameter: 0.131 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:         | 0.131 | in  | Diameter                             |
| $F_{yb}$ : | 100   | 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                            |
| $k_2$ :    | 1.242 |     | See Table                            |

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

$$Z_{Im}: 199 \text{ lbs} \quad Z_{Im} = \frac{D l_m F_{em}}{R_d} \text{ (EQ 12.3 - 1)}$$

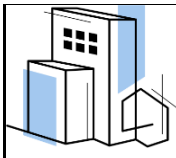
$$Z_{II}: 94 \text{ lbs} \quad Z_{II} = \frac{k_1 D l_s F_{es}}{R_d} \text{ (EQ 12.3 - 3)}$$

$$Z_{III_m}: 83 \text{ lbs} \quad Z_{III_m} = \frac{k_2 D l_m F_{em}}{(1 + 2R_e) R_d} \text{ (EQ 12.3 - 4)}$$

$$Z_{IV}: 82 \text{ lbs} \quad Z_{IV} = \frac{D^2}{R_d} \sqrt{\frac{2F_{em}F_{yb}}{3(1 + R_e)}} \text{ (EQ 12.3 - 6)}$$

$$Z_{MIN}: 82 \text{ lbs}$$

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:** 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)   |

$$Z': \boxed{132} \text{ lbs}$$

### Fastener Bending Across Shim Space

|            |       |                                  |
|------------|-------|----------------------------------|
| $\Omega$ : | 1.67  |                                  |
| L:         | 0.25  | in Maximum Shim Gap              |
| D:         | 0.131 | in Diameter                      |
| $F_{yb}$ : | 100   | ksi Dowel Bending Yield Strength |

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

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

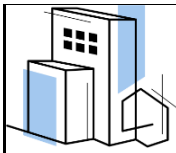
$$Z_n/\Omega: \boxed{106} \text{ lbs}$$

### 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:         | 0.131 | in                            |

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

$$P_{nv}/\Omega: \boxed{140} \text{ lbs}$$



**Subject:** Wood Screw Withdrawal

Input:

Calculation:

**Screw Information:**

Screw Size: 8

Root Diameter: 0.131 in

Screw Embed: 1.25 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)

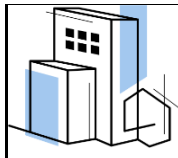
C<sub>M</sub>: 1.0 Wet Service Factor - Table 11.3.3 (NDS)

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

W: 82 lbs/in - Table 12.2B (NDS)

W: 103 lbs

W': 164 lbs



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

Input:   
Calculation:

**Screw Information:**

Screw Size:   
Screw Embed:  in

Root Diameter:  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:         | <input type="text" value="0.131"/> in  | Diameter                             |
| $F_{yb}$ : | <input type="text" value="100"/> ksi   | Dowel Bending Yield Strength         |
| $F_{em}$ : | <input type="text" value="3,350"/> psi | Main Member dowel bearing strength   |
| $F_{es}$ : | <input type="text" value="3,350"/> psi | Side Member dowel bearing strength   |
| $l_m$ :    | <input type="text" value="1.25"/> in   | Main Member dowel bearing length     |
| $l_s$ :    | <input type="text" value="1.25"/> in   | Side Member dowel bearing length     |
| $R_d$ :    | <input type="text" value="2.2"/>       | Reduction term - Table 12.3.1B (NDS) |
| $R_e$ :    | <input type="text" value="1"/>         | $= F_{em}/F_{es}$                    |
| $R_t$ :    | <input type="text" value="1.0"/>       | $= l_m/l_s$                          |
| $k_1$ :    | <input type="text" value="0.414"/>     | See Table                            |
| $k_2$ :    | <input type="text" value="1.158"/>     | See Table                            |

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

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

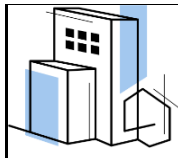
$Z_{II}$ :  lbs  $Z_{II} = \frac{k_1 D l_s F_{es}}{R_d}$  (EQ 12.3 - 3)

$Z_{III_m}$ :  lbs  $Z_{III_m} = \frac{k_2 D l_m F_{em}}{(1 + 2R_e) R_d}$  (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  $Z_{III_s}$  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)   |

$$Z': \boxed{132} \text{ lbs}$$

### Fastener Bending Across Shim Space

|            |       |                                  |
|------------|-------|----------------------------------|
| $\Omega$ : | 1.67  |                                  |
| L:         | 0.25  | in Maximum Shim Gap              |
| D:         | 0.131 | in Diameter                      |
| $F_{yb}$ : | 100   | ksi Dowel Bending Yield Strength |

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

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

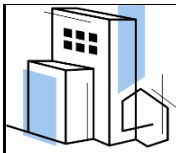
$$Z_n/\Omega: \boxed{106} \text{ lbs}$$

### 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:         | 0.131 | in                            |

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

$$P_{nv}/\Omega: \boxed{140} \text{ lbs}$$



**Subject:** Nail Withdrawal

Input:

Calculation:

**Nail Information:**

Nail Size: 6d

Nail Length: 2 in

Nail Type: Common

Nail Diameter: 0.113 in

Nail Embedment: 1.94 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>: 13,750 psi thickness (t<sub>s</sub>): 0.0625 in

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

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)

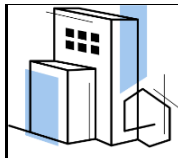
C<sub>t</sub>: 1.0 Temperature Factor - Table 11.3.4 (NDS)

W: 18 lbs/in

W: 35 lbs

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

W': 55 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)**

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

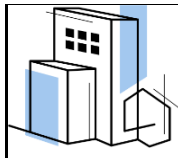
$$Z_{II}: 116 \text{ lbs} \quad Z_{II} = \frac{k_1 D l_s F_{es}}{R_d} \text{ (EQ 12.3 - 3)}$$

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

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

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

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)   |

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

**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 |

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

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

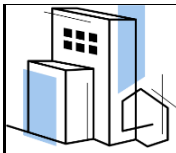
$$Z_n/\Omega: 113 \text{ lbs}$$

**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                            |

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

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



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

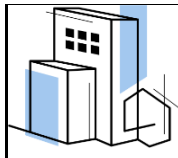
Head Size: 0.312 in

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

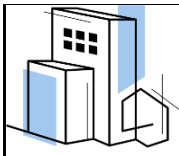
L: 0.25 in Maximum Shim Gap  
D: 0.138 in Root Diameter of TEK Screw  
 $F_{yb}$ : 100 ksi Yield Strength of TEK Screw

$\Omega$ : 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

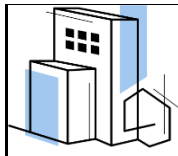
t: 20 GA

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:   
D:  in Nominal Diameter  
D<sub>sh</sub>:  in Shank Diameter

**Fastener Shear Capacity - 3,000 psi Concrete**

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

**Fastener Shear Capacity - Medium-Weight CMU**

P<sub>nv</sub>/Ω:  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:  in Maximum Shim Gap  
D<sub>sh</sub>:  in Shank Diameter of Tapcon  
F<sub>yb</sub>:  ksi Yield Strength of Tapcon

Ω:

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

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

P<sub>n</sub>/Ω:  lbs

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

Size:  Tapcon Size  
D<sub>sh</sub>:  in Shank Diameter of Tapcon Screw  
F<sub>u</sub>:  ksi Tensile Strength of Masonry Strap  
t:  GA  
t:  in Thickness of Masonry Strap

Ω:

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

P<sub>nv</sub>/Ω:  lbs