

**Micah Swartz, P.E.**

Project Number: MS24-08006

Project Name: ID 272 XO - Endurance

Date: 8/16/2024

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**Product Approval Supporting Calculations  
Alternative Anchorage Analysis & Design**

**Project Number:** MS24-08006

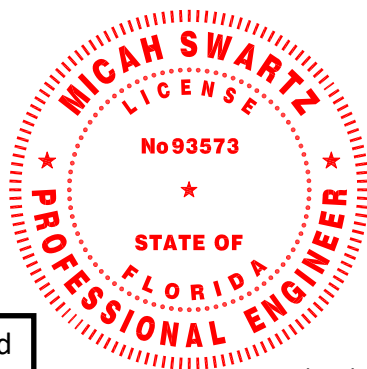
**Drawing Number:** 272-1

**Reference Test Report:** L1749.01-901-44

**Product Name:** ID 272 XO - Endurance 96x96

**Prepared for:**

VPI Quality Windows  
3420 E. Ferry Avenue  
Spokane, WA 99202



Prepared by:  
Micah Swartz, P.E.

08/16/24

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Micah Swartz, PE  
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<b>Micah Swartz, P.E.</b>	Project Number:	MS24-08006
	Project Name:	ID 272 XO - Endurance
	Date:	8/16/2024

**Scope:**

Micah Swartz, P.E. is contracted by Jeld-Wen Windows & Doors to evaluate alternative anchorage for the product: ID 272 XO - Endurance 96x96. This evaluation is based on testing performed by Intertek Building & Construction in Kent, WA, test report no.: L1749.01-901-44 and dated 1/15/21.

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:**

*Florida Building Code, Building, 2023 Edition*

*ANSI/AWC NDS 2018 - National Design Specification (NDS) for Wood Construction*

*ANSI S100-16 (2020) North American Specification for the Design of Cold-Formed Steel Structural Members*

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

*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.

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**Design Summary:**

The table below summarizes the product: ID 272 XO - Endurance 96x96 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
ID 272 XO - Endurance 96x96	L1749.01-901-44 (1/15/21)	96" x 96"	+35 psf / -35 psf

**As Tested Design:**

**Geometry - Through Nail Flange**

**Screw Information:**

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

Wood Screw Withdrawal: 131 lbs      Per ft. Capacity: 394 plf

**Geometry - Fender Washer over Nail Flange @ Header**

*See Intertek Report No. N2543.01-904-44 issued 3/15/22*

Performance of Unit: -45 psf      Load Applied to Header (Tributary Method): 135 plf

Load resisted by one (1) #8 screw w/ 1-1/8" embedment @ 12" o.c.

Screw Size: 8      Screw Embed: 1.125 in      Edge Distance: 3/4 in (minimum)  
 qty: 1      Spacing: 12 in O.C.

Wood Screw Withdrawal: 148 lbs      Per ft. Capacity: 148 plf

Performance of Unit: 35 psf      Load Applied to Header (Tributary Method): 140 plf

Load is resisted by #8 screws w/ 1" embedment @ 4" O.C. with a capacity of 394 plf as shown above.

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*Alternative Fasteners Cont. - See following sheets for detailed fastener analysis*

**Geometry - Through Nail Flange**

**TEK Screw Information:**

Screw Size: 10-16

qty: 1

Spacing: 4 in O.C.

TEK Withdrawal: 145 lbs

Per ft. Capacity: 435 plf

Unity: 0.90

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Subject: As Tested - Wood Screw Withdrawal

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

$$W' = W * C_D * C_M^2 * C_t - \text{As per table 11.3.1 NDS 2018}$$

C<sub>D</sub>: 1.6 Load Duration Factor - Table 2.3.2 (NDS 2018)

C<sub>M</sub>: 1.0 Wet Service Factor - Table 11.3.3 (NDS 2018)

C<sub>t</sub>: 1.0 Temperature Factor - Table 11.3.4 (NDS 2018)

W: 82 lbs/in - Table 12.2B (NDS 2018)

W: 82 lbs

W': 131 lbs

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**Subject:** As Tested - Wood Screw Withdrawal (Fender Washer)

Input:

Calculation:

**Screw Information:**

Screw Size: 8

Root Diameter: 0.131 in

Screw Embed: 1.125 in

Main Member Type: S-P-F

G: 0.42

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

$$W' = W * C_D * C_M^2 * C_t - \text{As per table 11.3.1 NDS 2018}$$

C<sub>D</sub>: 1.6 Load Duration Factor - Table 2.3.2 (NDS 2018)

C<sub>M</sub>: 1.0 Wet Service Factor - Table 11.3.3 (NDS 2018)

C<sub>t</sub>: 1.0 Temperature Factor - Table 11.3.4 (NDS 2018)

W: 82 lbs/in - Table 12.2B (NDS 2018)

W: 92 lbs

W': 148 lbs

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Subject: TEK Withdrawal

Input:   
Calculation:

**Tensile Strength of Fastener - ESR 1976**

Screw Size:

$P_{nv}/\Omega$ :  lbs See ESR-1976

**Tensile Pullout - ESR 1976**

Screw Size:

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

t:  GA

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

$P_{nv}/\Omega$ :  lbs See ESR-1976

**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:  Tested fastener is a   
Head Size:  in

*TEK Screw Head Size:*

Screw Size:   
Head Size:  in