Architectural Testing

# TEST REPORT

Rendered to:

## NATIONAL NAIL CORPORATION

For:

**Uplift Resistance of**
**Proprietary Fastener System for Deck Boards**

**Report No: A5983.01-119-19**
**Report Date: 01/05/10**

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Architectural Testing

# TEST REPORT

Rendered to:

NATIONAL NAIL CORPORATION
2964 Clyndon S.W.
Grand Rapids, Michigan 49519

Report No: A5983.01-119-19
Test Date: 12/14/10
Through: 12/20/10
Report Date: 01/05/10

## 1.0 General Information

### 1.1 Product

Proprietary Fastener System for Deck Boards

### 1.2 Project Description

Architectural Testing was contracted by National Nail Corporation to perform uplift resistance testing on their proprietary fastener system for deck boards. The scope of testing was limited to evaluation per ASTM E 330-02 which is referenced by Section 4.1.4 ICC-ES™ AC174 (July 1, 2010), *Acceptance Criteria for Deck Board Span Ratings and Guardrail Systems* (*Guards and Handrails*). AC174-10 was developed by the ICC Evaluation Service, Inc. (ICC-ES™) as acceptance criteria to evaluate materials per 2009 *International Building Code®* and 2009 *International Residential Code®*.

### 1.3 Qualifications

Architectural Testing has demonstrated compliance with ANS/ISO/IEC Standard 17025 and is consequently accredited as a Testing Laboratory (TL-144) by International Accreditation Service, Inc. Architectural Testing is accredited to perform all testing reported herein.

### 1.4 Product Sampling

Test specimens were provided directly by National Nail Corporation.

### 1.5 Witnessing

There were no witnesses from National Nail Corporation present for testing conducted and reported herein.

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### 1.6 Product Description

National Nail's proprietary fastening system consists of the DIY (Do It Yourself) Pro Tool and #7-9 TPI (0.116 in shank diameter, 0.100 in root diameter) x 1-7/8 in long, or 2-3/8 in long CAMO screws. The DIY Pro Tool is placed over the deck board at the joist, and the tool automatically creates a 3/16 in gap between deck boards. The CAMO screws are inserted into the guides at each end of the DIY Pro Tool; the guides are set at a 55° angle. The CAMO screws are then screwed in using one of two variations of a 3-1/2 in T15 star-head screw bit. The shank of the bit for grooved boards is 2-5/16 in of the 3-1/2 in total bit length while the shank of the bit for the solid boards is 2-1/8 in of the 3-1/2 in total bit length. This 3/16 in difference in the bits allows the screws to be driven at full speed until they disengage from the bit at the appropriate depth for each type of deck board. See drawing in Appendix A for dimensional details.

### 1.7 Conditioning of Specimens

All test specimen materials were stored in the laboratory set to maintain temperature in the range of 68 ±4°F and humidity in the range of 50 ±5% RH. All test specimens were stored in the laboratory environment indicated for no less than 40 hours prior to testing.

## 2.0 Reference Standards

ASTM D 7032-07, *Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails)*

ASTM E 330-02, *Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference*

## 3.0 Uplift Resistance Testing

Re: AC174 - Section 4.1.4; ASTM D 7032 - Section 5.5; ASTM E 330

### 3.1 General

The purpose of this testing was to determine the ultimate uplift resistance of installed deck boards using National Nail's proprietary fastener system for deck boards. Testing was conducted in accordance with Section 4.1.4 of AC174 as referenced by Section 5.5 of ASTM D 7032 and using the methods described in ASTM E 330.

### 3.2 Test Specimens

Fifteen specimens of each deck board type were cut to lengths of 51 in to address a three-span application using four support joists on 16 in centers for testing.

### 3.3 Test Setup

Three deck mock-ups were constructed for each deck board type from 2x8 MCA preservative-treated Southern-Yellow-Pine (SYP) lumber, each approximately 66 in by 83 in. Each mock-up consisted of five deck specimens each attached to four 63 in long joists for a three-span condition. The unused area of the deck mock-up was filled with 1/2 in plywood sheets and blocking. To retain air pressure on the specimens during testing, a layer of 4-mil thick polyethylene plastic was loosely draped between the joists of the mock-up prior to securing the test specimens and plywood to the lumber frame. The deck boards were attached to each joist with two #7-9 TPI (0.116 in shank diameter, 0.100 in root diameter) x 1-7/8 in long CAMO screws (2-3/8 in long CAMO screws were utilized in the *2x6 Preservative Treated, SYP* deck board installation) using the DIY Pro Tool for installation. See drawings in Appendix A for screw details.

### 3.4 Test Conditions

Uplift testing was performed in ambient conditions. Test specimens were assembled to the deck mock-ups and tested within two hours of removal from the laboratory conditions.

### 3.5 Test Procedure

An assembled deck mock-up was inverted and placed upside down on a vacuum chamber constructed of structural steel channels. The lumber framing of the mock-up rested on the chamber walls. Test specimens were not supported by the vacuum chamber walls. The mock-up to chamber interface was sealed for air-tightness. The plastic covered underside of the deck specimens was exposed to atmospheric pressure. A negative static air pressure was applied to the vacuum chamber creating an uplift pressure on the underside of all deck boards simultaneously. Differential pressure was measured using a differential pressure transducer. Differential pressure was increased incrementally and held for ten seconds until deck board failure.

### 3.6 Test Results

**_Fiberon® Horizon®_ (Grooved) Wood-Plastic Composite (WPC) Deck Boards Installed with National Nail's Proprietary Fastener System Test Dates: 12/14/10**

| Test Specimen | Maximum Sustained Uplift Load (psf) [1] | Comments |
|---|---|---|
| 1 | 450 | Boards pulled off over screw heads, chipping the deck boards at most of the screw locations. |
| 2 | 425 | |
| 3 | 450 | |
| **Average** | **442** | |

[1] *Held for 10 seconds. Maximum sustained uplift load DOES NOT take into account the weight of the deck board based on the inverted condition of the assembled deck mockup. See calculations below.*

Weight of *Fiberon Horizon* (grooved) WPC deck board in 51 in length = 9.68 lb

Five decks boards per test specimen, 9.68 lb x 5 = 48.4 lb

Tributary Area of assembled deck mock-up = 27.5 in wide x 51 in span ÷144 $in^2/ft^2$ = 9.74 $ft^2$

Dead Load of *Fiberon Horizon* (grooved) WPC deck board = Total Weight / Tributary Area = 48.4 lb / 9.74 $ft^2$ = 4.97 psf

Additional Uplift Resistance = 2 x Product Dead Load = 2 x 4.97 psf = 9.94 psf

Total Uplift Load* = 9.94 psf + 442 psf = **452 psf**

* *In a typical installation of the deck board, the self-weight of the decking would help resist uplift. However, in the inverted assembled deck mockup, the self-weight is not resisting uplift but actually contributing to the failure of the assembly. Therefore, due to the assembly setup, twice the deck board self-weight must be added to the measured sustained uplift load to determine the actual uplift load the deck boards can resist.*

**3.6 Test Results** (continued)

***Fiberon® Horizon®* (Solid) Wood-Plastic Composite (WPC) Deck Boards Installed with National Nail's Proprietary Fastener System**
**Test Dates: 12/14/10**

| Test Specimen | Maximum Sustained Uplift Load (psf) [1] | Comments |
|---|---|---|
| **1** | 350 | Boards pulled off over screw heads, chipping the deck boards at most of the screw locations. |
| **2** | 375 | |
| **3** | 375 | |
| **Average** | **367** | |

[1] *Held for 10 seconds. Maximum sustained uplift load DOES NOT take into account the weight of the deck board based on the inverted condition of the assembled deck mockup. See calculations below.*

Weight of *Fiberon Horizon* (solid) WPC deck board in 51 in length = 9.88 lb

Five deck boards per test specimen, 9.88 lb x 5 = 49.4 lb

Tributary Area of assembled deck mock-up = 27.5 in wide x 51 in span ÷144 $in^2/ft^2$ = 9.74 $ft^2$

Dead Load of *Fiberon Horizon* (solid) WPC deck board = Total Weight / Tributary Area = 49.4 lb / 9.74 $ft^2$ = 5.07 psf

Additional Uplift Resistance = 2 x Product Dead Load = 2 x 5.07 psf = 10.14 psf

Total Uplift Load* = 10.14 psf + 367 psf = **377 psf**

* *In a typical installation of the deck board, the self-weight of the decking would help resist uplift. However, in the inverted assembled deck mockup, the self-weight is not resisting uplift but actually contributing to the failure of the assembly. Therefore, due to the assembly setup, twice the deck board self-weight must be added to the measured sustained uplift load to determine the actual uplift load the deck boards can resist.*

**3.6 Test Results** (continued)

***Gossen Passport* (Grooved) Cellular PVC (CPVC) Deck Boards**
**Installed with National Nail's Proprietary Fastener System**
**Test Dates: 12/15/10**

| Test Specimen | Maximum Sustained Uplift Load (psf) [1] | Comments |
|---|---|---|
| **1** | 525 | Boards pulled off over screw heads, chipping the deck boards at most of the screw locations. |
| **2** | 475 | |
| **3** | 550 | |
| **Average** | **517** | |

[1] *Held for 10 seconds. Maximum sustained uplift load DOES NOT take into account the weight of the deck board based on the inverted condition of the assembled deck mockup. See calculations below.*

Weight of *Gossen Passport* (grooved) CPVC deck board in 51 in length = 6.26 lb

Five deck boards per test specimen, 6.26 lb x 5 = 31.3 lb

Tributary Area of assembled deck mock-up = 27.5 in wide x 51 in span ÷144 $in^2/ft^2$ = 9.74 $ft^2$

Dead Load of *Gossen Passport* (grooved) CPVC deck board = Total Weight / Tributary Area = 31.3 lb / 9.74 $ft^2$ = 3.21 psf

Additional Uplift Resistance = 2 x Product Dead Load = 2 x 3.21 psf = 6.42 psf

Total Uplift Load* = 6.42 psf + 517 psf = **523 psf**

* *In a typical installation of the deck board, the self-weight of the decking would help resist uplift. However, in the inverted assembled deck mockup, the self-weight is not resisting uplift but actually contributing to the failure of the assembly. Therefore, due to the assembly setup, twice the deck board self-weight must be added to the measured sustained uplift load to determine the actual uplift load the deck boards can resist.*

**3.6 Test Results** (continued)

***TimberTech® TwinFinish®* (Grooved) Wood-Plastic Composite (WPC) Deck Boards Installed with National Nail's Proprietary Fastener System**
**Test Dates: 12/15/10**

| Test Specimen | Maximum Sustained Uplift Load (psf) [1] | Comments |
|---|---|---|
| **1** | 400 | Boards pulled off over screw heads, chipping the deck boards at most of the screw locations. |
| **2** | 375 | |
| **3** | 325 | |
| **Average** | **367** | |

[1] *Held for 10 seconds. Maximum sustained uplift load DOES NOT take into account the weight of the deck board based on the inverted condition of the assembled deck mockup. See calculations below.*

Weight of *TimberTech TwinFinish* (grooved) WPC deck board in 51 in length = 11.54 lb

Five deck boards per test specimen, 11.54 lb x 5 = 57.7 lb

Tributary Area of assembled deck mock-up = 27.5 in wide x 51 in span ÷144 $in^2/ft^2$ = 9.74 $ft^2$

Dead Load of *TimberTech TwinFinish* (grooved) WPC deck board = Total Weight / Tributary Area = 57.7 lb / 9.74 $ft^2$ = 5.92 psf

Additional Uplift Resistance = 2 x Product Dead Load = 2 x 5.92 psf = 11.84 psf

Total Uplift Load* = 11.84 psf + 367 psf = **379 psf**

* *In a typical installation of the deck board, the self-weight of the decking would help resist uplift. However, in the inverted assembled deck mockup, the self-weight is not resisting uplift but actually contributing to the failure of the assembly. Therefore, due to the assembly setup, twice the deck board self-weight must be added to the measured sustained uplift load to determine the actual uplift load the deck boards can resist.*

**3.6 Test Results** (continued)

***TimberTech® TwinFinish®* (Solid) Wood-Plastic Composite (WPC) Deck Boards Installed with National Nail's Proprietary Fastener System**
**Test Dates: 12/15/10**

| Test Specimen | Maximum Sustained Uplift Load (psf) [1] | Comments |
|---|---|---|
| **1** | 325 | Boards pulled off over screw heads, chipping the deck boards at most of the screw locations. |
| **2** | 375 | |
| **3** | 350 | |
| **Average** | **350** | |

[1] *Held for 10 seconds. Maximum sustained uplift load DOES NOT take into account the weight of the deck board based on the inverted condition of the assembled deck mockup. See calculations below.*

Weight of *TimberTech TwinFinish* (solid) WPC deck board in 51 in length = 12.24 lb

Five deck boards per test specimen, 12.24 lb x 5 = 61.2 lb

Tributary Area of assembled deck mock-up = 27.5 in wide x 51 in span ÷144 $in^2/ft^2$ = 9.74 $ft^2$

Dead Load of *TimberTech TwinFinish* (solid) WPC deck board = Total Weight / Tributary Area = 61.2 lb / 9.74 $ft^2$ = 6.28 psf

Additional Uplift Resistance = 2 x Product Dead Load = 2 x 6.28 psf = 12.56 psf

Total Uplift Load* = 12.56 psf + 350 psf = **363 psf**

* *In a typical installation of the deck board, the self-weight of the decking would help resist uplift. However, in the inverted assembled deck mockup, the self-weight is not resisting uplift but actually contributing to the failure of the assembly. Therefore, due to the assembly setup, twice the deck board self-weight must be added to the measured sustained uplift load to determine the actual uplift load the deck boards can resist.*

**3.6 Test Results** (continued)

***TimberTech® XLM®* (Solid) Cellular PVC (CPVC) Deck Boards**
**Installed with National Nail's Proprietary Fastener System**
**Test Dates: 12/16/10**

| Test Specimen | Maximum Sustained Uplift Load (psf) [1] | Comments |
|---|---|---|
| **1** | 425 | Boards pulled off over screw heads, chipping the deck boards at most of the screw locations. |
| **2** | 425 | |
| **3** | 425 | |
| **Average** | **425** | |

[1] *Held for 10 seconds. Maximum sustained uplift load DOES NOT take into account the weight of the deck board based on the inverted condition of the assembled deck mockup. See calculations below.*

Weight of *TimberTech XLM* (solid) CPVC deck board in 51 in length = 6.48 lb

Five deck boards per test specimen, 6.48 lb x 5 = 32.4 lb

Tributary Area of assembled deck mock-up = 27.5 in wide x 51 in span ÷144 $in^2/ft^2$ = 9.74 $ft^2$

Dead Load of *TimberTech XLM* (solid) CPVC deck board = Total Weight / Tributary Area = 32.4 lb / 9.74 $ft^2$ = 3.33 psf

Additional Uplift Resistance = 2 x Product Dead Load = 2 x 3.33 psf = 6.66 psf

Total Uplift Load* = 6.66 psf + 425 psf = **432 psf**

* *In a typical installation of the deck board, the self-weight of the decking would help resist uplift. However, in the inverted assembled deck mockup, the self-weight is not resisting uplift but actually contributing to the failure of the assembly. Therefore, due to the assembly setup, twice the deck board self-weight must be added to the measured sustained uplift load to determine the actual uplift load the deck boards can resist.*

**3.6 Test Results** (continued)

***5/4 Preservative Treated, Southern Yellow Pine (SYP)* Deck Boards**
**Installed with National Nail's Proprietary Fastener System**
**Test Dates: 12/16/10**

| Test Specimen | Maximum Sustained Uplift Load (psf) [1] | Comments |
|---|---|---|
| 1 | 475 | Boards pulled off over screw heads, chipping the deck boards at most of the screw locations. |
| 2 | 475 | |
| 3 | 475 | |
| **Average** | **475** | |

[1] *Held for 10 seconds. Maximum sustained uplift load DOES NOT take into account the weight of the deck board based on the inverted condition of the assembled deck mockup. See calculations below.*

Weight of *5/4 Preservative Treated SYP* deck board in 51 in length = 8.60 lb

Five deck boards per test specimen, 8.60 lb x 5 = 43.0 lb

Tributary Area of assembled deck mock-up = 27.5 in wide x 51 in span ÷144 $in^2/ft^2$ = 9.74 $ft^2$

Dead Load of *5/4 Preservative Treated SYP* deck board = Total Weight / Tributary Area = 43.0 lb / 9.74 $ft^2$ = 4.41 psf

Additional Uplift Resistance = 2 x Product Dead Load = 2 x 4.41 psf = 8.82 psf

Total Uplift Load* = 8.82 psf + 475 psf = **484 psf**

**In a typical installation of the deck board, the self-weight of the decking would help resist uplift. However, in the inverted assembled deck mockup, the self-weight is not resisting uplift but actually contributing to the failure of the assembly. Therefore, due to the assembly setup, twice the deck board self-weight must be added to the measured sustained uplift load to determine the actual uplift load the deck boards can resist*

**3.6 Test Results** (continued)

***2x6 Preservative Treated, Southern Yellow Pine (SYP)*, Grade No. 2, Deck Boards Installed with National Nail's Proprietary Fastener System**
**Test Dates: 12/17/10**

| Test Specimen | Maximum Sustained Uplift Load (psf) [1] | Comments |
|---|---|---|
| 1 | 650 | Boards pulled off over screw heads, chipping the deck boards at most of the screw locations. |
| 2 | 650 | |
| 3 | 475 | |
| **Average** | **592** | |

[1] *Held for 10 seconds. Maximum sustained uplift load DOES NOT take into account the weight of the deck board based on the inverted condition of the assembled deck mockup. See calculations below.*

Weight of *2x6 Preservative Treated SYP* deck board in 51 in length = 8.80 lb

Five deck boards per test specimen, 8.80 lb x 5 = 44.0 lb

Tributary Area of assembled deck mock-up = 27.5 in wide x 51 in span ÷144 $in^2/ft^2$ = 9.74 $ft^2$

Dead Load of *2x6 Preservative Treated SYP* deck board = Total Weight / Tributary Area = 44.0 lb / 9.74 $ft^2$ = 4.52 psf

Additional Uplift Resistance = 2 x Product Dead Load = 2 x 4.52 psf = 9.04 psf

Total Uplift Load* = 9.04 psf + 592 psf = **601 psf**

**In a typical installation of the deck board, the self-weight of the decking would help resist uplift. However, in the inverted assembled deck mockup, the self-weight is not resisting uplift but actually contributing to the failure of the assembly. Therefore, due to the assembly setup, twice the deck board self-weight must be added to the measured sustained uplift load to determine the actual uplift load the deck boards can resist.*

**3.6 Test Results** (continued)

***TimberTech® XLM®* (Grooved) Cellular PVC (CPVC) Deck Boards Installed with National Nail's Proprietary Fastener System**
**Test Dates: 12/17/10**

| Test Specimen | Maximum Sustained Uplift Load (psf) [1] | Comments |
|---|---|---|
| 1 | 500 | Boards pulled off over screw heads, chipping the deck boards at most of the screw locations. |
| 2 | 450 | |
| 3 | 475 | |
| **Average** | **475** | |

[1] *Held for 10 seconds. Maximum sustained uplift load DOES NOT take into account the weight of the deck board based on the inverted condition of the assembled deck mockup. See calculations below.*

Weight of *TimberTech XLM* (grooved) CPVC deck board in 51 in length = 6.76 lb

Five deck boards per test specimen, 6.76 lb x 5 = 33.8 lb

Tributary Area of assembled deck mock-up = 27.5 in wide x 51 in span ÷144 $in^2/ft^2$ = 9.74 $ft^2$

Dead Load of *TimberTech XLM* (grooved) CPVC deck board = Total Weight / Tributary Area = 33.8 lb / 9.74 $ft^2$ = 3.47 psf

Additional Uplift Resistance = 2 x Product Dead Load = 2 x 3.47 psf = 6.94 psf

Total Uplift Load* = 6.94 psf + 475 psf = **482 psf**

* *In a typical installation of the deck board, the self-weight of the decking would help resist uplift. However, in the inverted assembled deck mockup, the self-weight is not resisting uplift but actually contributing to the failure of the assembly. Therefore, due to the assembly setup, twice the deck board self-weight must be added to the measured sustained uplift load to determine the actual uplift load the deck boards can resist.*

**3.6 Test Results** (continued)

***Trex® Accents®* (Grooved) Wood-Plastic Composite (WPC) Deck Boards Installed with National Nail's Proprietary Fastener System**
**Test Dates: 12/17/10**

| Test Specimen | Maximum Sustained Uplift Load (psf) [1] | Comments |
|---|---|---|
| **1** | 300 | Boards pulled off over screw heads, chipping the deck boards at most of the screw locations. |
| **2** | 375 | |
| **3** | 375 | |
| **Average** | **350** | |

[1] *Held for 10 seconds. Maximum sustained uplift load DOES NOT take into account the weight of the deck board based on the inverted condition of the assembled deck mockup. See calculations below.*

Weight of *Trex Accents* (grooved) WPC deck board in 51 in length = 9.74 lb

Five deck boards per test specimen, 9.74 lb x 5 = 48.7 lb

Tributary Area of assembled deck mock-up = 27.5 in wide x 51 in span ÷144 $in^2/ft^2$ = 9.74 $ft^2$

Dead Load of *Trex Accents* (grooved) WPC deck board deck board = Total Weight / Tributary Area = 48.7 lb / 9.74 $ft^2$ = 5.00 psf

Additional Uplift Resistance = 2 x Product Dead Load = 2 x 5.00 psf = 10.00 psf

Total Uplift Load* = 10.00 psf + 350 psf = **360 psf**

* *In a typical installation of the deck board, the self-weight of the decking would help resist uplift. However, in the inverted assembled deck mockup, the self-weight is not resisting uplift but actually contributing to the failure of the assembly. Therefore, due to the assembly setup, twice the deck board self-weight must be added to the measured sustained uplift load to determine the actual uplift load the deck boards can resist.*

**3.6 Test Results** (continued)

***Trex® Transcend®* (Grooved) Wood-Plastic Composite (WPC) Deck Boards Installed with National Nail's Proprietary Fastener System**
**Test Dates: 12/20/10**

| Test Specimen | Maximum Sustained Uplift Load (psf) [1] | Comments |
|---|---|---|
| **1** | 425 | Boards pulled off over screw heads, chipping the deck boards at most of the screw locations. |
| **2** | 425 | |
| **3** | 425 | |
| **Average** | **425** | |

[1] *Held for 10 seconds. Maximum sustained uplift load DOES NOT take into account the weight of the deck board based on the inverted condition of the assembled deck mockup. See calculations below.*

Weight of *Trex Transcend* (grooved) WPC deck board in 51 in length = 10.36 lb

Five deck boards per test specimen, 10.36 lb x 5 = 51.8 lb

Tributary Area of assembled deck mock-up = 27.5 in wide x 51 in span ÷144 $in^2/ft^2$ = 9.74 $ft^2$

Dead Load of *Trex Transcend* (grooved) WPC deck board = Total Weight / Tributary Area = 51.8 lb / 9.74 $ft^2$ = 5.32 psf

Additional Uplift Resistance = 2 x Product Dead Load = 2 x 5.32 psf = 10.64 psf

Total Uplift Load* = 10.64 psf + 425 psf = **436 psf**

* *In a typical installation of the deck board, the self-weight of the decking would help resist uplift. However, in the inverted assembled deck mockup, the self-weight is not resisting uplift but actually contributing to the failure of the assembly. Therefore, due to the assembly setup, twice the deck board self-weight must be added to the measured sustained uplift load to determine the actual uplift load the deck boards can resist.*

**3.6 Test Results** (continued)

***Trex® Transcend®* (Solid) Wood-Plastic Composite (WPC) Deck Boards Installed with National Nail's Proprietary Fastener System**
**Test Dates: 12/20/10**

| Test Specimen | Maximum Sustained Uplift Load (psf) [1] | Comments |
|---|---|---|
| 1 | 425 | Boards pulled off over screw heads, chipping the deck boards at most of the screw locations. |
| 2 | 550 | |
| 3 | 575 | |
| **Average** | **517** | |

[1] *Held for 10 seconds. Maximum sustained uplift load DOES NOT take into account the weight of the deck board based on the inverted condition of the assembled deck mockup. See calculations below.*

Weight of *Trex Transcend* (solid) WPC deck board in 51 in length = 10.40lb

Five deck boards per test specimen, 10.40 lb x 5 = 52.0 lb

Tributary Area of assembled deck mock-up = 27.5 in wide x 51 in span ÷144 $in^2/ft^2$ = 9.74 $ft^2$

Dead Load of *Trex Transcend* (solid) WPC deck board = Total Weight / Tributary Area = 52 lb / 9.74 $ft^2$ = 5.34 psf

Additional Uplift Resistance = 2 x Product Dead Load = 2 x 5.34 psf = 10.68 psf

Total Uplift Load* = 10.68 psf + 517 psf = **528 psf**

* *In a typical installation of the deck board, the self-weight of the decking would help resist uplift. However, in the inverted assembled deck mockup, the self-weight is not resisting uplift but actually contributing to the failure of the assembly. Therefore, due to the assembly setup, twice the deck board self-weight must be added to the measured sustained uplift load to determine the actual uplift load the deck boards can resist.*

### 3.7 Test Summary

In the absence of an AC174-specified factor of safety for determining allowable uplift capacity, a factor of safety of 3.0, as referenced by Section 5.5 of ASTM D 7032, was used.

**Allowable Uplift Capacity for National Nail's Proprietary Fastener System Installed with Various Materials of Deck Boards**

| Deck Board Used in Testing | Total Uplift Load (psf) | Allowable Uplift Capacity (psf)* |
|---|---|---|
| *Fiberon Horizon* (grooved) WPC deck boards | 452 | **151** |
| *Fiberon Horizon* (solid) WPC deck boards | 377 | **126** |
| *Gossen Passport* (grooved) CPVC deck boards | 523 | **174** |
| *TimberTech Twin Finish* (grooved) WPC deck boards | 379 | **126** |
| *TimberTech Twin Finish* (solid) WPC deck boards | 363 | **121** |
| *TimberTech XLM* (solid) CPVC deck boards | 432 | **144** |
| *5/4 Preservative Treated, SYP* deck boards | 484 | **161** |
| *2x6 Preservative Treated, SYP* deck boards | 601 | **200** |
| *TimberTech XLM* (grooved) CPVC deck boards | 482 | **161** |
| *Trex Accents (grooved)* WPC deck board | 360 | **120** |
| *Trex Transcend (grooved)* WPC deck board | 436 | **145** |
| *Trex Transcend (solid)* WPC deck board | 528 | **176** |

** Total uplift load divided by a safety factor of 3.0*

## 4.0 Closing Statement

Drawings, data sheets, representative samples of test specimens, and a copy of this test report will be retained by Architectural Testing for a period of four years from the original test date. At the end of this retention period such materials shall be discarded without notice and the service life of this report by Architectural Testing will expire. Results obtained are tested values and were secured using the designated test methods. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimens tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing.

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Attachments (pages): This report is complete only when all attachments listed are included.
Appendix A: Drawings (1)
Appendix B: Photographs (4)

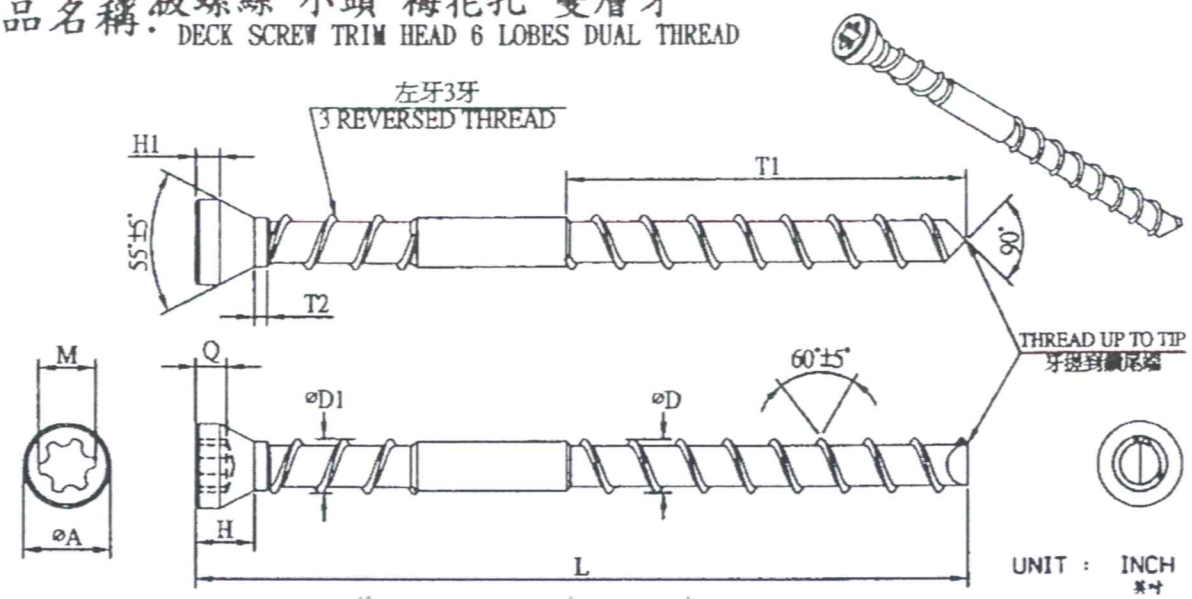
## Revision Log

| Rev. # | Date | Page(s) | Revision(s) |
|---|---|---|---|
| 0 | 01/05/10 | N/A | Original report issue |

# APPENDIX A

## Drawings

# 產品名稱: 平板螺絲 小頭 梅花孔 雙層牙
DECK SCREW TRIM HEAD 6 LOBES DUAL THREAD




0.08" 0.13" 0.09"

| SIZE | | A | H | H1 | 針號 | M | Q | D | D1 | T2 |
|---|---|---|---|---|---|---|---|---|---|---|
| #7-9 | INCH | 0.200<br>0.197 | 0.152<br>0.136 | 0.06<br>REF. | T15 | 0.132<br>REF. | 0.079<br>0.074 | 0.167<br>0.152 | 0.144<br>0.136 | 0.06<br>0.04 |
| | MM | [5.09<br>5.00] | [3.86<br>3.46] | [1.52<br>REF.] | T15 | [3.35<br>REF.] | [2.00<br>1.88] | [4.24<br>3.86] | [3.65<br>3.46] | [1.52<br>1.00] |

備註 :
1. 材料: AISI 1018/不銹鋼 316(不熱處理)
2. 機械性質:
   A)滲碳層: 0.002"/0.006"(0.05/0.15mm )
   B)心部硬度: HV340/450 (HRC 34/45)
   C)表面硬度: HV500/750 (HRC 50/75)
   D) 扭力 : #7 : 37 KG-CM MIN.

NOTES:
1. MATERIAL : AISI 1018/STAINLESS STEEL 316(UNHARDEN)
2. MECHANICAL PROPERTY :
   A) CASE DEPTH : 0.002"/0.006"(0.05/0.15mm )
   B) CORE HARDNESS : HV340/450(HRC 34/45)
   C) SURFACE HARDNESS : HV500/750 (HRC 50/75)
   D) TORQUE #7 : 37 KG-CM MIN.

| LENGTH | | 1-7/8" | 2-3/8" |
|---|---|---|---|
| L | INCH | 1.875/1.815 | 2.375/2.315 |
| | MM | 47.63/46.1 | 60.32/58.80 |
| T1 | INCH | 1.04/0.96 | 1.04/0.96 |
| | MM | 26.42/24.4 | 26.42/24.4 |

A5983.01-119-19
Date 12/28/10 Tech KAG

| 參考標準 | RD |
|---|---|

| 版次 | 制修日期 | 制 修 項 目 | 版次 | 制修日期 | 制 修 項 目 |
|---|---|---|---|---|---|
| A | 99/05/11 | 新制定 | D | 99/09/13 | 新增長度2.375" |
| B | 99/07/28 | 修改長度、新增不銹鋼材質 | | | |
| C | 99/08/17 | 修改頭徑5.13-5.00改5.09-5.00 | | | |

| 圖 號 | 總 經 理 | 品管單位 | 生產單位 | 生管單位 | 業務單位 | 修 定 | 制 定 |
|---|---|---|---|---|---|---|---|
| SY-DS-F017-1D-A | | | | | | | |

# APPENDIX B

## Photographs

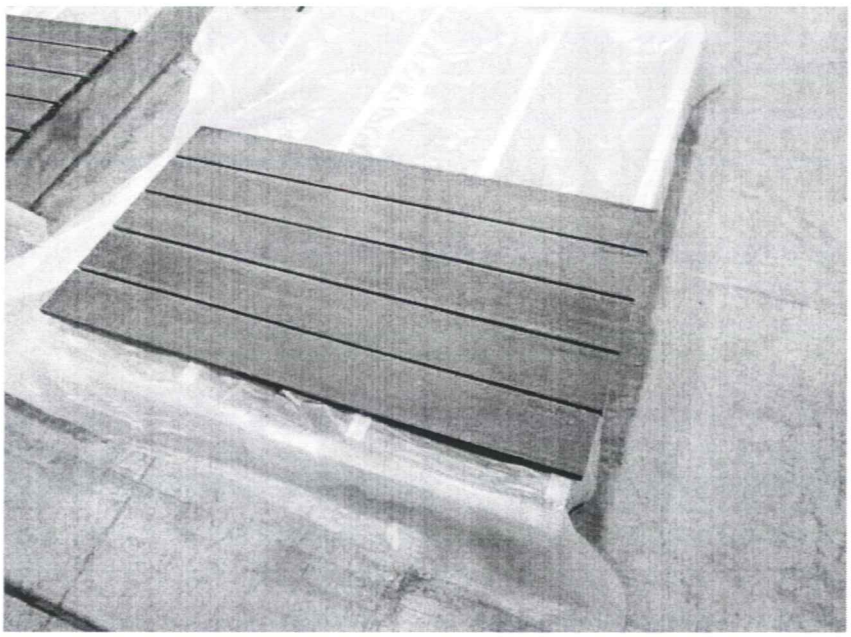


**Photo No. 1**
**Typical Test Specimen**

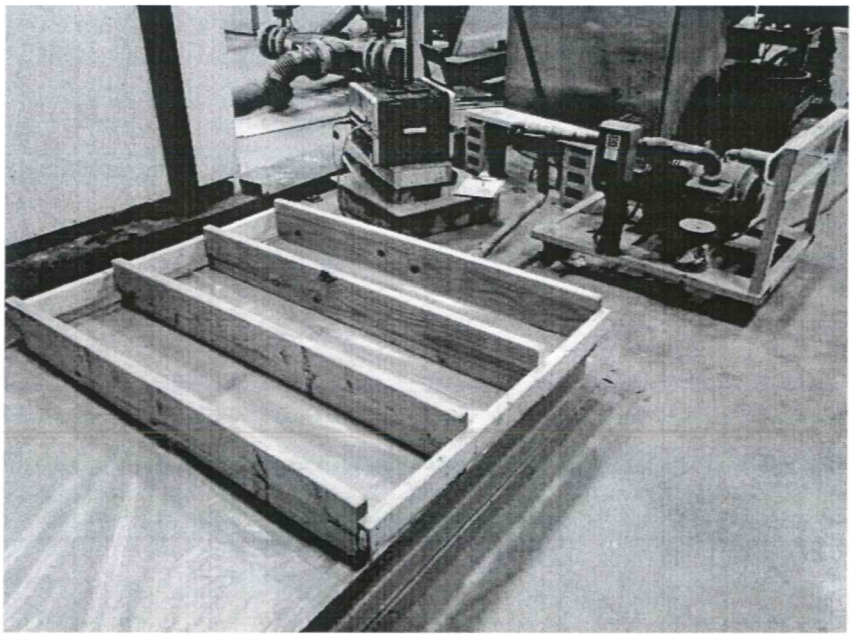


**Photo No. 2**
**Deck Mock-Up Inverted onto Vacuum Chamber**

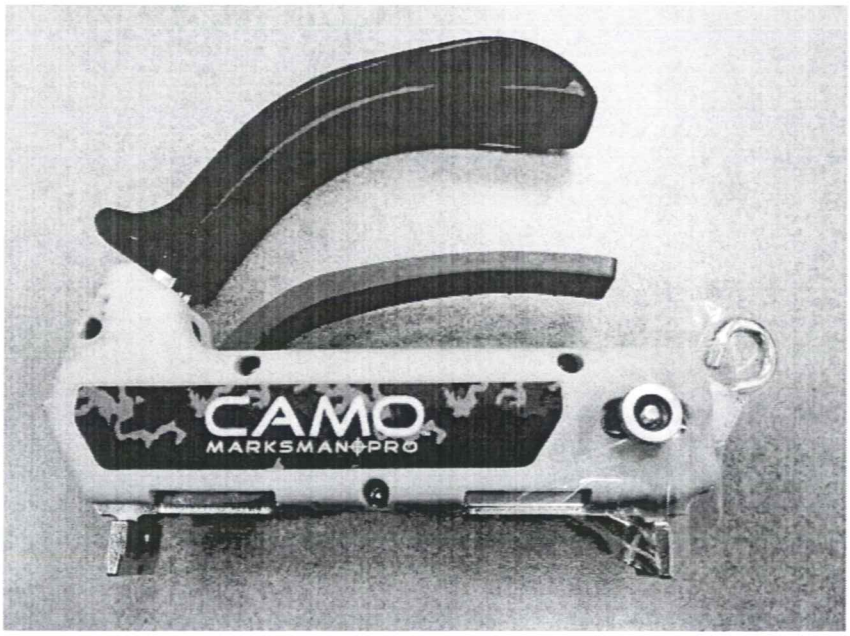



**Photo No. 3**
**DIY Pro Tool**

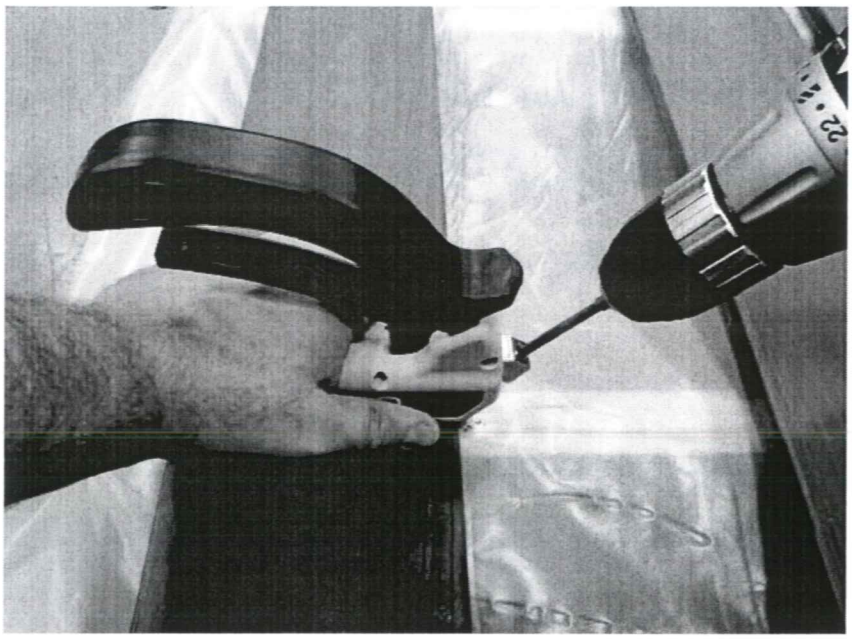


**Photo No. 4**
**DIY Pro Tool with Installation of CAMO Screw**

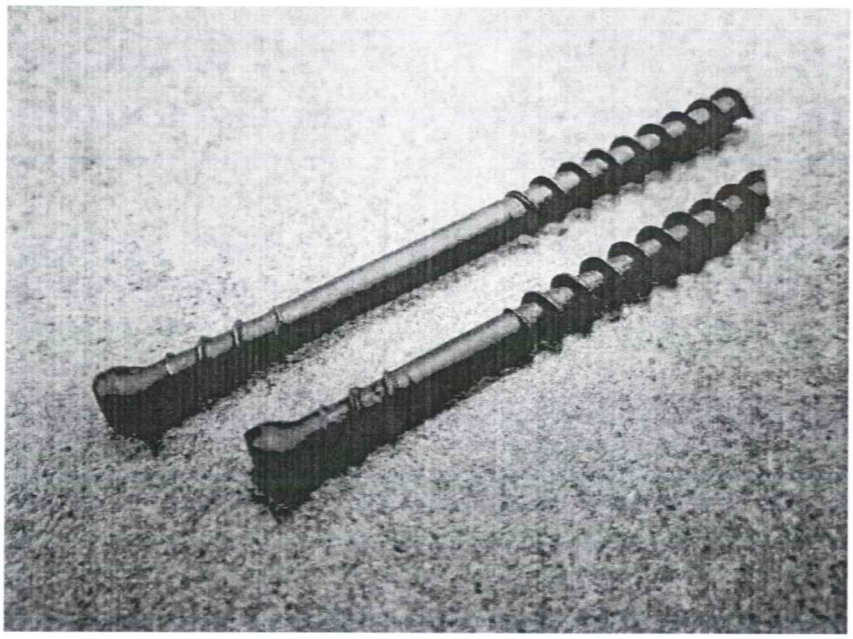


**Photo No. 5**
**Left – 2-3/8 in CAMO Screw (Used with *2x6 Preservative Treated*, *SYP* Deck Boards)**
**Right – 1-7/8 in CAMO Screw**


**Photo No. 6**
**Top – Standard Bit for Use with Solid Boards**
**Bottom – Special Bit for Use with Grooved Boards**

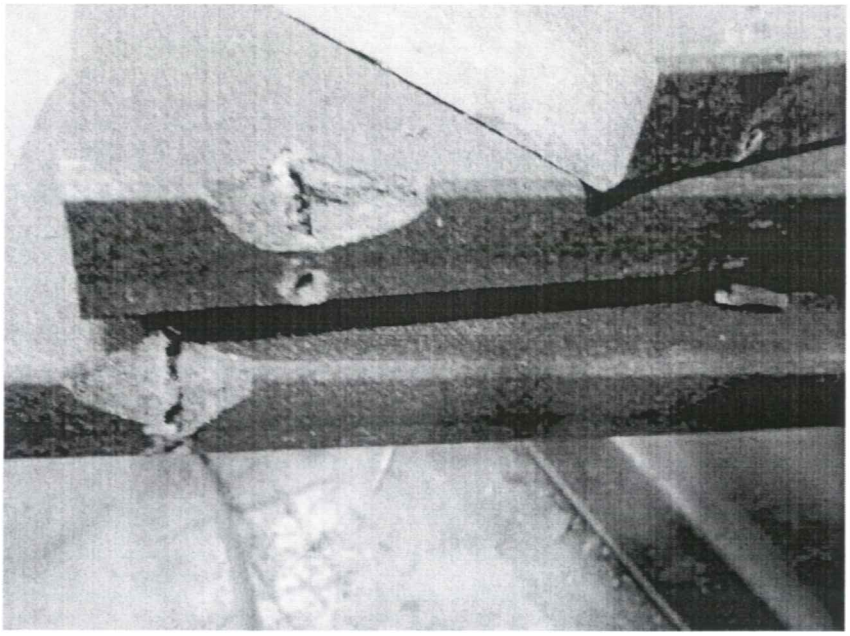


**Photo No. 7**
**Typical Test Specimen Failure**