

TEST REPORT
for
ASTM F1575 Determining Bending Yield Moment of Nails in Accordance with ICC-ES AC233

Rendered to:

SFS Group USA, Inc., Division Construction

PRODUCT:

SFS ConnexTite WS-T Self-Drilling Dowel

Report No.: SFSG061020-34(R0)
Test Date(s): 06/15/2020
Report Date: 06/25/2020
14 pages

Test Report

SFSG061020-34(R0)

06/25/2020

TABLE OF CONTENTS

1.0 General Information 3

2.0 Referenced Standards 4

3.0 ASTM F1575..... 5

4.0 Closing Statement..... 8

Appendix A - Photographs 9

Appendix B – Drawings 11

Appendix C - Data..... 12

Appendix D - Revision Log..... 14

TEST REPORT

Rendered to:

SFS Group USA, Inc., Division Construction
1045 Spring Street
Wyomissing, PA 19610

Report No.: SFSG061020-34(R0)
Test Date: 06/15/2020
Report Date: 06/25/2020

1.0 General Information

1.1 Product

SFS ConnexTite WS-T Self-Drilling Dowel

1.2 Project Summary

ICC NTA, LLC was contracted by SFS Group USA, Inc., Division Construction to evaluate their *SFS ConnexTite WS-T Self-Drilling Dowel* in accordance with ASTM F1575 in accordance with ICC-ES AC 233. Results obtained are tested values and were secured by using the designated test method(s). Testing was conducted at ICC NTA's facility in Nappanee, IN.

1.3 Product Description

The fastener tested herein was the SFS ConnexTite WS-T-7.0x113 Self-Drilling Dowel. The fasteners were received in one box in good condition on June 10th, 2020.

1.4 Qualifications

ICC NTA in Nappanee, IN has demonstrated compliance with ISO/IEC 17025 and is consequently accredited as a Testing Laboratory. ICC NTA is accredited to perform all testing reported herein.

1.5 Product Sampling

No evidence was provided that a third-party agency sampled materials for the testing reported herein. All test specimens were supplied by SFS Group USA, Inc., Division Construction .

1.6 Witnessing

No representatives of SFS Group USA, Inc., Division Construction were present for testing reported herein.

1.7 Conditions of Testing

Unless otherwise indicated, all testing reported herein was conducted in a laboratory set to maintain temperature in the range of $73.4 \pm 3.6^{\circ}\text{F}$ and humidity in the range of $50 \pm 5\% \text{RH}$. All test specimen materials were stored in the laboratory environment for no less than 40 hours prior to testing.

2.0 Referenced Standards

ASTM F1575-03(2013), Standard Test Method for Determining Bending Yield Moment of Nails

ICC-ES AC233 (editorially revised August 2015), Acceptance Criteria for Alternative Dowel-Type Threaded Fasteners

3.0 ASTM F1575

3.1 General

This test method covers the procedures to determine the bending yield moment of a fastener when subjected to a static loading.

3.2 Test Specimens

A total of (100) fasteners were received on June 10th, 2020.; from this set (15) were randomly selected and tested. A drawing of the screw WS-T-7.0X113, provided by the client is provided in Appendix B and the screw’s characteristics are shown in the Fastener Information table below. The material and heat treatment reported below are as specified by the client and were not independently verified by ICC NTA.

Fastener Information

Characteristic	Value (Nominal)
Distributor	SFS Intec
Trade Name	WS-T-7X113 Drift Pin, Self-Drilling, Zn blue
Part Number	1490472
Head Marking(s)	“SFS 113”
Drive/Head Type	T-Drive, T-40, Cylindrical countersunk head
Thread Pitch	10 TPI
Specified Material	S 235/ St 37/ FeE 235
Heat Treatment	75 ksi
Finish	Galvanized Blue (A2K)
Head Diameter	0.375 in. (10mm)
Shank Diameter	0.250 in. (7mm)
Major Thread Diameter	0.345 in. (8.76mm)
Minor Thread Diameter	0.250 in. (7mm)
Length	4-7/16 in. (113mm)
Shank Length	4 in. (101mm)
Tip Length	0.472 in. (12mm)
Tip Type	Proprietary Hardened Blade Drill Point

3.3 Test Setup and Procedure

Test procedures were in accordance with ASTM F15751. Accordingly, each specimen was tested in a universal testing machine using a center-point bend apparatus, as described in the test standard. The span between supports was taken as 11.5 times the nominal shank or root diameter, rounded to the nearest tenth of an inch, except in cases where the fastener had a length shorter than the required span. In such cases, the span was selected that best suited the supplied length of the fastener. The fastener was placed on cylindrical bearing points for testing, so that the transition zone between shank and threads was as close to the midpoint between bearings as possible. A photograph showing the basic test setup is provided in Photo 1.

Each specimen was loaded in displacement control at a rate of crosshead movement of 0.25-inches per minute. All data was continuously recorded by a computer throughout the test. The actual conditions of test used are noted in the Test Parameters table.

Test Parameters

Parameter	Value
Test Span, s_{bp}	2.9 in.
Support/Loading Anvil Diameter	0.375 in.
Loading Rate, r	0.25 inch/minute

Deviations from the standard include: None.

3.4 Test Results

Test results for each test are summarized in the table below. Formulas used in the calculations of the results are given in Equation 1. Photographs of the screw before and after testing are provide in Appendix A. Additional test data is provided in Appendix C.

The bending yield moment was determined by fitting a straight line to the initial linear portion of the load-deformation curve, offsetting this line by a deformation equal to 5% of the fastener diameter, and selecting the load at which the offset line interested the load-deformation curve (see Appendix). In those cases where the offset line did not intersect the load-deformation curve, the maximum load shall be used as the yield load. The bending yield stress was then calculated using the following equation.

$$F_{yb} = \frac{3P \cdot s_{bp}}{2D^3} \tag{Equation 1}$$

Where:

- F_{yb} = Fastener yield strength (psi)
- P = Test load as determined from load-deformation curve (lbf)
- s_{bp} = Test Span, as indicated in Table 1 (in.)
- D = Fastener diameter, shank or root diameter (in.)

Test Results

	Specimen Number	Base Metal Measured Root Diameter, D_r (in.)	5% Yield Offset Base Metal D_r (lbf)
1	121509	0.2705	356
2	121510	0.2695	357
3	121511	0.2700	356
4	121512	0.2700	354
5	121513	0.2695	349
6	121514	0.2700	363
7	121515	0.2690	348
8	121516	0.2695	359
9	121517	0.2695	347
10	121518	0.2700	356
11	121519	0.2700	356
12	121520	0.2695	351
13	121521	0.2695	345
14	121522	0.2690	350
15	121523	0.2685	356

3.5 Summary and Conclusions

ICC NTA, LLC was contracted by SFS Group USA, Inc., Division Construction to evaluate their SFS ConnexTite WS-T Self-Drilling Dowel in accordance with ASTM F1575 in accordance with ICC-ES AC 233. The purpose of this evaluation was to establish an average bending yield stress, F_{yb} for the fastener submitted. Conclusions are provided below with detailed results and load deflection curves provided in the Appendix C.

Conclusion

Fastener	5% Offset Moment (in.-lbf)	Bending Yield Stress ^a , F_{yb} (psi)
	Root Diameter	Root Diameter
WS-T-7.0x113 Self-Drilling Dowel with Zn Blue as Described Herein	256	78,500

^aBending yield loads and stresses were calculated using the root diameter. Value was rounded to the nearest 100 psi

4.0 Closing Statement

This report contains only findings and results arrived at after employing the specific test procedures listed herein. It does not constitute a recommendation for, endorsement of, or certification of the product or material tested. ICC NTA, LLC makes no warranty, expressed or implied, except that the test has been performed, and a report prepared, based upon the specimen specified by the client. Extrapolation of data, from the test data provided herein, to the batch or lot from which the specimens were obtained may not correlate and should be interpreted with extreme caution. ICC NTA assumes no responsibility for variations in quality, composition, appearance, performance, or other features of similar materials produced by the client, other persons, or under conditions over which ICC NTA has no control. ICC NTA has issued this report for the exclusive use of the client to whom it is addressed. Any use or duplication of this report shall not be made without their consent. This report shall only be reproduced in its entirety.

For ICC NTA, LLC:

Cody Meyer
Test Engineer

06/25/2020

Brad Wear
Senior Test Engineer

06/25/2020

Appendix A - Photographs



Photo No. 1
Test Setup Specimen #121510

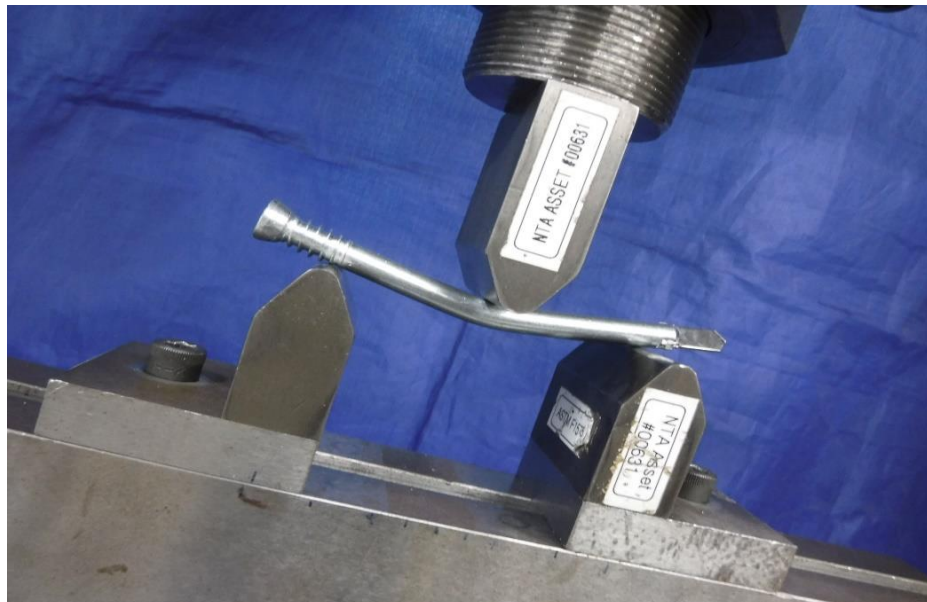


Photo No. 2
Test Specimen #121509 During Test



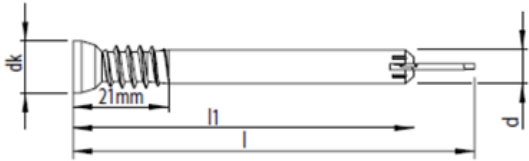
Photo No. 3
Test Specimen #121512 After Test



Photo No. 4
Coating Stripped for Base Metal Root Diameter Measurement

Appendix B – Drawings

ConnexTite™ WS-T



Cylindrical countersunk head | T-drive | Galvanized blue (A2K)



Product Code Type	Diameter		Nominal length		Thread length		Head Diameter		Drive	Carton Qty
	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)		
WS-T-7.0x73	1/4"	7.0	2-7/8"	73	2-3/8"	61	3/8"	10.0	T-40	100
WS-T-7.0x93	1/4"	7.0	3-11/16"	93	3-3/16"	81	3/8"	10.0	T-40	100
WS-T-7.0x113	1/4"	7.0	4-7/16"	113	4"	101	3/8"	10.0	T-40	100
WS-T-7.0x133	1/4"	7.0	5-1/4"	133	4-3/4"	121	3/8"	10.0	T-40	100
WS-T-7.0x153	1/4"	7.0	6"	153	5-9/16"	141	3/8"	10.0	T-40	50
WS-T-7.0x173	1/4"	7.0	6-13/16"	173	6-5/16"	161	3/8"	10.0	T-40	50
WS-T-7.0x193	1/4"	7.0	7-5/8"	193	7-1/8"	181	3/8"	10.0	T-40	50
WS-T-7.0x213	1/4"	7.0	8-3/8"	213	7-15/16"	201	3/8"	10.0	T-40	50
WS-T-7.0x233	1/4"	7.0	9-3/16"	233	8-11/16"	221	3/8"	10.0	T-40	50

Drawing 1: WS-T-7.0 X L Fastener Provided by Client

Appendix C - Data

SFSG061020-34, ASTM F1575-03(2013) TEST Bend Yield Moment (FINAL)
Out

ICC NTA

SUMMARY DATA

ASTM F1575-03 (2013), Bending Yield Moment of Nails

General:

Client: SFS Group USA, Inc., Division Construction
 Job Number: SFSG061020-34
 Performed By: Melissa Johnson
 Test Location: ICC NTA
 Nappanee, Indiana

Apparatus:

Asset No.
 Test Frame: 00140
 Load Cell: 00151
 Calipers: 02426
 Bend Fixture: 00632
 Load Anvils: 00631
 Span Template: N/A

Specimen Information:

Test Series./Desc.: Certification Testing
 Manufacturer/Source: SFS Intec
 Product Trade Name: 13 Drift pin, Self Drilling, Zn Blue
 Date Received: 6/10/2020
 Parent Spec. No.: 121508 PO/Lot/Batch Number: 15040

Nominal Dimensions:

Fastener Type: Other	Head Diameter: 0.375-in.	Tip Type: 12mm
Fastener Length: 4.4375-in.	Head Markings: N/A	Washer Thickness: N/A-in.
Shank Diameter: 0.25-in.	Heat Treatment: NP	Head Type: Cylindrical countersunk head
Shank Length: 4-in.		Drive: T-Drive, T-40

Test Data:

Test Date: 6/15/2020	Span Length: 2.9-in.	Ambient Temp.: 72.6 deg. F
Start Time: 12:46 PM	Loading Rate: 0.25 in./min.	Ambient R.H.: 45.5% RH
	Average Major Diameter: 0-in.	

Bending Yield Moment Test Results

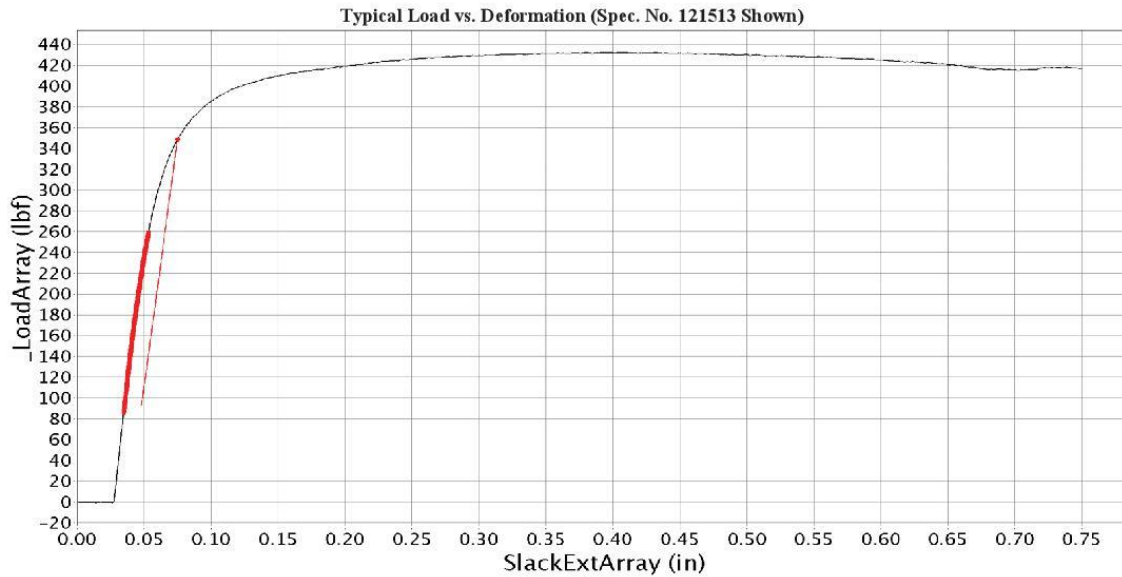
Specimen No.	Shank Diameter		Specimen No.	Shank Diameter	
	Base Metal Measured D_r (in.)	5% Yield Offset D_r (lb f)		Base Metal Measured D_r (in.)	5% Yield Offset D_r (lb f)
1	121509	0.2705	356	16	
2	121510	0.2695	357	17	
3	121511	0.2700	356	18	
4	121512	0.2700	354	19	
5	121513	0.2695	349	20	
6	121514	0.2700	363	21	
7	121515	0.2690	348	22	
8	121516	0.2695	359	23	
9	121517	0.2695	347	24	
10	121518	0.2700	356	25	
11	121519	0.2700	356	26	
12	121520	0.2695	351	27	
13	121521	0.2695	345	28	
14	121522	0.2690	350	29	
15	121523	0.2685	356	30	
	Max	0.2705	363		
	Min	0.2685	345		
	Avg	0.2696	353		
	St. Dev.	0.0005	4.9		

Calculation Basis	5% Offset Moment (in.-lb f)	Plastic Section Modulus (in. ³)	Bend Yield (psi)
Shank Diameter, D_r	256.2	0.00327	78500

This summary contains only data arrived at after employing the specific test procedures listed herein. This summary data might not include all reporting requirements of the test standard. The data herein does not constitute a recommendation for, endorsement of, or certification of the product or material tested. ICC NTA makes no warranty, expressed or implied, except that the test has been performed, and data prepared/specimen furnished by the client. Extrapolation of data from the test data provided herein, to the batch or lot from which the specimens were obtained may not correlate and should be interpreted with extreme caution. ICC NTA assumes no responsibility for variations in quality, composition, appearance, performance, or other features of similar materials produced by the client, other persons, or under conditions over which ICC NTA has no control. ICC NTA has issued this data summary for the exclusive use of the client to whom it is addressed. Any use or duplication of this summary shall not be made without their consent. This summary shall only be reproduced in its entirety.

SUMMARY DATA
ASTM F1575-03 (2013), Bending Yield Moment of Nails

Test Series./Desc.: Certification Testing
 Manufacturer/Source: SFS Intec
 Date Received: 6/10/2020
 Parent Spec. No.: 121508



Histogram of 5% Yield Offset Loads over a Normal Distribution

This summary contains only data arrived at after employing the specific test procedures listed herein. This summary data might not include all reporting requirements of the test standard. The data herein does not constitute a recommendation for, endorsement of, or certification of the product or material tested. ICC NTA makes no warranty, expressed or implied, except that the test has been performed, and data prepared, based upon the specimen furnished by the client. Extrapolation of data, from the test data provided herein, to the batch or lot from which the specimens were obtained may not correlate and should be interpreted with extreme caution. ICC NTA assumes no responsibility for variations in quality, composition, appearance, performance, or other features of similar materials produced by the client, other persons, or under conditions over which ICC NTA has no control. ICC NTA has issued this data summary for the exclusive use of the client to whom it is addressed. Any use or duplication of this summary shall not be made without their consent. This summary shall only be reproduced in its entirety.

Appendix D - Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
0	06/25/2020	N/A	Original report issue