



November 8, 2018

Mr. Clifford Schrock
SUNMODO
14800 NE 65th St.
Vancouver, WA 98682

Project Number 1180828C

Subject: EZ 2" Mini Standing Seam Clamp with L-Foot Laboratory Load Testing
Part #K50210-002 Attached to 24ga MS-200 by Taylor Systems

Dear Mr. Schrock:

As requested, Applied Materials & Engineering, Inc. (AME) has completed load-testing the EZ 2" Mini Standing Seam Clamp, (Part #K50210-002) with L-Foot; see Appendix A, Figure A1. The purpose of our testing was to evaluate the tensile (uplift) and lateral (shear) load capacity of the EZ 2" Mini Standing Seam Clamp attached to a 24ga MS-200 roofing sample manufactured by Taylor Systems.

SAMPLE DESCRIPTION

Mockup samples were delivered to our laboratory on October 19, 2018. Mockup configuration consists of a 1/2" Structural I plywood test sample reinforced with a 2"x4" wood frame to minimize the flexing of the plywood. The 24ga MS-200 roofing sample is fastened to a 2"x4" wood rafter through the Structural I plywood via 3/8"Øx2.5" lag screws. The EZ 2" Mini Standing Seam Clamp with L-Foot is attached to the 24ga MS-200 roofing sample via two M10 set screws. The test samples can be seen in Appendix B.

TEST PROCEDURES & RESULTS

1. Tensile (Uplift) Load Test

A total of three tests were conducted for tensile (uplift) load capacity on November 1, 2018 using a United Universal testing machine. Samples were rigidly attached to the testing machine and an uplift (tensile) load was applied to each clamp. The samples were loaded in tension at a constant rate of axial deformation of 0.10 in. /min. without shock until failure occurred; deflection at maximum load was recorded.

Based on the above testing, the average maximum uplift load of the EZ 2" Mini Standing Seam Clamp with L-Foot attached to a 24ga MS-200 roofing sample by Taylor Systems was determined to be 375 lbf. Detailed results are provided in Table I and Figure 1. Test setup and mode of failure are provided in Appendix B, Figure B1.

NOTE: THESE LOADS SHOW NO FACTOR OF SAFETY (FOS). A FOS = 2 IS RECOMMENDED FOR LOAD CAPACITY VALUES.

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2. Lateral (Shear) Load Test Parallel to Rafter and Seam

A total of three tests were conducted for lateral (shear) load capacity on November 5, 2018 using a United Universal testing machine. Samples were rigidly attached to the testing machine and a shear load (parallel to the rafter and roofing sample seam) was applied to each clamp. The samples were loaded in a downward direction at a constant rate of axial deformation of 0.10 in. /min. without shock until failure occurred; displacement at maximum load was recorded.

Based on the above testing, the average maximum shear load of the EZ 2" Mini Standing Seam Clamp with L-Foot attached to a 24Ga MS-200 roofing sample by Taylor Systems was determined to be 215 lbf. Detailed results are provided in Table II and Figure 2. Test setup and mode of failure are provided in Appendix B, Figure B2.

Respectfully Submitted,

APPLIED MATERIALS & ENGINEERING, INC.

Joseph Gapuz

Joseph Gapuz
Laboratory Manager



Reviewed by:

Armen Tajirian
Armen Tajirian, Ph.D., P.E.
Principal

NOTE: THESE LOADS SHOW NO FACTOR OF SAFETY (FOS). A FOS = 2 IS RECOMMENDED FOR LOAD CAPACITY VALUES.

TABLE I

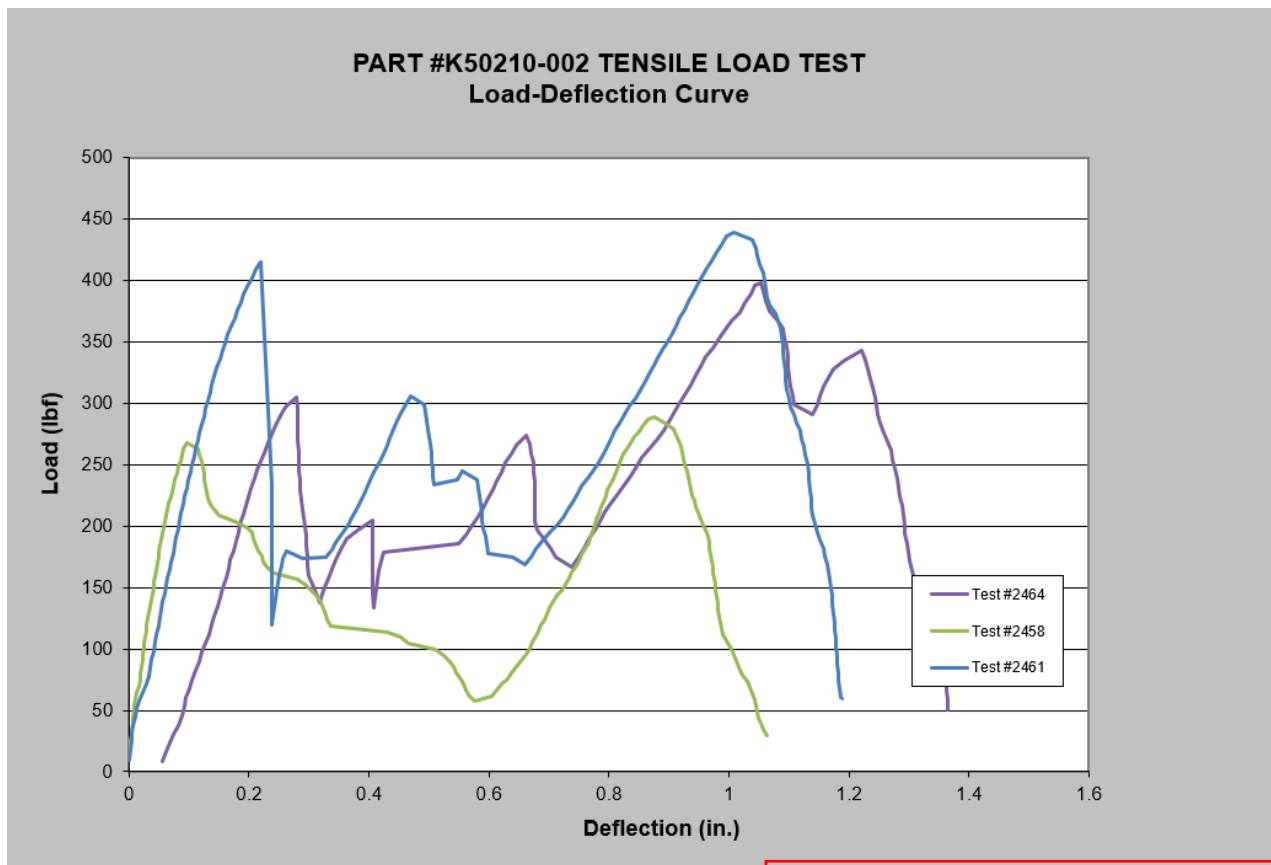
TENSILE (UPLIFT) LOAD TEST RESULTS

EZ 2" MINI STANDING SEAM CLAMP w/ L-FOOT
(PART #K50210-002)

PROJECT NUMBER 1180828C

TEST NUMBER	MAXIMUM TENSILE LOAD (lbf)	DEFLECTION AT MAXIMUM LOAD (in.)	MODE OF FAILURE
2458	289	0.9	Seam Clamp Slippage
2461	439	1.0	
2464	398	1.0	
AVERAGE	375	1.0	..

FIGURE 1

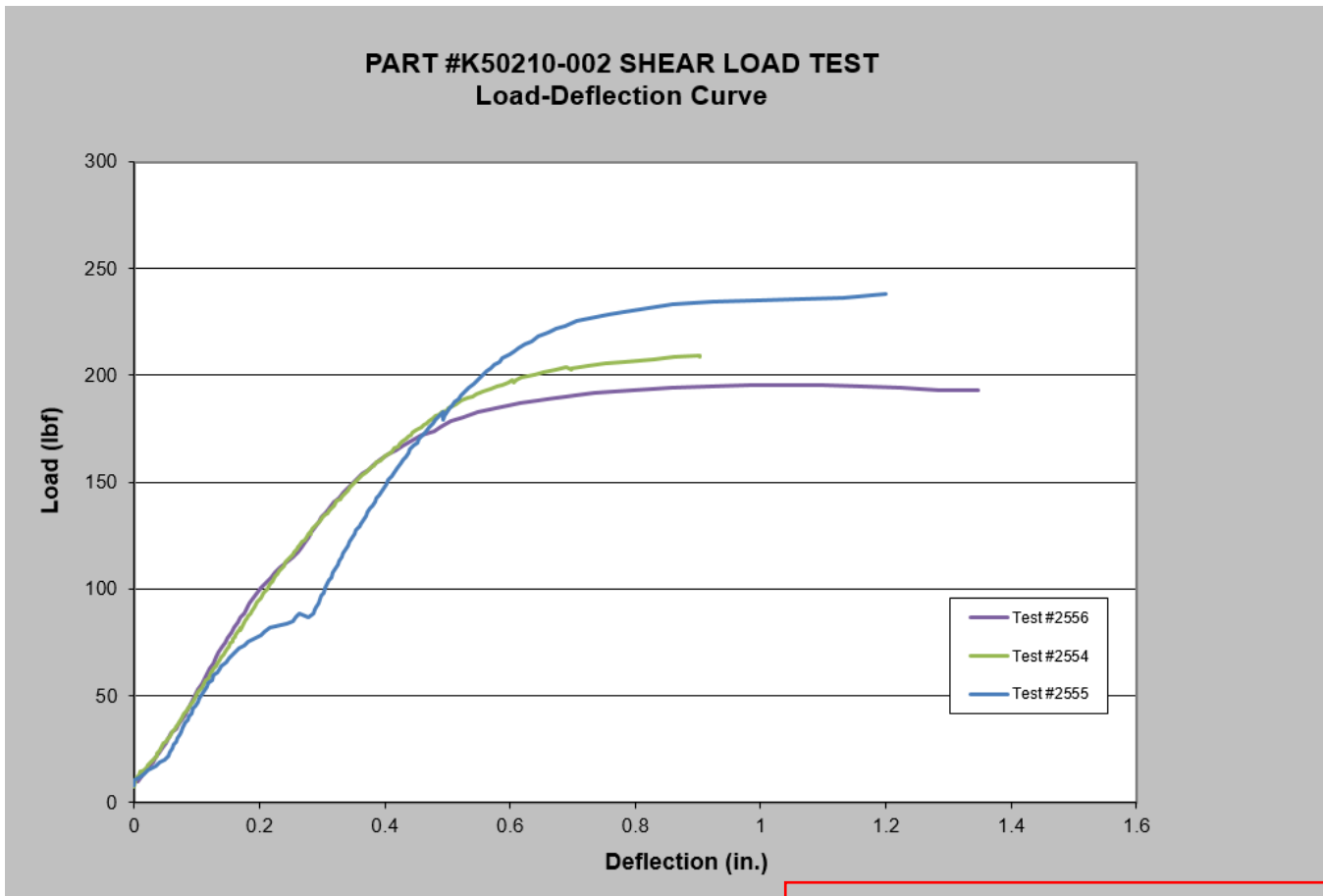


NOTE: THESE LOADS SHOW NO FACTOR OF SAFETY (FOS). A FOS = 2 IS RECOMMENDED FOR LOAD CAPACITY VALUES.

TABLE II
LATERAL (SHEAR) LOAD TEST RESULTS
EZ 2" MINI STANDING SEAM CLAMP w/ L-FOOT
(PART #K50210-002)
PROJECT NUMBER 1180828C

TEST NUMBER	MAXIMUM SHEAR LOAD (lbf)	DEFLECTION AT MAXIMUM LOAD (in.)	MODE OF FAILURE
2554	210	0.9	Seam Clamp Slippage
2555	238	1.2	
2556	196	1.0	
AVERAGE	215	1.0	..

FIGURE 2



NOTE: THESE LOADS SHOW NO FACTOR OF SAFETY (FOS). A FOS = 2 IS RECOMMENDED FOR LOAD CAPACITY VALUES.

REFERENCES

AC13-2010, “*Acceptance Criteria for Joist Hangers and Similar Devices*”, ICC Evaluation Service.






AC85-2008, “*Acceptance Criteria for Test Reports*”, ICC Evaluation Service.

APPENDIX A

FIGURE A1

EZ 2" MINI STANDING SEAM CLAMP w/ L-FOOT
(PART #K50210-002)

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EZ STANDING SEAM ROOF CLAMPS			
			
1" SEAM CLAMP STANDARD K50200-001	1" SEAM CLAMP MINI K50200-002	2" SEAM CLAMP STANDARD K50210-001	2" SEAM CLAMP MINI K50210-002
Competitors Clamps			
Ace A2 Ace A2-N S-5-B S-5-E S-5-N S-5-R465 S-5-S S-5-U S-5-V S-5-Z	Ace A2 Ace A2-N S-5-B Mini S-5-E Mini S-5-N Mini S-5-R465 Mini S-5-S Mini S-5-U Mini S-5-V Mini S-5-Z Mini	Ace ML S-5-H S-5-H90 S-5-N 1.5 S-5-Q S-5-S S-5-T S-5-U S-5-V S-5-Z	Ace ML S-5-H Mini S-5-H90 Mini S-5-N 1.5 Mini S-5-Q Mini S-5-S Mini S-5-T Mini S-5-U Mini S-5-V Mini S-5-Z Mini
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APPENDIX B

FIGURE B1

EZ 2" MINI STANDING SEAM CLAMP w/ L-FOOT
(PART #K50210-002)

TENSILE LOAD TEST SETUP

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Figure B1a. Test Setup



Figure B1b. Typical Failure Mode

FIGURE B2

EZ 2" MINI STANDING SEAM CLAMP w/ L-FOOT
(PART #K50210-002)

LATERAL (SHEAR) LOAD TEST SETUP

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Figure B2a. Test Setup



Figure B2b. Typical Failure Mode