



**PERFORMANCE EVALUATION TEST REPORT**

**Rendered to:**

**GREENFIELD MANUFACTURING COMPANY**

**PRODUCT: Bowtie Flange Plate**

**Report No: C5324.01-106-31**

**Report Date: 02/06/13**

**Test Record Retention Date: 02/06/17**

**PERFORMANCE EVALUATION TEST REPORT**

Rendered to:

GREENFIELD MANUFACTURING COMPANY  
920 Levick Street  
Philadelphia, Pennsylvania 19111-5498

Report No: C5324.01-106-31

Test Date: 01/21/13

Report Date: 02/06/13

Test Record Retention Date: 02/06/17

**Product:** Bowtie Flange Plate

**Project Summary:** Architectural Testing, Inc. was contracted by Greenfield Manufacturing Company to perform withdrawal testing and evaluation services for their Flange Plate mounted to a wood substrate.

**Test Methods:** The test specimens were evaluated in general accordance with ASTM D 1761-06, *Standard Test Methods for Mechanical Fasteners in Wood*.

**Test Procedures:** Testing was performed on materials which were provided by Greenfield Manufacturing Company in ready to test condition (10 Flange Plate backing board withdrawal specimens).

Each specimen consisted of one 13 gauge flange plate (nominal dimensions: 1-7/8 in x 2-7/8 in) shaped around a 3/8 in nut secured with two lag bolts (1/4 in x 1-1/4 in long) into the long edge of a backing board (nominal dimensions: 12.0 in. x 3.5 in. x 1.5 in.). Specimens were secured to the test stage of an SATEC 50UD universal test machine (Y002011) and tensile load was applied to a socket head machine screw (provided by Architectural Testing Inc. and threaded into the flange plate by an ATI Technician) at a rate of 0.1 in/min. Upon reaching 1,000 lbf the test load was held for 60 sec then returned to 10 lbf to acquire permanent set readings. The test load was then increased to 2,000 lbf and held for 60 sec. before returning to 10 lbf for a final permanent set reading.

**Test Results:** The results are reported in the following table.

**ASTM D 1761 - Fastener Withdrawal**

Specimen No.	Product ID	Deflection at 1,000 lbf (in)	Permanent Set at 1,000 lbf (in)	Deflection at 2,000 lbf (in)	Permanent Set at 2,000 lbf (in)
1	2-2552	0.027	0.004	0.078	0.039
2	1-2476	0.039	0.013	0.087	0.048
3	3-2583	0.062	0.015	0.101	0.041
4	5-1801	0.030	0.007	0.074	0.025
5	6-1749	0.034	0.004	N/A	N/A <sup>1</sup>
6	7-2467	0.047	0.019	0.092	0.047
7	8-2648	0.041	0.010	0.082	0.038
8	9-1670	0.033	0.006	0.090	0.039
9	10-1676	0.035	0.005	0.075	0.027
10	11-2590	0.035	0.011	0.092	0.050
<b>Average</b>		<b>0.038</b>	<b>0.009</b>	<b>0.086</b>	<b>0.039</b>

<sup>1</sup> Data for Permanent Set could not be collected due to lag bolt fastener withdrawal prior to the conclusion of the 60 sec. hold at 2,000 lbf.

Architectural Testing will service this report for the entire test record retention period. Test records that are retained such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation will be retained by Architectural Testing, Inc. for the entire test record retention period.

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, Inc.

For ARCHITECTURAL TESTING, INC.:

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Keith A. Gurnee - Technician I  
Components / Materials Testing

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Gary Hartman, P.E. - Director  
Components / Materials Testing

KAG:kag/nlh

Attachments (pages) This report is complete only when all attachments listed are included.

Appendix A - Photographs (2)

Appendix B - Accreditation of Architectural Testing, Inc. (1)

### Revision Log

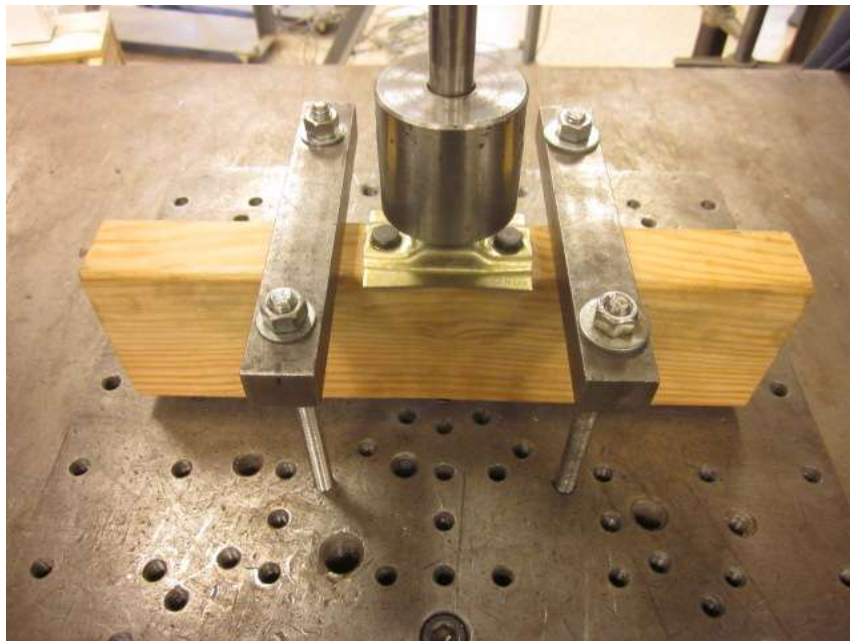
<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
0	02/06/13	N/A	Original report issue.

**APPENDIX A**

**Photographs**



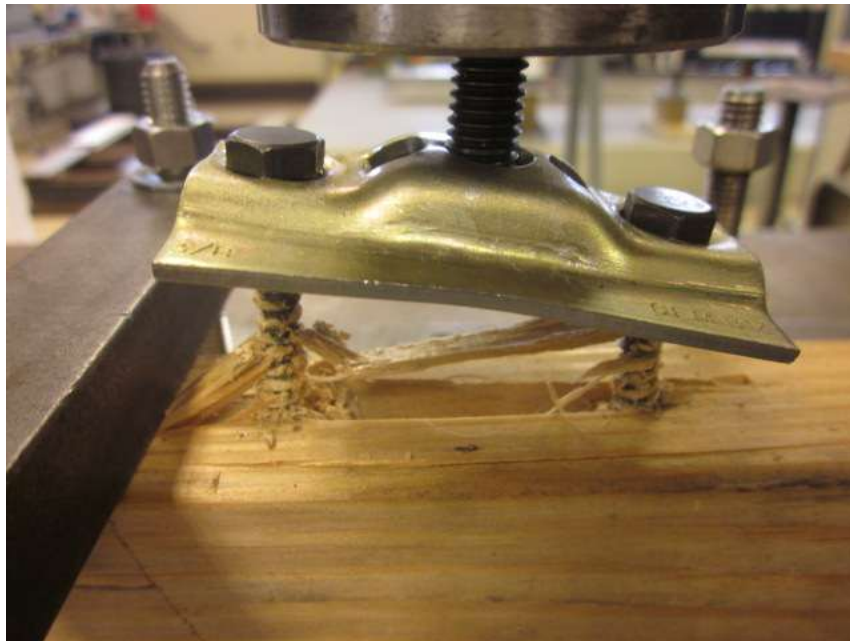
**Photo No. 1**  
**Typical Flange Plate Detail**



**Photo No. 2**  
**Typical Pretest Test Specimens**



**Photo No. 3**  
**Typical Fastener Withdrawal Test Setup Detail**



**Photo No. 4**  
**Fastener Withdrawal (Specimen 6-1749) Failure Mode Detail**

**APPENDIX B**

**Accreditation of Architectural Testing, Inc.**



Architectural Testing, Inc. is an independent testing, quality assurance, and professional services organization serving the building industry for over 38 years. We currently have laboratories in 14 locations with a professional staff of over 250 employees. The calibration of equipment, training of personnel, and accreditation of our laboratories is an important component of our quality program. Our international accreditations include ISO-17025, ISO-17020, and ISO Guide 65. ATI is recognized or accredited by the following organizations.

- International Accreditation Service, Inc. (IAS)
- American Architectural Manufacturers Association (AAMA)
- National Fenestration Rating Council (NFRC)
- Window and Door Manufacturers Association (WDMA)
- Canadian Standards Association (CSA)
- Insulating Glass Certification Council (IGCC)
- Metropolitan Dade County Florida
- Safety Glazing Certification Council (SGCC)
- Texas Department of Insurance (TDI)
- Florida Building Commission
- National Accreditation and Management Institute (NAMI)
- American National Standards Institute (ANSI)