


PERFORMANCE EVALUATION OF VARIOUS SCREW FASTENERS FOR PULL-OUT STRENGTH IN ACCORDANCE WITH MODIFIED ASTM D1037 TEST METHOD

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1.0 INTRODUCTION

At the request of *DIZAL*, Element Materials Technology was retained to evaluate the performance of various screw fasteners in general accordance with ASTM D1037, *Section 14 – Nail Withdrawal*.

Upon receipt, the samples were assigned the following Element Sample Numbers:

Client Sample Identification	Sample Photo	Element Sample No.
DIZAL-SC2-A, B and C #8 x 2"- Self-drilling P#20-006-164856		20-06-P0063-A
DIZAL-SC1-A, B and C #8 x 1"- Self-drilling P#20-006-164856		20-06-P0063-B

2.0 PROCEDURE

Testing was performed with the following test method:

Test Description	Test Method
Standard Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials	ASTM D1037 (modified) – Section 14

No. of Specimens Tested: Three (3) for each fastener configuration

Pre-Conditioning: >40 hours at 23± 2°C; 50 ± 5%

Equipment: Instron Load Frame, MII# A04407
25 kN Load Cell, MII# A08308
Digital Calipers, MII# B10644
Environmental Controller, MII# B14944

Crosshead Rate: 3 mm/min

Test Conditions: 23 ± 2°C; 50 ± 5% Relative Humidity

Test Date: 2020-05-11

3.0 RESULTS

A summary of the fastener pull-out testing is presented in Table 1. Detailed test results can be found in Appendix A. SI units are the primary units of measure.

Table 1 – Summary of Fastener Pull-Out Results Applicable Standard: ASTM D1037 (modified) – Section 14 Element Sample No.: 20-06-P0063			
Sample Description	Sample Number	Pull-Out Force, N	Average Pull-Out Force, N
DIZAL-SC2-A	20-06-P0063-A1	5105	5121
DIZAL-SC2-B	19-06-P0175-A2	4346	
DIZAL-SC2-C	19-06-P0175-A3	5910	
DIZAL-SC1-A	19-06-P0175-B1	5158	5271
DIZAL-SC1-B	19-06-P0175-B2	5367	
DIZAL-SC1-C	19-06-P0175-B3	5287	

4.0 CONCLUSION

The samples submitted by DIZAL, were evaluated for fastener pull-out strength, as described in this report. A summary of the test results can be found in Table 1.

5.0 REVISION HISTORY

Date:
2020-05-21

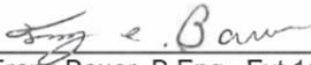
Revision:
N/A

Comments:
Original

Reported by:

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APPENDIX A

Detailed Fastener Pull-Out Strength Testing.

(3 Pages)

A DIZAL-SC2-A, B and C #8 x 2"- Self-drilling

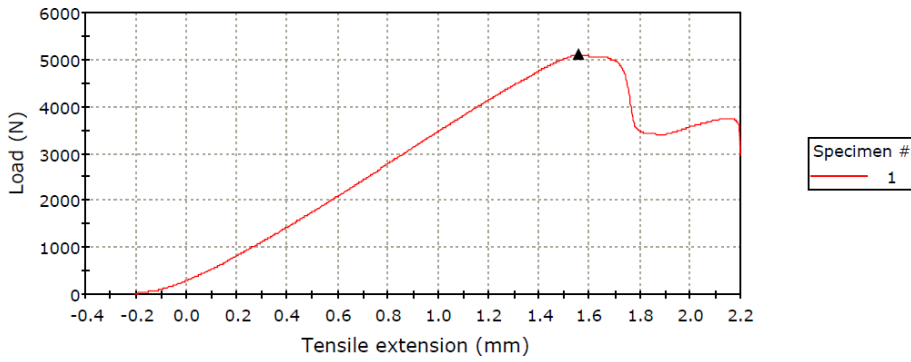


Figure A1 – Load (N) vs Extension (mm) for Element Sample No.: 20-06-P0063-A1.

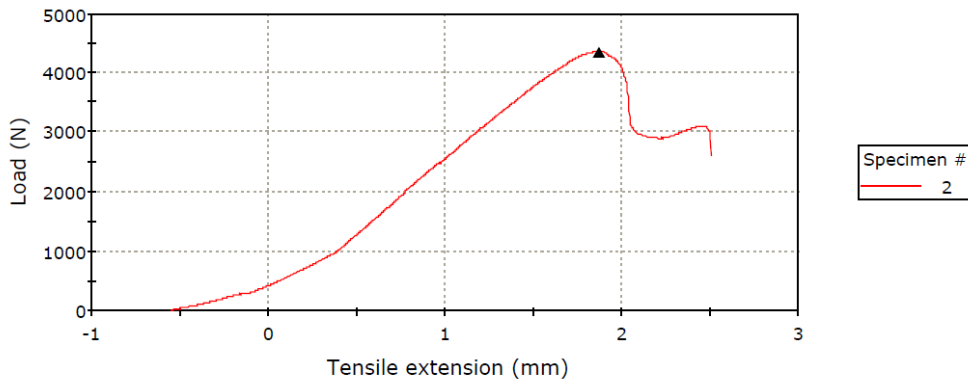


Figure A2 – Load (N) vs Extension (mm) for Element Sample No.: 20-06-P0063-A2.

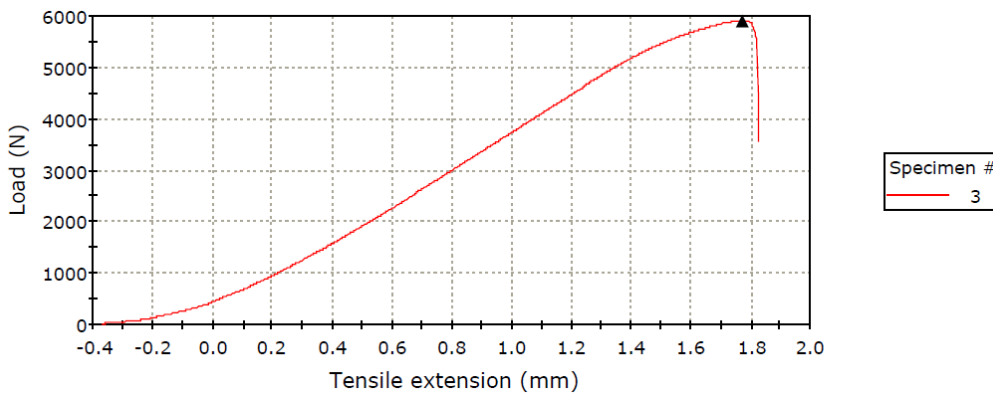


Figure A1 – Load (N) vs Extension (mm) for Element Sample No.: 20-06-P0063-A3.

B DIZAL-SC1-A, B and C #8 x 1"- Self-drilling

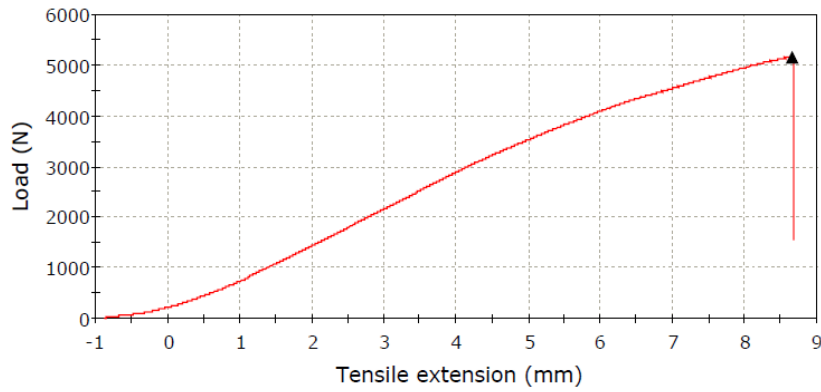


Figure B1 – Load (N) vs Extension (mm) for Element Sample No.: 20-06-P0063-B1

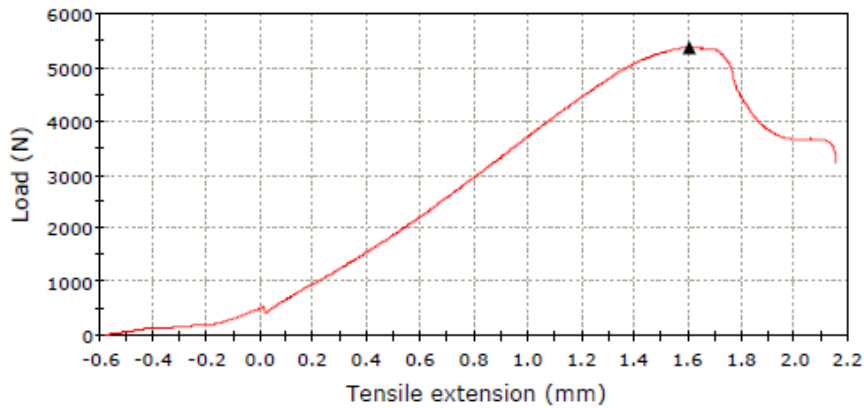


Figure B2 – Load (N) vs Extension (mm) for Element Sample No.: 20-06-P0063-B2

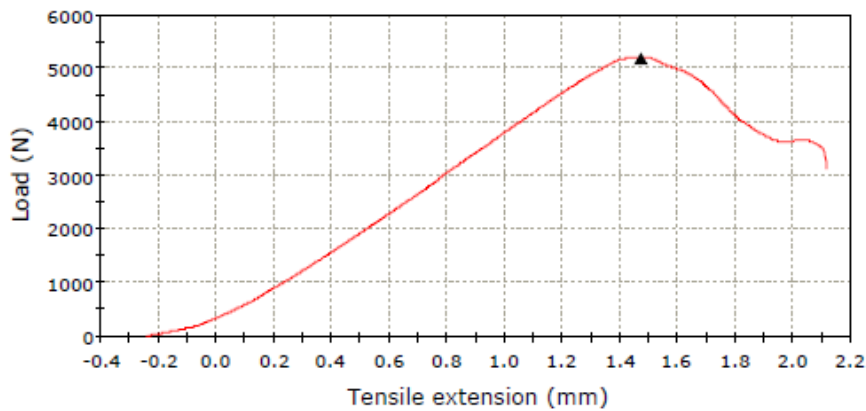


Figure B3 – Load (N) vs Extension (mm) for Element Sample No.: 20-06-P0063-B3

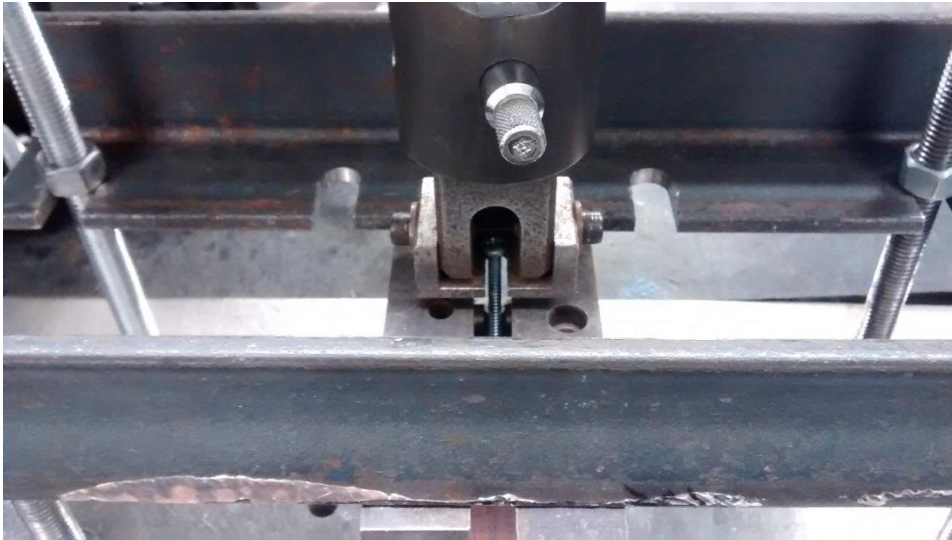


Photo 1: Test Set up

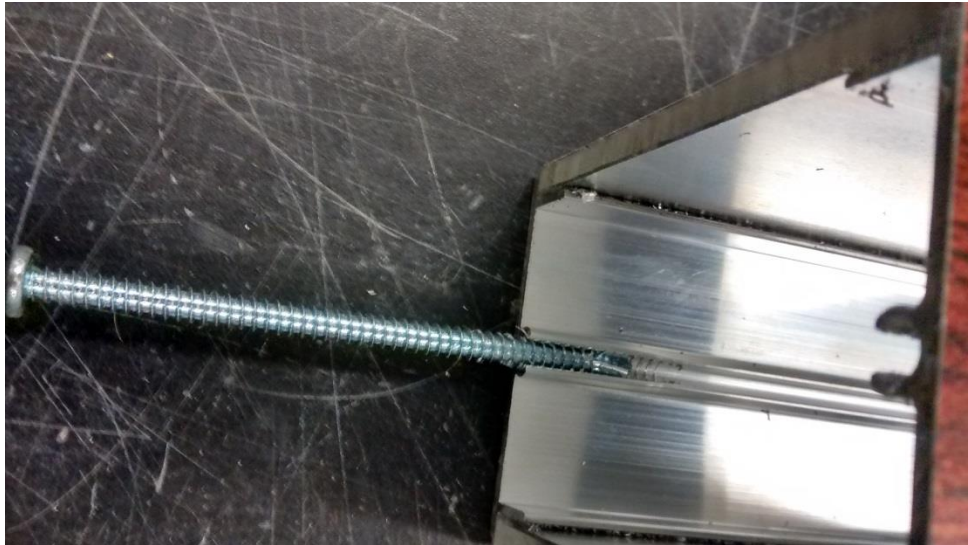


Photo 2: After Screw withdrawn