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## LOAD TESTING OF Z-CLIPS AND RAILS

**Eagle Aluminum**  
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## INTRODUCTION

This report presents the results of the vertical load testing of 2.5” Z-clips, and 48” Z-Clip rails. Tom Henrich of Eagle Aluminum submitted the samples for the testing.

## OBJECTIVE

The scope of our work was limited to vertically loading the Z-clips in their normally installed position and providing a certification report of the results. Testing was completed on April 12, 2024.

## SAMPLE IDENTIFICATION

<b>Submitted by</b>	Tom Henrich
<b>Sample Description</b>	<p><u>Test 1</u> Qty (3) Z-clips mated to a 48” rail clips spaced 16” on center</p> <p><u>Test 2</u> Qty (4) Z-clips mated to a 48” rail clips spaced 12” on center</p> <p><u>Test 3</u> Qty (1) 48” rail mated to a 48” rail utilizing all 6 screw attachment points</p>

**Table 1. Sample Descriptions**

*The results of this test apply only to the units identified in this Engineering Report by device identifier and model / part number, or serial number.*

## TEST PROCEDURE

The Z-clips and rails were installed into 2”x8” SPF (Spruce, Pine, Fir) boards with No. 8 – ¾” wood screws. 1/8” diameter pilot holes were drilled into the 2”x8” prior to installing the screws.

The test was conducted at a constant cross-head speed of 0.4 in/min. The test was run until load yielded or until failure occurred.

The moisture content of the boards used in testing was determined using a moisture meter. All boards used measured between 7-8% moisture content.

**TEST SETUP**



**Figure 1. Vertical Load Test Setup (typical)**



**Figure 2. 2.5" clip installation (typical)**

## TEST SETUP



**Figure 3. Clip Engagement (typical)**

## CALIBRATED TEST EQUIPMENT

Description	Asset ID#	Calibration Due Date
Honeywell Temp/RH Chart Recorder	MM190-024	08 June 2024
MTS Universal Test Machine	MM210-009.3	24 May, 2024
MTS Load Cell	MM210-009.2	24 May, 2024
Measuring tape	PT166-087	19 September, 2024
Delmhorst BD-2100 Moisture meter	PT163-053	Calibrated Before Use

**Table 2. Test Equipment**

## TEST RESULTS

Test 1 - Three (3) Z-clips mated to One (1) 48" rail.

Failure mode was screw pullout from the wood. The peak load was 899.56lbs.

Test 2 - Four (4) Z-clips mated to One (1) 48" rail.

Failure mode was screw pullout from the wood. The peak load was 898.73lbs.

Test 3 - One (1) 48" rail mated to One (1) 48" rail.

Failure mode was screw pullout from the wood. The peak load was 878.64lbs.

## SUMMARY OF TEST RESULTS

Description	Peak Load	Failure Mode
Three (3) Z-clips mated to One (1) 48" rail	899.56lbs	Screw pullout from wood
Four (4) Z-clips mated to One (1) 48" rail	898.73lbs	Screw pullout from wood
One (1) 48" rail mated to One (1) 48" rail	878.64lbs	Screw pullout from wood

**Table 3. Test Equipment**