Farabaugh Engineering and Testing Inc.

Project No. T188-20

Report Date: March 27, 2020

No. Pages: 9 (inclusive)

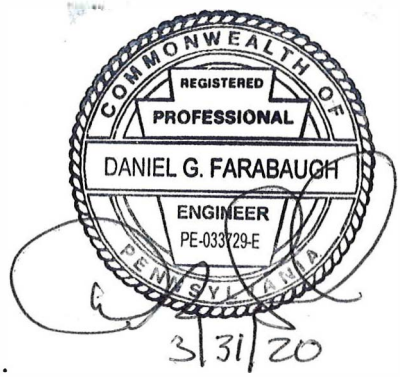
PERFORMANCE TEST REPORT

ASTM E330 UNIFORM LOAD STRUCTURAL TEST

BOX RIB – 4 PANEL
12" WIDE X 24 GA. STEEL/0.032" ALUMINUM
WITH SCREW LEG/CLIP

FOR

PETERSEN ALUMINUM CORP.
10551 PAC RD.
TYLER, TX 75707



Prepared by:

Paul G. Farabaugh

Approved by:

Daniel G. Farabaugh

Project No. T188-20

Purpose
The purpose of this test is to establish structural loading on the referenced test specimen in accordance with ASTM E330.

Test Completion Date
3/27/20

Test Specimen
Manufacturer: Petersen Aluminum Corp.
10551 PAC Rd.
Tyler, TX 75707

Specimen:
Box Rib – Clip) 4 Panel, 12" wide (Coverage), 24 ga. steel (with Screw leg and with 4 Panel, 12" wide Coverage), 0.032" aluminum (with Screw Leg and with Clip)

Panel Clip: One Piece Stainless Steel Clip – 2-1/2" Long X 0.034" Thick

Test Apparatus
A test chamber was used with two static pressure taps located at diagonally opposite corners. A controlled blower provided a uniform pressure load the specimen mock-up. Calibrated manometers were used to measure the pressure at each pressure tap. The uniform load pressure was performed in the negative direction on the panel specimen mock-up. Calibrated deflectometers were attached to monitor panel deformation as shown.

Test Assembly
- The panels were attached to 16 ga supports with #14-13 X 1-1/2" long DP4 Concealor self-drill fasteners. For Test #1 & #2 the panel had a screw leg and the panel was fastened thru the screw leg into the support with only one screw. For Test #3 & #4 the panel had no screw leg and the panel was fastened with a Stainless Steel clip using two fasteners per clip. See test setup for location of supports and installation of panels. Note: Screw leg length varied from original drawing. See panel drawings for actual screw leg lengths.

- 4 mil Plastic Sheeting was placed over top face of panel for the positive direction testing and then the panel was flipped over with plastic covering the exposed back of the panel and tested in the negative direction.

- See attached drawings showing test set-up and assembly details.

Test Procedure
The tests were conducted in accordance with ASTM E330/E330M-14, "Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference "and as provided herein. Note: Panels were tested in the positive and negative pressure direction.

TEST #1

Test Specimen:
Box Rib – 4 Panel, 12" wide (Coverage), 24 ga. Steel (w/ screw leg length 0.75" long)

Support Spacing: 2 spans @ 46.5" o/c

NEGATIVE TEST PRESSURE

PETERSEN 4 PANEL W/SCREW LEG 12" W X 24 GA. STEEL(2 SPANS @ 46.5")			
DEFLECTION DIAL READINGS (INCHES)			
LOAD (PSF)	D-1	D-2	D-3
0.0	0.000	0.000	0.000
10.4	0.009	0.048	0.017
20.8	0.021	0.105	0.040
31.2	0.040	0.195	0.091
41.6	0.063	0.302	0.168
52.0	0.085	0.397	0.259
62.4	0.108	0.488	0.344

RESULTS:
@ Test Load 62.4 psf – partial seam disengagement

Maximum Test Load = 107.6 psf (Panel tore thru side at fastener location)

TEST #2

Test Specimen:
Box Rib – 4 Panel, 12" wide (Coverage), 0.032" alum. (w/ screw leg length 0.71" long)

Support Spacing: 2 spans @ 46.5" o/c

NEGATIVE TEST PRESSURE

PETERSEN 4 PANEL W/SCREW LEG 12" W X 0.032" ALUM.(2 SPANS @ 46.5")			
DEFLECTION DIAL READINGS (INCHES)			
LOAD (PSF)	D-1	D-2	D-3
0.0	0.000	0.000	0.000
10.4	0.043	0.168	0.034
20.8	0.106	0.378	0.087
31.2	0.176	0.580	0.149
41.6	0.252	0.792	0.231

RESULTS:
Maximum Test Load =50.4 psf (Panel pulled over fastener)

TEST #3

Test Specimen: Box Rib – 4 Panel, 12" wide (Coverage), 24 ga. Steel (w/ clip) **Support Spacing:** 2 spans @ 46.5" o/c

NEGATIVE TEST PRESSURE

PETERSEN 4 PANEL W/CLIP 12" W X 24 GA. STEEL(2 SPANS @ 46.5")			
DEFLECTION DIAL READINGS (INCHES)			
LOAD (PSF)	D-1	D-2	D-3
0.0	0.000	0.000	0.000
15.6	0.074	0.188	0.119
31.2	0.296	0.587	0.443
46.8	0.371	0.709	0.545
62.4	0.523	0.928	0.723
78.1	0.624	1.098	0.871
93.7	0.753	1.270	1.031
109.3	0.841	1.386	1.140
124.9	0.915	1.489	1.239
140.5	0.996	1.599	1.342

RESULTS:
Maximum Test Load = 164.8 psf (Clip straightened out and seam disengaged from clip)

TEST #4

Test Specimen: Box Rib – 4 Panel, 12" wide (Coverage), 0.032" alum. (w/clip)

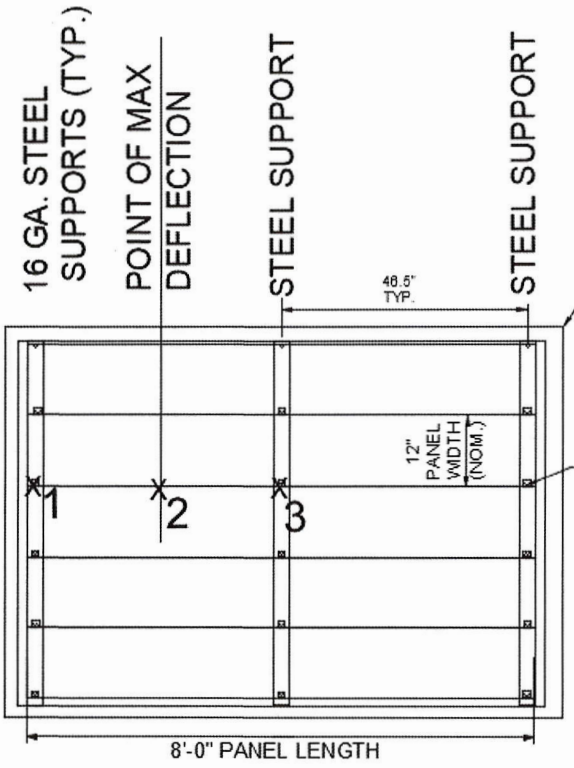
Support Spacing: 2 spans @ 46.5" o/c

NEGATIVE TEST PRESSURE

PETERSEN 4 PANEL W/ CLIP 12" W X 0.032" ALUM.(2 SPANS @ 46.5")			
DEFLECTION DIAL READINGS (INCHES)			
LOAD (PSF)	D-1	D-2	D-3
0.0	0.000	0.000	0.000
10.4	0.050	0.148	0.043
20.8	0.106	0.333	0.126
31.2	0.192	0.524	0.243
41.6	0.307	0.738	0.351
52.0	0.427	0.920	0.428
62.4	0.531	1.085	0.511
72.9	0.627	1.225	0.588
83.3	0.723	1.353	0.666
93.7	0.803	1.475	0.751

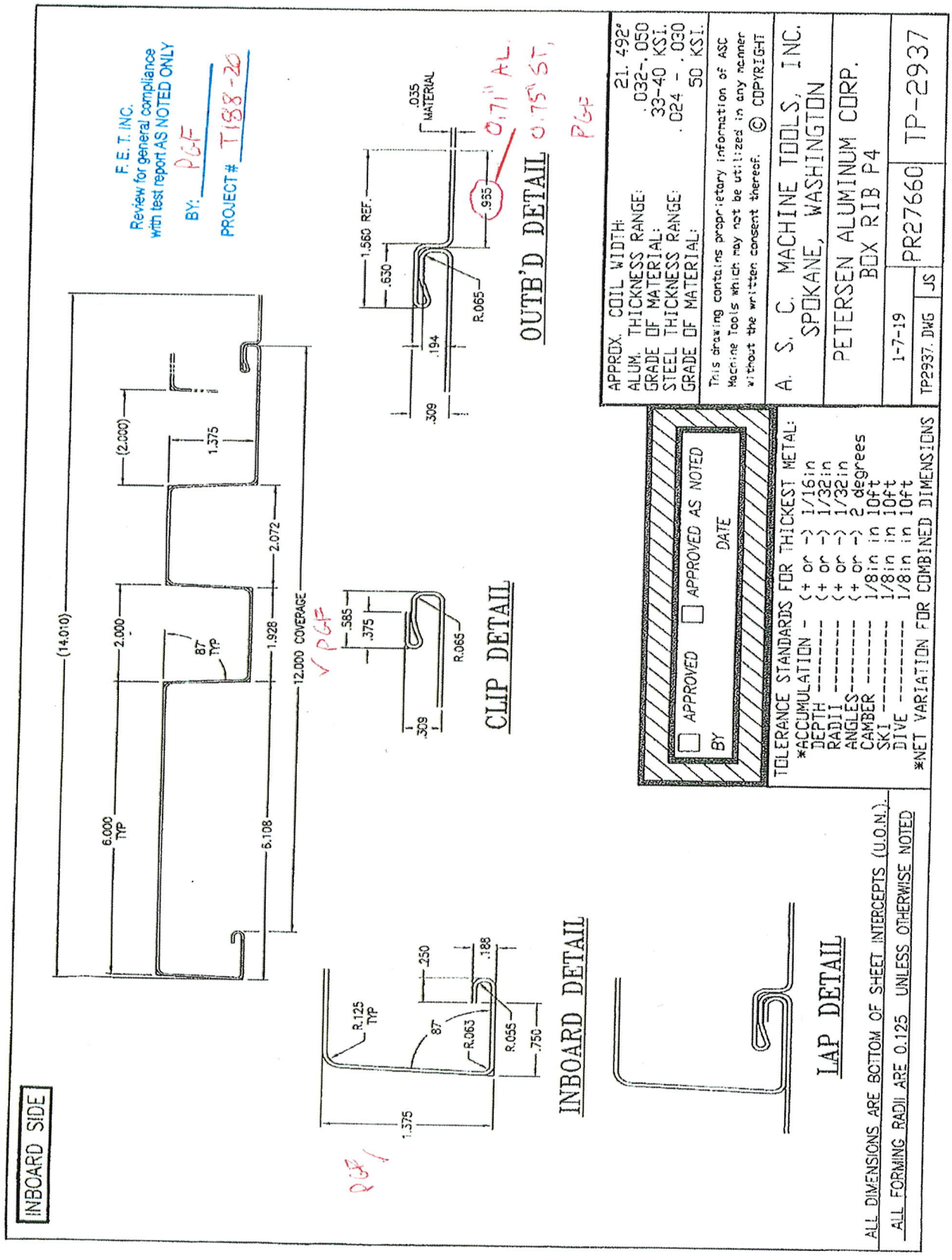
RESULTS:
Maximum Test Load =111.3 psf (Clip straightened out and seam disengaged from clip)

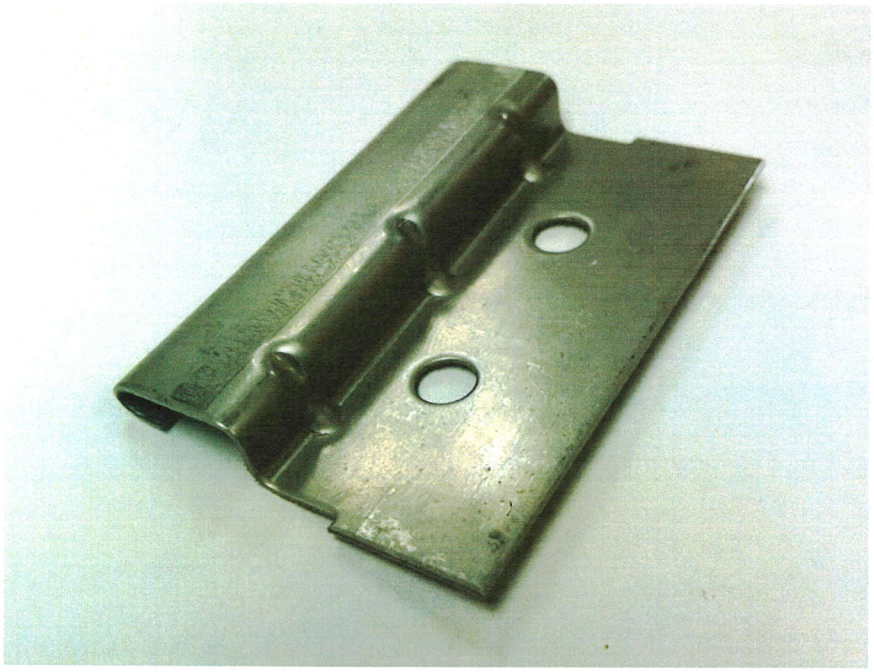
TEST SET UP



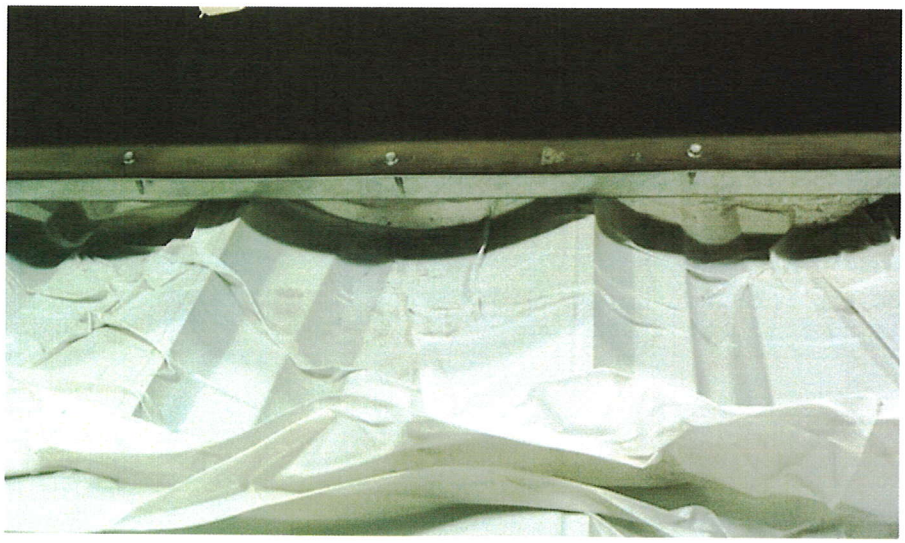
X# - DEFLECTION LOCATION

PLAN VIEW

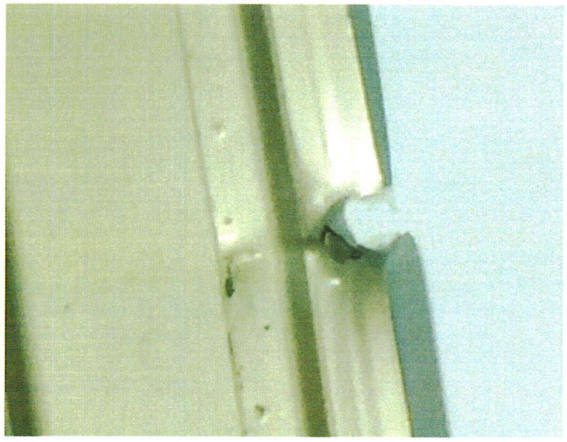

INBOARD SIDE
F. E. T. INC.
Review for general compliance with test report AS NOTED ONLY
BY: PGF
PROJECT # T188-20
(14.010)
2.000
(2.000)
1.375
87 TYP
6.000 TYP
1.928
2.072
12.000 COVERAGE
5.108
1.560 REF.
.630
.309
.194
R.065
.035 MATERIAL
.955
0.71" AL.
0.75" ST.
PGF
OUTB'D DETAIL
.585
.375
.309
R.065
CLIP DETAIL
R.125 TYP
.250
.188
87
R.063
R.055
.750
1.375
INBOARD DETAIL
LAP DETAIL
ALL DIMENSIONS ARE BOTTOM OF SHEET INTERCEPTS (U.O.N.).
ALL FORMING RADII ARE 0.125 UNLESS OTHERWISE NOTED
APPROX. COIL WIDTH: 21.492"
ALUM. THICKNESS RANGE: .032-.050
GRADE OF MATERIAL: 33-40 KSI.
STEEL THICKNESS RANGE: .024 - .030
GRADE OF MATERIAL: 50 KSI.
This drawing contains proprietary information of ASC Machine Tools which may not be utilized in any manner without the written consent thereof. © COPYRIGHT
APPROVED
APPROVED AS NOTED
BY
DATE
TOLERANCE STANDARDS FOR THICKEST METAL:
*ACCUMULATION - (+ or -) 1/16in
DEPTH ---------- (+ or -) 1/32in
RADII ---------- (+ or -) 1/32in
ANGLES---------- (+ or -) 2 degrees
CAMBER ---------- 1/8in in 10ft
SKI ---------- 1/8in in 10ft
DIVE ---------- 1/8in in 10ft
*NET VARIATION FOR COMBINED DIMENSIONS
A. S. C. MACHINE TOOLS, INC.
SPOKANE, WASHINGTON
PETERSEN ALUMINUM CORP.
BOX RIB P4
1-7-19
TP2937.DWG
JS
PR27660
TP-2937



PANEL CLIP



TYP. DEFLECTION OF PANELS DURING STR. LOADING



TYP. PANEL TEAR AT SCREW LEG

TYPICAL CLIP WITH TYPICAL FAILED CLIP

TYP. FAILED DISENGAGEMENT OF PANEL

Project No. T188-20

TENSILE TEST REPORT

Client: Petersen Aluminum Corp.
10551 PAC Rd.
Tyler, TX 75707

Test Date: February 4, 2020 – Sample 20015
February 24, 2020 – Sample 20022
March 26, 2020 – Sample 20053 & 20054

Test Method: ASTM A370-10 steel, ASTM B557-10 aluminum

Material Description:
Box Rib – 4 Panel, 12" wide (Coverage), 24 ga. steel w/screw leg & clip leg
Box Rib – 4 Panel, 12" wide (Coverage), 0.032" aluminum w/screw leg & clip leg

Sample No.	Width (in)	Thickness (in)	Yield Load (lb)	Max. Load (lb)	0.2% Offset Yield Strength (psi)	Tensile Strength (psi)	Elongation (% in 2 inches)
20053 Steel w/screw leg	0.500	0.024	579.48	677.08	48,290	56,423	27.1
20054 Aluminum w/screw leg	0.502	0.030	346.93	393.81	23,038	26,150	6.3
20022 Steel w/clip leg	0.506	0.023	635.5	730.9	54,604	62,801	26.4
20015 Aluminum w/clip leg	0.498	0.031	351.26	389.41	22,753	25,224	10.4

Equipment Used: Tensile Machine #QT7-061196-020
Caliper #14682489
Extensometer #10311744D
Micrometer #52-222-001