Farabaugh Engineering and Testing Inc.

Project No. T349-11

Report Date: December 16, 2011

Total Pages (inclusive): 10

ASTM E330
STRUCTURAL PERFORMANCE TESTING

16" SIDING PANEL WITH CLIP
22 GA STEEL

FOR

PETERSEN ALUMINUM CORP.
1005 TONNE RD.
ELK GROVE VILLAGE, IL 60007

Report Prepared By:

Patrick J. Farabaugh

Reviewed and Approved By:

Daniel G. Farabaugh

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Purpose

This test method covers the evaluation of structural performance of the referenced test specimen per ASTM E330-02, "Standard Test Method of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference" and as provided herein.

Test Dates

12-5-11 to 12-12-11

Test Specimen

Manufacturer: Petersen Aluminum Corp.
1005 Tonne Rd.
Elk Grove Village, IL 60007

Panel: 16" Siding Panel with Clip, 22 ga Steel

Testing Apparatus

A vacuum test chamber was used with two static pressure taps located at diagonally opposite corners. A controlled blower provided a vacuum to uniformly 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 to monitor wind uplift on the panel specimen mock-up. Calibrated deflectometers were attached to monitor panel deformation as shown.

Installation

- The panels were installed on to 16 ga supports using a fixed clip with #10-16 X 1" long pancake head self drill fasteners (2 screws per clip). The panel side-joints were a tongue and groove type as shown on the attached detail.

- Plastic (4 mil thick) was employed loosely between the panels and subgirts and in the side joints to create a vacuum seal.

Procedure

- The test assembly was subjected to negative pressures to form an outward pressure at the values and time duration as shown in the attached table.

- Each pressure increment was held for at least 1 minute.

- Deflection movement of the assembly during the tests was recorded.

- Successive increments were achieved as above until failure or ultimate load was reached.

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TEST "A"

Specimen: 16" Siding Panel with Clip, 22 ga Steel

Clip Spacing: 4 ft o/c

NEGATIVE LOAD TEST

	DEFLECTION READINGS (INCHES)							
LOAD (PSF)	D-1	D-2	D-3	D-4	D-5	D-6	D-7	D-8
1.6	0	0	0	0	0	0	0	0
12.0	0.103	0.387	0.144	0.352	0.079	0.396	0.053	0.371
1.6	0	0.008	0.02	-0.004	0.003	0.023	0.001	0.003
22.4	0.226	0.735	0.328	0.744	0.19	0.705	0.118	0.699
1.6	0.018	0.041	0.073	0.08	0.026	0.073	0.001	0.022
32.8	0.351	1.015	0.51	1.082	0.294	0.978	0.19	0.95
1.6	0.04	0.098	0.125	0.162	0.069	0.105	0.02	0.068
43.2	0.484	1.263	0.66	1.378	0.386	1.22	0.288	1.205
1.6	0.083	0.17	0.194	0.283	0.1	0.178	0.063	0.133
53.6	0.61	1.486	0.803	1.626	0.501	1.43	0.366	1.418
1.6	0.119	0.246	0.255	0.366	0.133	0.291	0.102	0.212
64.0	0.721	1.682	0.934	1.852	0.548	1.641	0.421	1.615
1.6	0.159	0.332	0.314	0.461	0.166	0.344	0.127	0.296
74.5	0.835	1.877	1.082	2.086	0.616	1.874	0.491	1.793
1.6	0.201	0.433	0.401	0.582	0.209	0.502	0.156	2.383

RESULTS:

Maximum Test Load = 84.9 psf (Panel disengaged from clip)

$R_{(ULT)} = [84.9\ \#/ft^2 \times 4\ ft] = 339.6\ \#/ft$

$F.S. = 2.0$

$R_{(ALLOW)} = 169.8\ \#/ft$

$R_{(ULT)} = [84.9\ \#/ft^2 \times 4\ ft] = 339.6\ \#/ft$

$F.S. = 1.65$

$R_{(ALLOW)} = 205.8\ \#/ft$

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TEST "B"

Specimen: 16" Siding Panel with Clip, 22 ga Steel

Clip Spacing: 1 ft o/c

NEGATIVE LOAD TEST

	DEFLECTION READINGS (INCHES)							
LOAD (PSF)	D-1	D-2	D-3	D-4	D-5	D-6	D-7	D-8
1.6	0	0	0	0	0	0	0	0
12.0	0.016	0.188	0.025	0.213	0.021	0.195	0.017	0.192
1.6	-0.004	-0.003	0.011	-0.004	0.001	0	0	0
22.4	0.046	0.41	0.044	0.433	0.052	0.413	0.042	0.413
1.6	-0.015	-0.006	0.011	0	0.001	0	0	0
32.8	0.07	0.601	0.072	0.616	0.084	0.596	0.065	0.6
1.6	0.009	0.015	0.022	0.014	0.001	0	0	0.002
53.6	0.145	0.933	0.144	0.942	0.152	0.926	0.136	0.933
1.6	0.009	0.015	0.02	0.018	0.001	0.005	0.004	0.008
79.7	0.32	1.332	0.276	1.323	0.333	1.345	0.289	1.345
1.6	0.1	0.167	0.1	0.179	0.099	0.167	0.097	0.171
110.9	0.486	1.779	0.451	1.685	0.503	1.62	0.478	1.783
1.6	0.304	0.502	0.209	0.437	0.233	0.488	0.227	0.503
126.5	0.569	1.978	0.55	1.834	0.588	1.975	0.552	1.982
1.6	0.31	0.666	0.264	0.569	0.291	0.667	0.283	0.684
147.3	0.674	2.213	0.616	2.056	0.682	2.188	0.645	2.204
1.6	0.359	0.908	0.328	0.758	0.372	0.891	0.344	0.909
168.1	0.757	2.425	0.691	2.228	0.78	2.376	0.718	2.425
1.6	0.43	1.142	0.382	0.952	0.431	1.123	0.425	1.157
188.9	0.85	2.614	0.775	2.406	0.885	2.606	0.828	2.624
1.6	0.474	1.306	0.433	1.14	0.489	1.29	0.465	1.338
209.8	1.021	2.831	0.858	2.668	0.967	2.815	0.881	2.816
1.6	0.539	1.515	0.504	1.402	0.562	1.523	0.541	1.551

RESULTS:

Maximum Test Load = 338.5 psf (Clip Bending and Panel distortion)

$R_{(ult)} = [338.5\ \#/ft^2 \times 1\ ft] = 338.5\ \#/ft$

F.S. = 2.0

$R_{(allow)} = 169.3\ \#/ft$

$R_{(allow)}$ Average ⇒ 169.6 #/ft

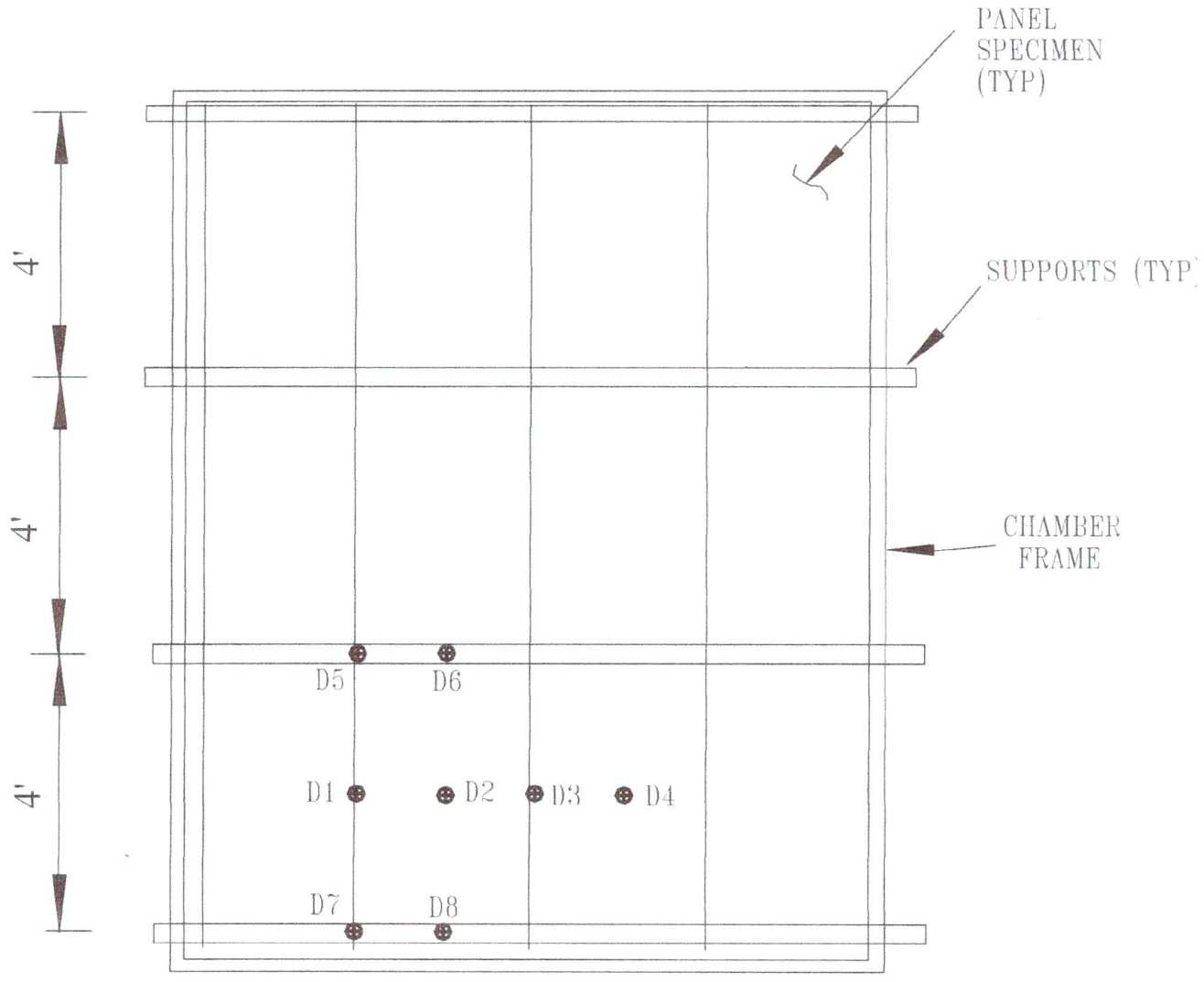
$R_{(ult)} = [338.5\ \#/ft^2 \times 1\ ft] = 338.5\ \#/ft$

F.S. = 1.65

$R_{(allow)} = 205.2\ \#/ft$

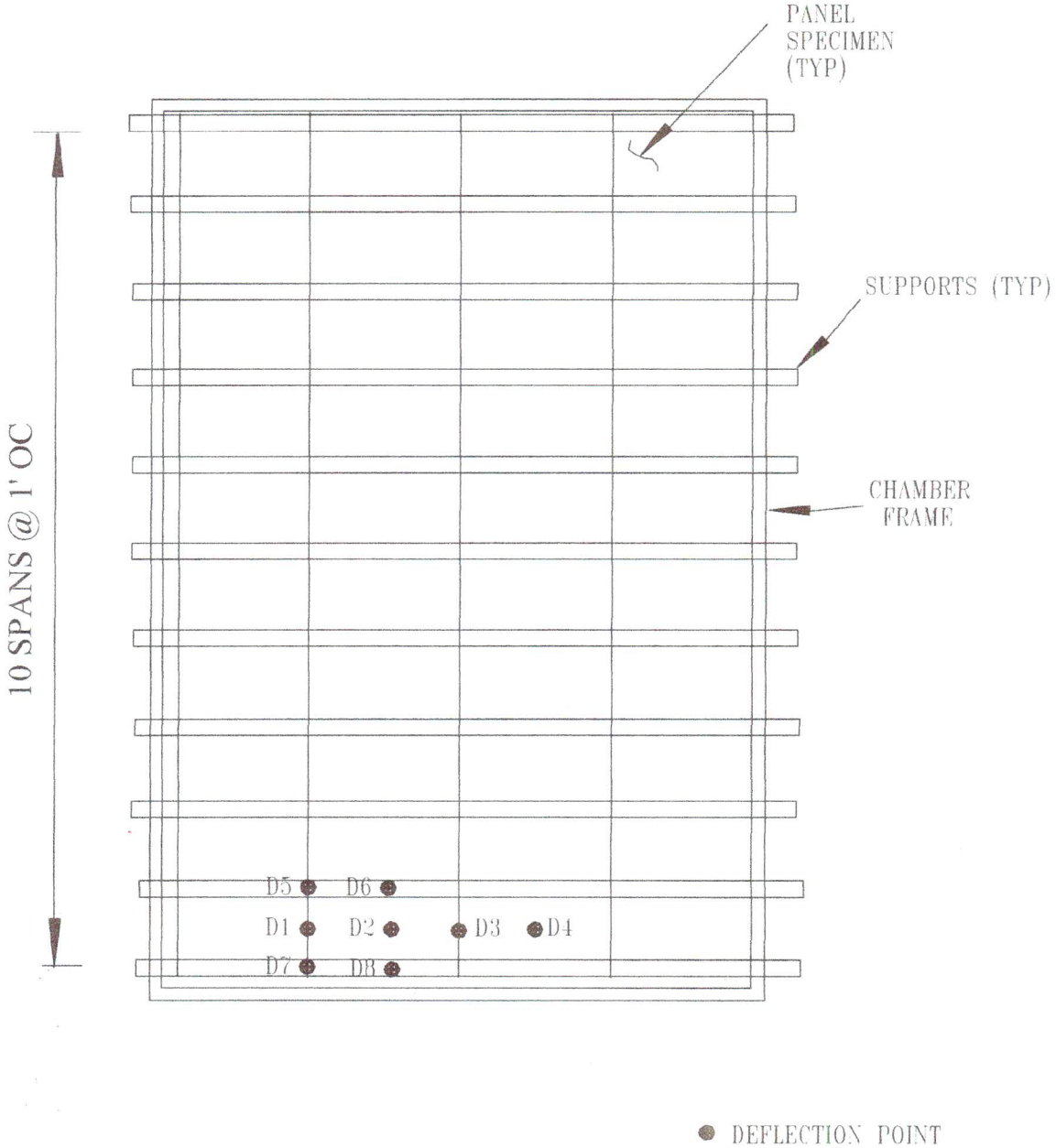
$R_{(allow)}$ Average ⇒ 205.5 #/ft

TEST "A"



TEST ASSEMBLY

TEST "B"



TEST ASSEMBLY

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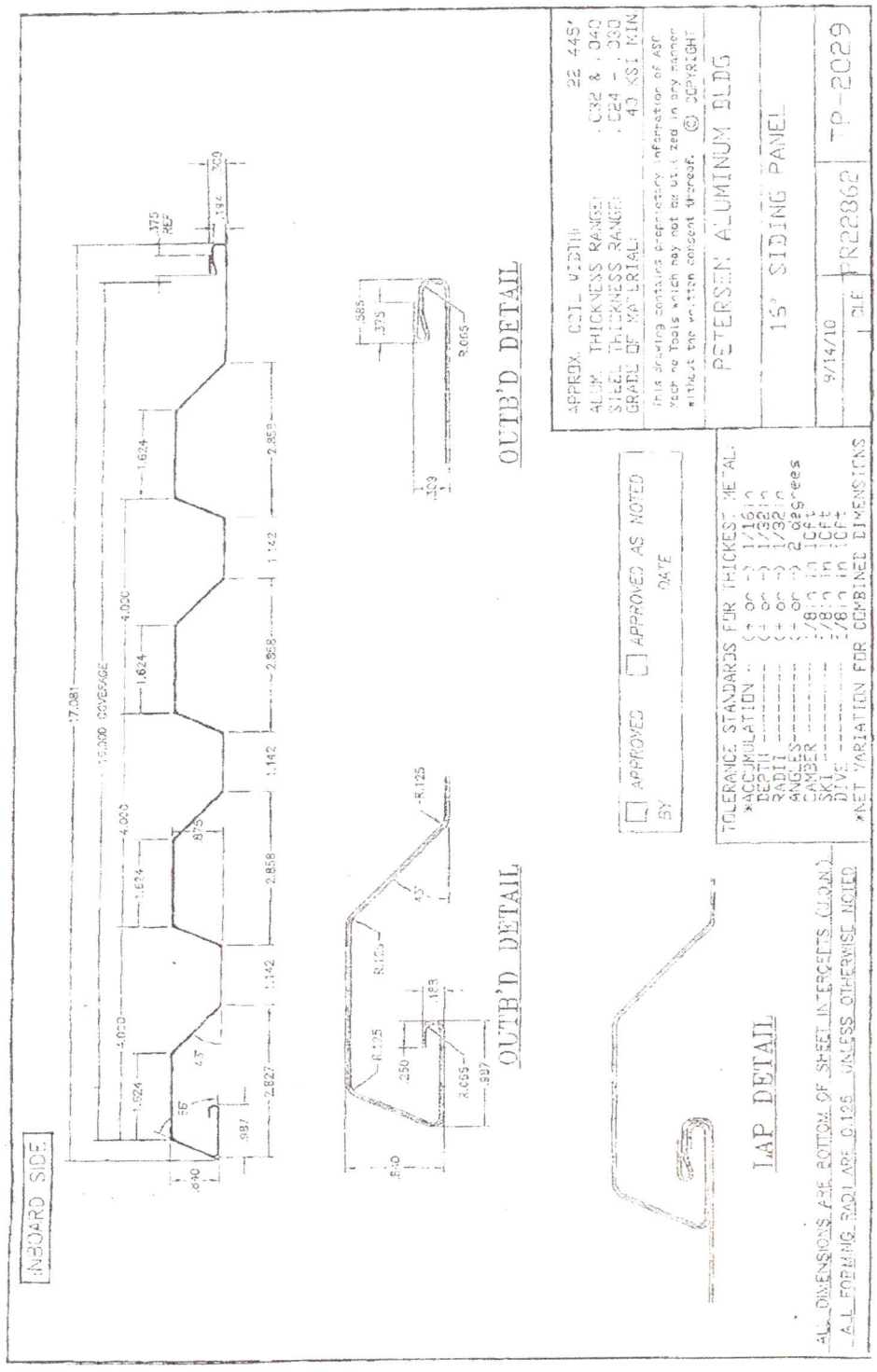

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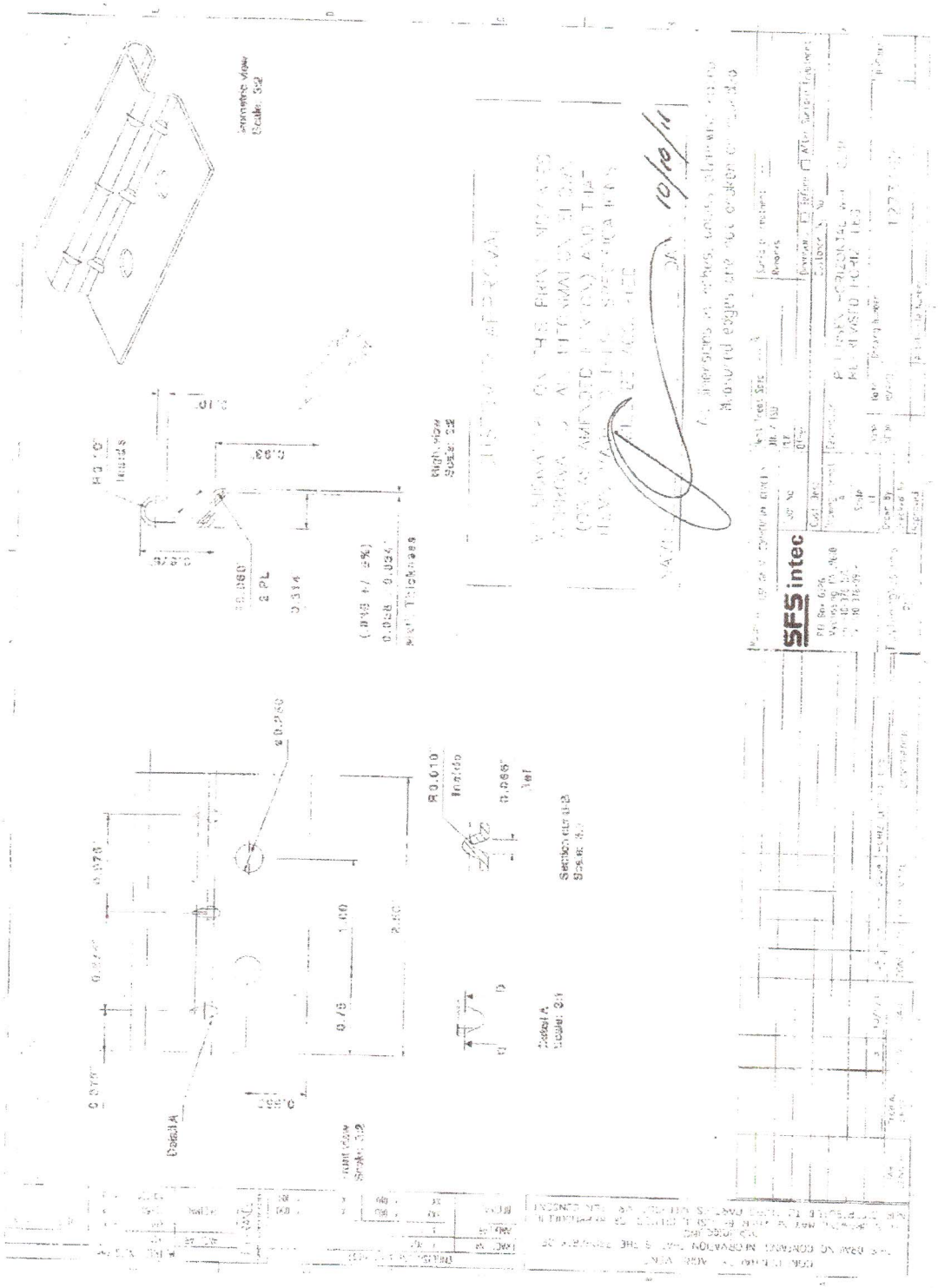

TENSILE TEST REPORT

Client: Petersen Aluminum Corp.
1005 Tonne Rd.
Elk Grove Village, IL 60007

Test Date: December 15, 2011

Test Method: ASTM A370-10

Material Description: 16" Siding Panel, 22 ga Steel

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)
0092-11	0.510	0.029	794.7	873.6	53,735	59,059	31.9

Equipment Used: Tensile Machine #QT7-061196-020
Caliper #081410113-1
Extensometer #10311744D
Micrometer #52-222-001