Farabaugh Engineering and Testing Inc.

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ASTM E 1592
STANDARD TEST METHOD FOR
STRUCTURAL PERFORMANCE OF SHEET METAL ROOF AND SIDING
SYSTEMS BY UNIFORM STATIC AIR PRESSURE DIFFERENCE

7/8"CORRUGATED ROOF PANEL
24 GA. STEEL

FOR

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

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Project No. T124-09

ASTM E1592-01
STANDARD TEST METHOD FOR
STRUCTURAL PERFORMANCE OF SHEET METAL ROOF AND SIDING
SYSTEMS BY UNIFORM STATIC AIR PRESSURE DIFFERENCE

Purpose

This test method covers the evaluation of the structural performance of Sheet Metal Panels and Anchor to Panel Attachments for roof or siding systems under uniform static air pressure difference.

Test Date

Test #1 (Specimen "A") – 2/11/09

Test #2 (Specimen "B") – 2/12/09

Test Specimen

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

Panel: 7/8" Roof Panel, 24 ga. Steel

Panel Length: as shown

Testing Apparatus

Test Chamber: Vacuum Chamber Composed of Wood

Mounting Frame: Hat Shape Subgirts fastened to W6 X 15 Wide Flange Beams

Pressure Indicator: Digital Pressure Indicator from Micro-Pneumatic Logic, Inc.

Defection Devices: Digital Potentiometers 0-6" range

Installation

- The panels were installed on to 16 ga supports using ¼"-14 X 1-1/4" long hex head self drill fasteners with 5/8" seal washer located at every other low cell of the panel as shown on the fastener pattern details. The fixed end used fasteners at every low cell of the panel. The panel side-joints were overlapping using #12-14 X 1" long hex head self drill fasteners with 5/8" seal washer located at 12" o.c. .

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

Procedure

- The specimen was checked for proper adjustment and all vents closed in the pressure measuring lines.

- The required deflection measuring apparatus' were installed at their specified locations.

- A nominal initial pressure was applied equal to at least four times but not more than ten times the dead weight of the specimen. This nominal pressure was used as the reference zero and initial deflection readings were recorded.

- At each load increment, pressure was maintained for a period of not less than 60 seconds and until the deflection gages indicated no further increase in deflections.

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

The test was conducted according to the procedure in ASTM E-1592-01 and as noted herein. In our opinion the tape and plastic had no influence on the results of the test.

TEST #1

NEGATIVE (UPLIFT) PRESSURE

PAC 7/8" CORRUGATED PANEL X 24 GA. STEEL (SPECIMEN A) 3 SPANS @ 5 '-0" oc									
	DEFLECTION DIAL READINGS (INCHES)								
LOAD (PSF)	D-1	D-2	D-3	D-4	D-5	D-6	D-7	D-8	REMARKS
1.2	0	0	0	0	0	0	0	0	PANEL WT.
11.6	0.093	0.121	0.121	0.154	0.101	0.06	0.037	0.044	
1.2	0.008	0.008	0.007	0.008	0.006	0.001	0.002	0.003	PANEL WT.
16.8	0.16	0.202	0.193	0.237	0.144	0.107	0.058	0.069	
1.2	0.012	0.013	0.011	0.011	0.01	0.015	-0.005	0.004	PANEL WT.
27.2	0.288	0.343	0.319	0.388	0.22	0.217	0.098	0.097	
1.2	0.027	0.021	0.031	0.034	0.029	0.028	0.002	0.005	PANEL WT.
37.6	0.405	0.473	0.426	0.514	0.266	0.269	0.139	0.142	
1.2	0.029	0.032	0.032	0.036	0.032	0.029	0.002	0.006	PANEL WT.
48.0	0.527	0.621	0.548	0.65	0.312	0.323	0.186	0.192	
1.2	0.035	0.04	0.038	0.043	0.037	0.036	0.003	0.006	PANEL WT.
58.4	0.648	0.754	0.661	0.776	0.36	0.374	0.22	0.23	
1.2	0.045	0.053	0.049	0.055	0.044	0.044	0.009	0.01	PANEL WT.
74.1	0.861	0.991	0.86	0.988	0.444	0.468	0.264	0.277	
1.2	0.067	0.084	0.072	0.089	0.061	0.065	0.019	0.018	PANEL WT.
89.7	1.086	1.243	1.073	1.204	0.533	0.56	0.317	0.334	
1.2	0.106	0.135	0.11	0.135	0.082	0.097	0.03	0.023	PANEL WT.
105.3	1.345	1.513	1.318	1.45	0.639	0.665	0.374	0.395	
1.2	0.163	0.208	0.163	0.198	0.114	0.118	0.046	0.037	PANEL WT.
120.9	1.649	1.842	1.622	1.726	0.761	0.783	0.441	0.47	
1.2	0.262	0.338	0.248	0.302	0.158	0.17	0.068	0.071	PANEL WT.
141.7	2.184	2.373	2.11	2.165	0.969	0.983	0.596	0.59	
1.2	0.52	0.651	0.461	0.518	0.274	0.278	0.135	0.156	PANEL WT.

RESULTS:

ULTIMATE TEST LOAD = 157.3 PSF
(BUCKLING OF PANEL @ 2'-6" FROM OPEN END)

TEST #2

NEGATIVE (UPLIFT) PRESSURE

PAC 7/8" CORRUGATED PANEL X 24 GA. STEEL (SPECIMEN B) 5 SPANS @ 2 '-0" oc									
	DEFLECTION DIAL READINGS (INCHES)								
LOAD (PSF)	D-1	D-2	D-3	D-4	D-5	D-6	D-7	D-8	REMARKS
1.2	0	0	0	0	0	0	0	0	PANEL WT.
27.2	0.062	0.07	0.077	0.075	0.087	0.05	0.04	0.041	
1.2	0.016	0.015	0.012	0.009	0.03	0.033	0.014	0.009	PANEL WT.
53.2	0.112	0.128	0.126	0.122	0.141	0.114	0.088	0.086	
1.2	0.024	0.024	0.019	0.015	0.04	0.042	0.025	0.013	PANEL WT.
79.3	0.164	0.187	0.177	0.17	0.19	0.172	0.14	0.136	
1.2	0.031	0.032	0.036	0.024	0.048	0.052	0.035	0.015	PANEL WT.
105.3	0.203	0.235	0.222	0.204	0.229	0.245	0.179	0.178	
1.2	0.035	0.036	0.038	0.025	0.054	0.055	0.042	0.019	PANEL WT.
131.3	0.254	0.283	0.264	0.24	0.289	0.309	0.22	0.217	
1.2	0.042	0.041	0.045	0.027	0.063	0.062	0.048	0.023	PANEL WT.
157.3	0.296	0.328	0.303	0.278	0.335	0.36	0.252	0.253	
1.2	0.048	0.047	0.051	0.031	0.069	0.07	0.054	0.029	PANEL WT.
183.3	0.34	0.374	0.348	0.318	0.39	0.426	0.287	0.295	
1.2	0.053	0.053	0.052	0.034	0.076	0.077	0.058	0.039	PANEL WT.
209.4	0.382	0.421	0.388	0.358	0.44	0.473	0.318	0.336	
1.2	0.059	0.061	0.058	0.04	0.083	0.084	0.062	0.05	PANEL WT.
235.4	0.423	0.465	0.426	0.397	0.486	0.538	0.348	0.377	
1.2	0.069	0.074	0.068	0.048	0.092	0.095	0.066	0.063	PANEL WT.
261.4	0.465	0.51	0.467	0.436	0.535	0.565	0.379	0.421	
1.2	0.079	0.088	0.072	0.057	0.103	0.107	0.071	0.08	PANEL WT.
287.4	0.505	0.553	0.524	0.471	0.583	0.611	0.408	0.464	
1.2	0.088	0.099	0.089	0.07	0.114	0.118	0.078	0.098	PANEL WT.
313.4	0.545	0.596	0.567	0.51	0.633	0.658	0.437	0.51	
1.2	0.102	0.112	0.1	0.083	0.128	0.331	0.085	0.116	PANEL WT.

RESULTS:

ULTIMATE TEST LOAD = 319.6 PSF (NO FAILURE)