



**Farabaugh Engineering and Testing, Inc.**

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Project No. T260-02

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

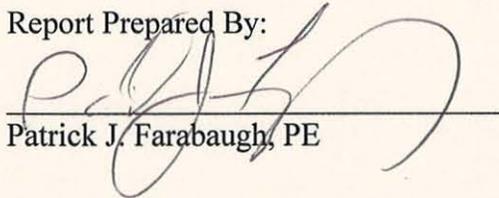
**TITE-LOC PLUS STEEL ROOF PANEL**

**18" WIDE / 24 GA THK**

FOR

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

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**ASTM 1592-01**  
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**

9-18-02 (3 Spans @ 5' oc.)

9-30-02 (6 Spans @ 2' oc)

**Test Specimen**

*Manufacturer:* Petersen Aluminum Corp.

1005 Tonne Rd.

Elk Grove Village, IL 60007

*Panel:* Tite-Loc Plus Steel Roof Panel, 24 ga, 18" Wide

*Clip:* Tite-Loc Plus Two Piece Low Floating Clip

*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 Indicators from Micro-Pneumatic Logic, Inc.

*Caliper:* Mitutoyo Digital Caliper, Model No. CD-12" CP

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### **Installation**

- The panels were installed with clips onto 16 ga hat shape subgirts using (2) #12-14 self drilling fasteners per clip. The side joints were seamed with a mechanical seamer. Continuity fasteners were located at the top of the sidelap joints at panel ends.
- The system was inverted and attached to the steel beams with #14 tek fasteners.
- 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.

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TEST DATA FOR 18" TITE-LOC PLUS PANEL 24 GA STEEL 3 SPANS @ 5'-0" oc							
DEFLECTION POINT READINGS (INCHES)							
LOAD (PSF)	D1	D2	D3	D4	D5	D6	REMARKS
1.2	0	0	0	0	0	0	PANEL WT.
11.6	0.104	1.263	0.106	1.284	0.055	1.145	
1.2	0.001	0.066	0.003	0.016	-0.006	-0.01	PANEL WT.
16.8	0.183	1.919	0.181	1.882	0.089	1.791	
1.2	0.011	0.143	0.018	0.068	-0.007	0.031	PANEL WT.
22.0	0.291	2.416	0.325	2.429	0.137	2.214	
1.2	0.065	0.272	0.026	0.138	-0.007	0.053	PANEL WT.
32.4	0.631	3.582	0.793	3.688	0.314	3.344	
1.2	0.213	-0.179	0.159	1.624	0.115	-0.654	PANEL WT.
42.8	1.209	4.492	1.249	4.422	0.615	4.065	
1.2	0.476	1.879	0.397	2.742	0.151	-0.635	PANEL WT.
53.2	1.714	5.122	1.817	5.051	0.993	4.688	
1.2	0.844	3.771	0.659	3.117	0.261	2.891	PANEL WT.

ULTIMATE TEST LOAD = 63.6 PSF (PANEL BUCKLING AT MIDSPAN OF END BAY)

NOTE: SEE SKETCH 1 FOR LOCATION OF PANEL BUCKLING.

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TEST DATA FOR 18" TITE-LOC PLUS PANEL 24 GA STEEL 6 SPANS @ 2'-0" oc							
DEFLECTION POINT READINGS (INCHES)							
LOAD (PSF)	D1	D2	D3	D4	D5	D6	REMARKS
1.2	0	0	0	0	0	0	PANEL WT.
11.6	0.06	1.359	0.044	1.353	0.054	1.384	
1.2	0.026	0.062	0.007	-0.166	0.005	0.039	PANEL WT.
22.0	0.176	2.198	0.154	2.24	0.131	2.289	
1.2	0.076	0.145	0.009	0.014	0.001	0.164	PANEL WT.
32.4	0.33	2.964	0.321	3.081	0.307	3.16	
1.2	0.092	1.314	-0.003	-0.422	0.082	1.336	PANEL WT.
42.8	0.59	3.716	0.572	3.817	0.592	3.768	
1.2	0.204	2.27	-0.013	0.14	0.205	2.435	PANEL WT.
63.6	0.761	4.096	0.761	4.172	0.804	4.229	
1.2	0.142	2.264	0.103	2.152	0.174	2.539	PANEL WT.
79.3	0.994	4.453	0.977	4.573	1.007	4.568	
1.2	0.284	2.903	0.251	2.941	0.346	3.154	PANEL WT.
94.9	1.285	4.872	1.235	4.96	1.313	4.959	
1.2	0.499	3.493	0.446	3.517	0.565	3.684	PANEL WT.
110.5	1.73	5.437	1.707	5.585	1.736	5.494	
1.2	0.8	4.148	0.721	4.253	0.899	4.314	PANEL WT.
126.1	2.086	5.82	2.02	5.968	2.029	5.824	
1.2	1.025	4.576	0.926	4.637	1.035	4.672	PANEL WT.
141.7	2.324	6.104	2.24	6.209	2.26	6.064	
1.2	1.163	4.883	1.061	4.884	1.235	5.014	PANEL WT.
167.7	3.656	7.457	3.54	7.566	3.548	7.408	
1.2	2.201	6.318	2.022	6.347	2.362	6.544	PANEL WT.

SOME CREASING OF PANEL AT FIXED END AT 126 PSF

ULTIMATE TEST LOAD = 198.8 PSF (PANEL BUCKLING AT MIDSPAN OF END BAY)

NOTE: SEE SKETCH 2 FOR LOCATION OF PANEL BUCKLING.