

## ASTM E 1592 STATIC AIR PRESSURE TEST REPORT

Prepared by: E. D. Lowe

Present at test: E. D. Lowe  
M. W. Croucher, Jr., P.E.

Witnessed by: Tim Royer, P.E.

Test date: September 13, 2001 1:00 pm

Location: Fabral Research and Development Lab

Specimen tested: 18" wide Thin Seam panels

Specimen properties: 24 gauge steel

Purlin spacings: 2'-6" spacings (corner test)

Type of test: **WIND UPLIFT PER ASTM E 1592**

### SUMMARY

A 10' by 25' air pressure test chamber was constructed with purlins 2'-6" o.c. Fabral Thin Seam panels were tested for wind uplift capacity using constant air pressure loading. Panel loading reached 50 psf without failure. This load was sustained for 1 minute. During reloading of the panel to attempt 60 psf, the sidejoint between the first and second panel on the north side of the test chamber disengaged before 50 psf was reached.

### TEST PROCEDURES

#### A. Specimen:

- 10' x 25' chamber
- purlins 16 gage 2'-6" o.c. 10 span condition
- panels were 18" wide Thin Seam 24 gauge steel
- panel clips were 18 gage galvanized steel, 3½" long and were located at each purlin and panel side joint with 2 #10-16 X 1" SDST fasteners per clip
- both sides were left completely free with panels attached outside of the sealed area
- one end was left completely free, one end was fixed with #10-16 screws (3 per

- panel)
- a 6 mil pleated plastic barrier was placed under the panels and held down by a batten to maintain the air pressure. This plastic was approximately 16' wide and 35' long so it could be pleated and allow full loading of the panels
  - test loads were measured using two manometers located at opposite ends of the test chamber.

#### B. Loading pattern:

1. 5 cycles were made to 20 psf to flex the specimen
2. deflection readings were taken at 0 psf
3. specimen was loaded to 10 psf (reference 0), held for 1 minute then deflections were measured
4. loaded to 20 psf, held for 1 minute, measure deflections
5. relax load for 1 minute
6. loaded to 10 psf, held for 1 minute, measure deflections
7. loaded to 30 psf, held for 1 minute, measure deflections
8. repeat 5, 6 and 7 adding 10 psf load each cycle to 60 psf

#### C. Deflection readings:

Deflection readings were taken on the fourth panel from the North edge at the following 6 locations:

1. Panel pan @ mid-span of 6th span (13' 9" from panel end)
2. Panel pan @ 7th support (15'-0" from panel end)
3. Panel rib @ 7th support (15'-0" from panel end)
4. Panel pan @ mid-span of 7th span (16'-3" from panel end)
5. Panel rib @ mid-span of 7th span (16'-3" from panel end)
6. Panel pan @ mid-span of 8th span (18'-9" from panel end)

The deflections are shown on the data sheet. The raw deflections, zeroed deflections and corrected deflections are also shown as well as a graph of the corrected deflection.

#### TEST OBSERVATIONS

at 50 psf                      Creaking noises were heard during unloading.

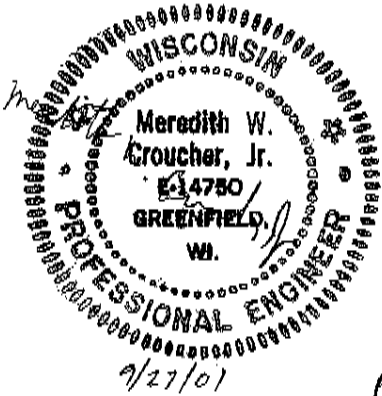
Panel sidejoint disengaged while attempting to load panels to 60 psf. Sidejoint disengaged at 46 psf. Test was concluded.

TEST RESULTS

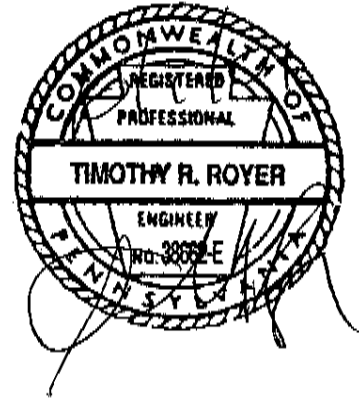
A maximum air pressure of 50 psf was attained before panel failure occurred in the sidejoint. Sidejoint failure occurred during an attempt to load the panels to 60 psf. Failure occurred as the sidejoint yielded sideways, effectively "unsnapping" the snap-together seams.

M. W. Croucher, Jr.  
M. W. Croucher, Jr., P.E.  
Fabral Engineering

Eric D. Lowe  
Eric D. Lowe  
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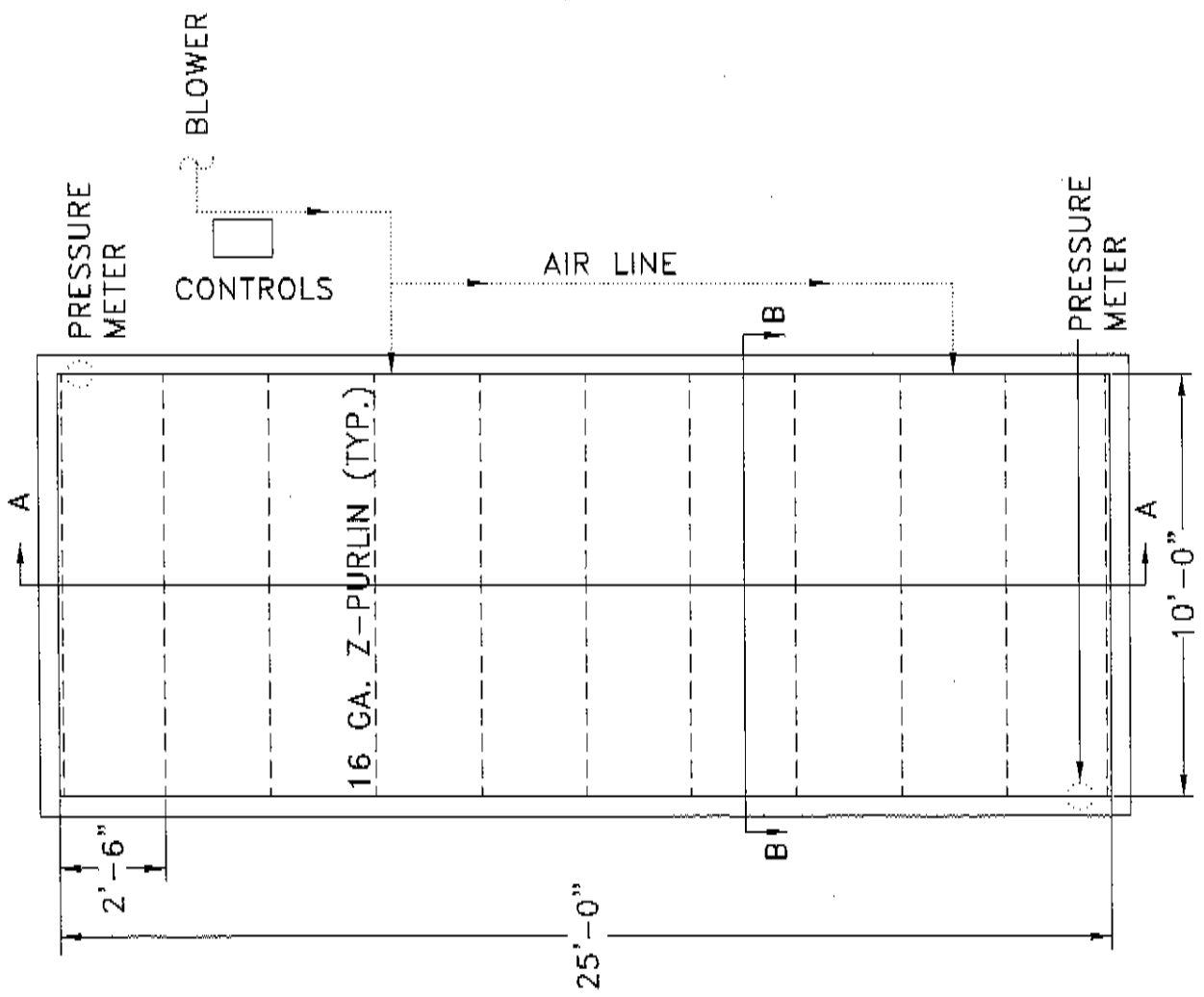
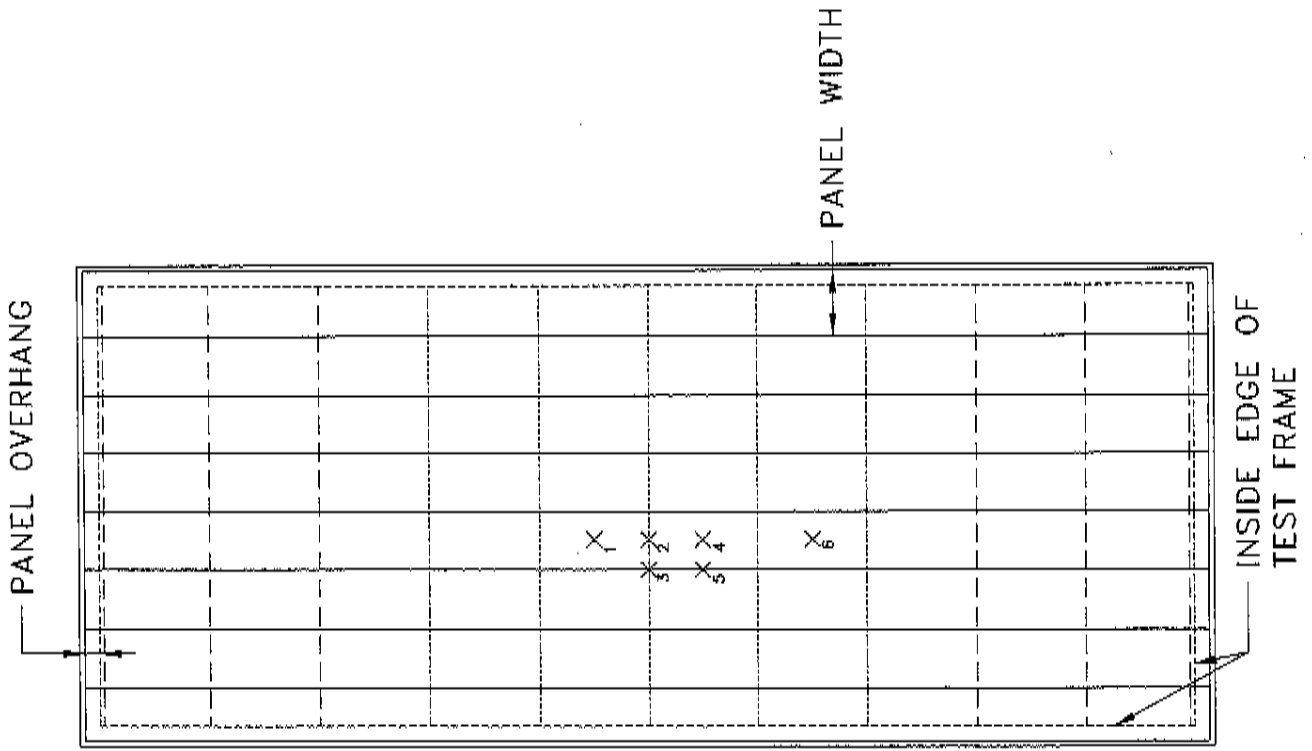


Tim Royer  
Tim Royer, P.E.  
Timber Tech Engineering



Addendum to ASTM E1592 Thin Seam 24 ga. 2' 6" test.

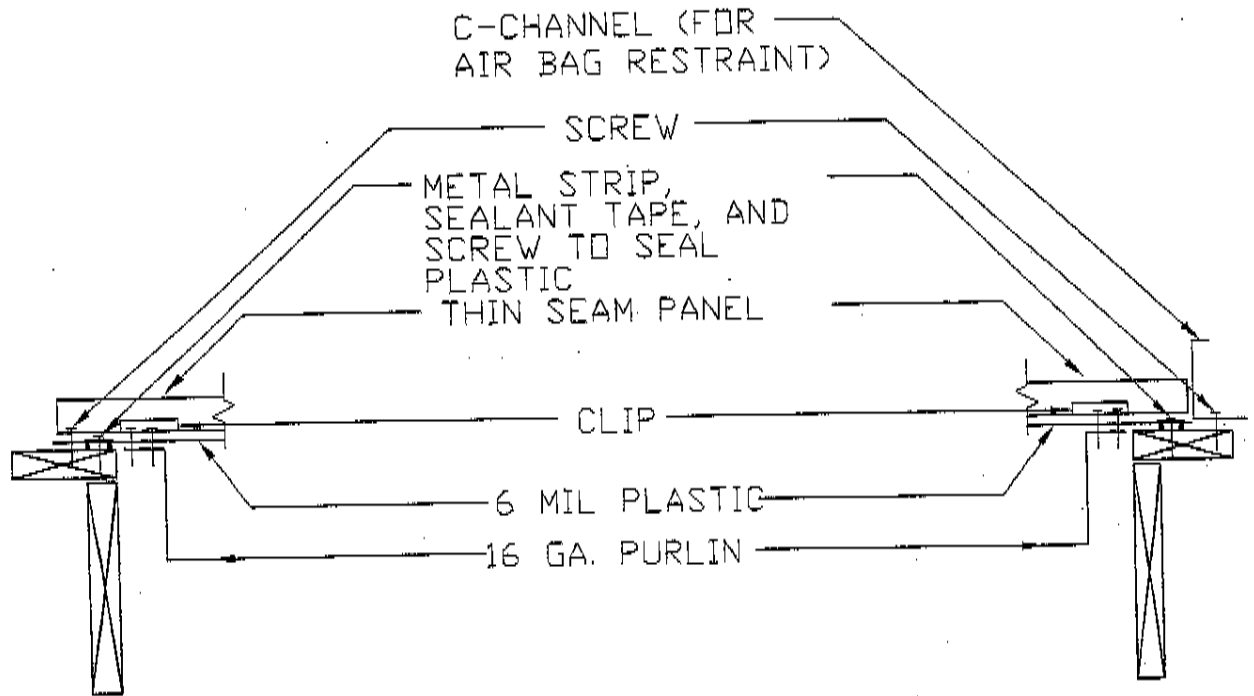
It was observed during installation that the first several seams had been needlessly pried open due to an incorrect installation technique. The first seam to fail was one of these. These several seams were then screwed together and the test procedure was continued. At 55 psf, one of the "good" seams failed. Thus it was concluded that the incorrect installation really had no significant bearing on the outcome of the test.



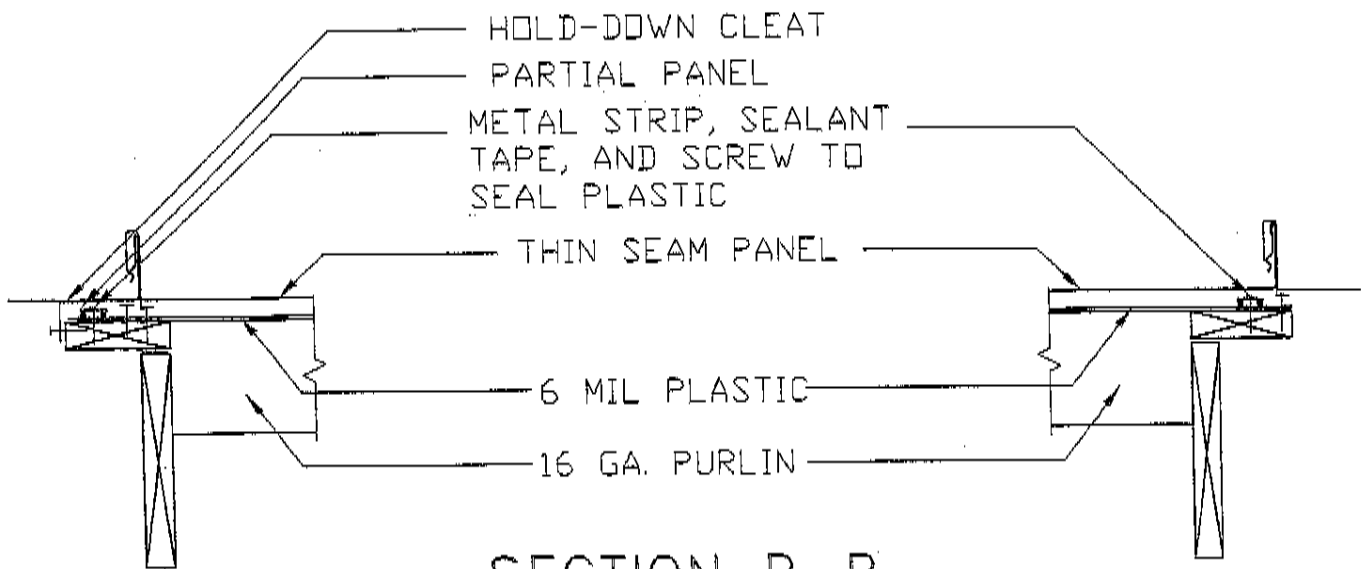
# FIELD TEST SETUP



THIN SEAM PROFILE



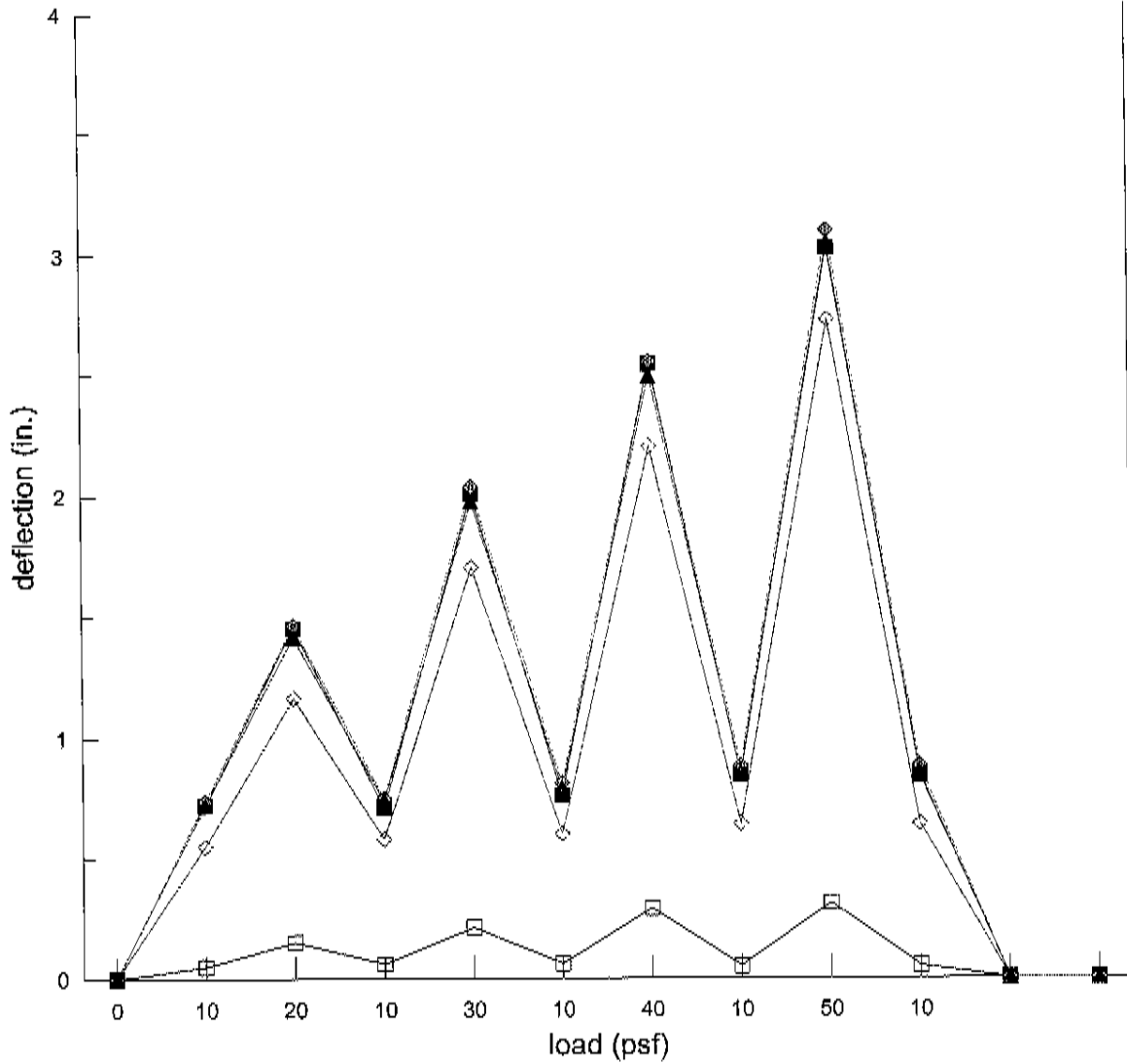
SECTION A-A



SECTION B-B  
FIELD TEST



Load vs. deflection for 24 ga. Thin Seam panels' static air pressure test as per Corp of Engineers (spacing is 2'-6")



■ mid pan 1   ♦ sup pan   ▲ mid pan 4   □ mid rib   ◇ mid pan 6

24 ga. Thin Seam @ 2'6" o.c.

7/13/01

5 CYCLES TO 20 PSF

7.26" FOR REF BM (LEFT SIDES)

LOAD	#1	#2	#3	#4	#5	#6
0	3.12	3.00	2.89	3.09	2.90	3.21
10	3.86	3.76	2.91	3.83	2.97	3.78
20	4.56	4.45	2.88	4.49	3.04	4.36
10	3.84	3.76	2.90	3.84	2.97	3.80
30	5.09	5.00	2.86	5.03	3.08	4.88
10	3.91	3.84	2.92	3.91	2.99	3.84
40	5.56	5.45	2.80	5.48	3.10	5.31
10	4.02	3.94	2.95	4.00	3.01	3.91
50	5.96	5.91	2.72	5.95	3.04	5.75
10	4.26	4.25	2.97	4.30	3.05	4.15
60	PANEL FAILED ON THE WAY TO 50. SIDES BETWEEN FIRST + SECOND PANEL ON NORTH SIDES DISCHARGED					

REF. 0 →

*J. M. [Signature]*  
9/13/01

*M. W. [Signature]*  
Eric D. [Signature]

24 ga. Thin Seam @ 2'6" o.c.

7/13/01

	LOAD	#1	#2	#3	#4	#5	#6	
✓	cycle 20 psf	5 times						
	✓ 0							
ref. 0	✓ 10							
	✓ 20							
	✓ 0							
	✓ 10							
	✓ 30							
	✓ 0							
	✓ 10							
	✓ 40							
	✓ 0							
	✓ 10							
	✓ 50	creaking clips during unloading						
	✓ 0							
	✓ 10							
	60	yielded during reloading at 46 psf.						
	0							
	10							
	70							

*Eric D. Howe*  
 9/13/01  
 Eric D. Howe

## ASTM E 1592 STATIC AIR PRESSURE TEST REPORT

Prepared by: E. D. Lowe

Present at test: E. D. Lowe  
M. W. Croucher, Jr., P.E.

Witnessed by: Tim Royer, P.E.

Test date: October 18, 2001 1:00 pm

Location: Fabral Research and Development Lab

Specimen tested: 18" wide Thin Seam panels

Specimen properties: 24 gauge steel

Purlin spacings: 5'-0" spacings (field test)

Type of test: **WIND UPLIFT PER ASTM E 1592**

## SUMMARY

A 10' by 25' air pressure test chamber was constructed with purlins 5'-0" o.c. Fabral Thin Seam panels were tested for wind uplift capacity using constant air pressure loading. Panel loading reached 40 psf without failure. This load was sustained for 1 minute. During reloading of the panels to attempt 50 psf, four sidejoints disengaged simultaneously at 49 psf.

## TEST PROCEDURES

## A. Specimen:

- 10' x 25' chamber
- purlins 16 gage 5'-0" o.c. 5 span condition
- panels were 18" wide Thin Seam 24 gauge steel
- panel clips were 18 gage galvanized steel, 3½" long and were located at each purlin and panel side joint with 2 #10-16 X 1" SDST fasteners per clip
- both sides were left completely free with panels attached outside of the sealed area
- one end was left completely free, one end was fixed with #10-16 screws (3 per panel)

- a 6 mil pleated plastic barrier was placed under the panels and held down by a batten to maintain the air pressure. This plastic was approximately 16' wide and 35' long so it could be pleated and allow full loading of the panels
- test loads were measured using two manometers located at opposite ends of the test chamber.

#### B. Loading pattern:

1. 5 cycles were made to 20 psf to flex the specimen
2. deflection readings were taken at 0 psf
3. specimen was loaded to 10 psf (reference 0), held for 1 minute then deflections were measured
4. loaded to 20 psf, held for 1 minute, measure deflections
5. relax load for 1 minute
6. loaded to 10 psf, held for 1 minute, measure deflections
7. loaded to 30 psf, held for 1 minute, measure deflections
8. repeat 5, 6 and 7 adding 10 psf load each cycle to 50 psf

#### C. Deflection readings:

Deflection readings were taken on the fourth panel from the North edge at the following 6 locations:

1. Panel pan @ mid-span of 6th span (13' 9" from panel end)
2. Panel pan @ 7th support (15'-0" from panel end)
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4. Panel pan @ mid-span of 7th span (16'-3" from panel end)
5. Panel rib @ mid-span of 7th span (16'-3" from panel end)
6. Panel pan @ mid-span of 8th span (18'-9" from panel end)

The deflections are shown on the data sheet. The raw deflections, zeroed deflections and corrected deflections are also shown as well as a graph of the corrected deflection.

#### TEST OBSERVATIONS

at 49 psf                      Four sidejoints disengaged. Test was concluded.

#### TEST RESULTS

A maximum air pressure of 49 psf was attained before panel failure occurred in the sidejoint. Sidejoint failure occurred during an attempt to load the panels to 50 psf.

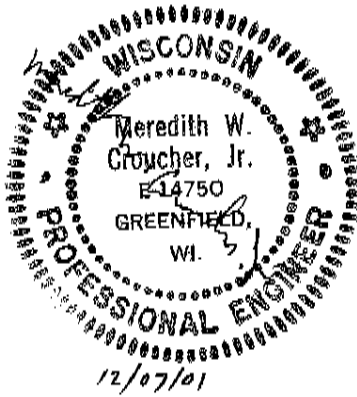
Failure occurred as the sidejoint yielded sideways, effectively "unsnapping" the snap-together seams. Four sidejoints yielded simultaneously at 49 psf.

*M. W. Croucher, Jr.*

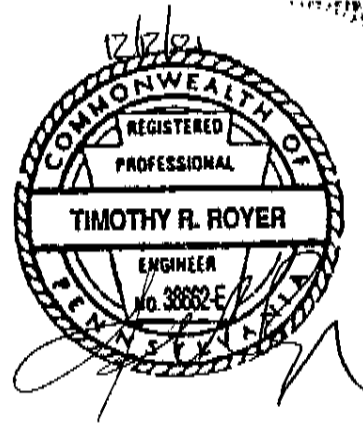
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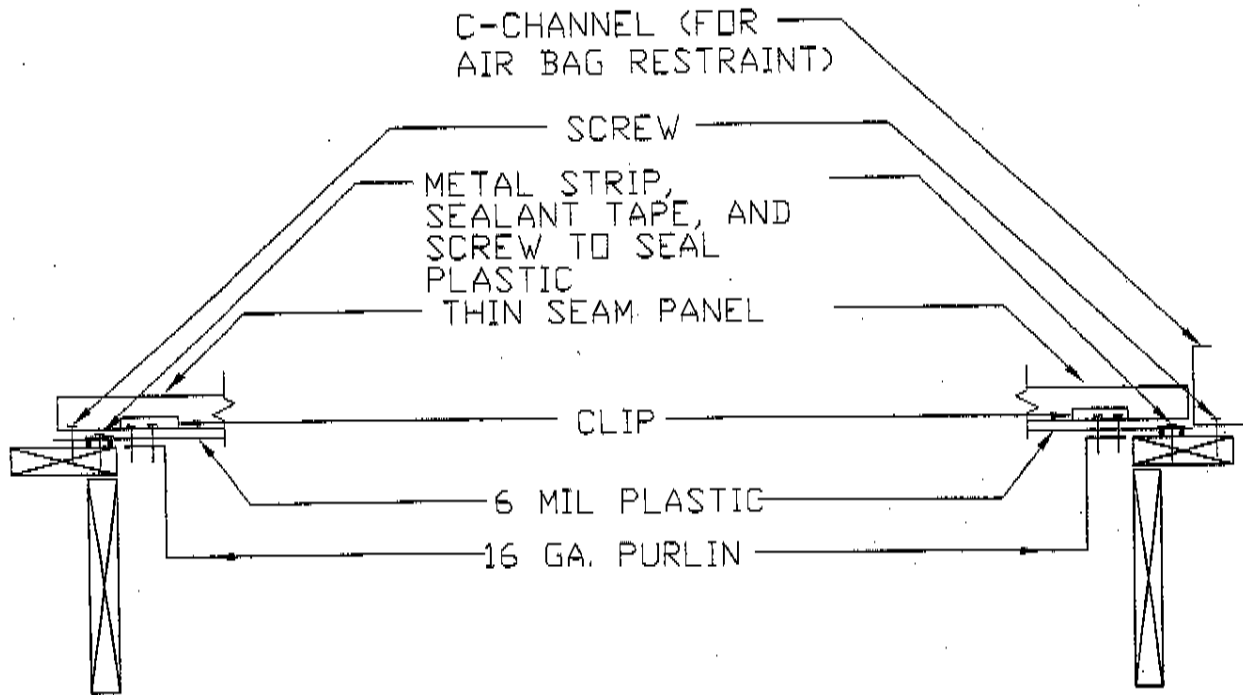


*Tim Royer*  
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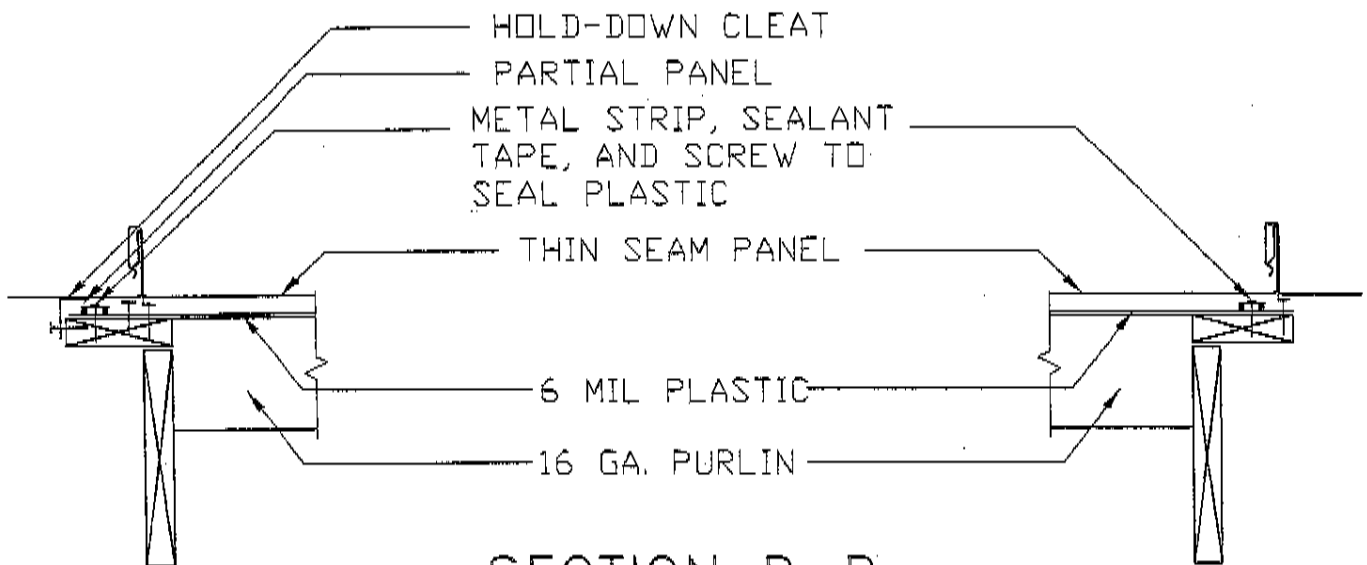




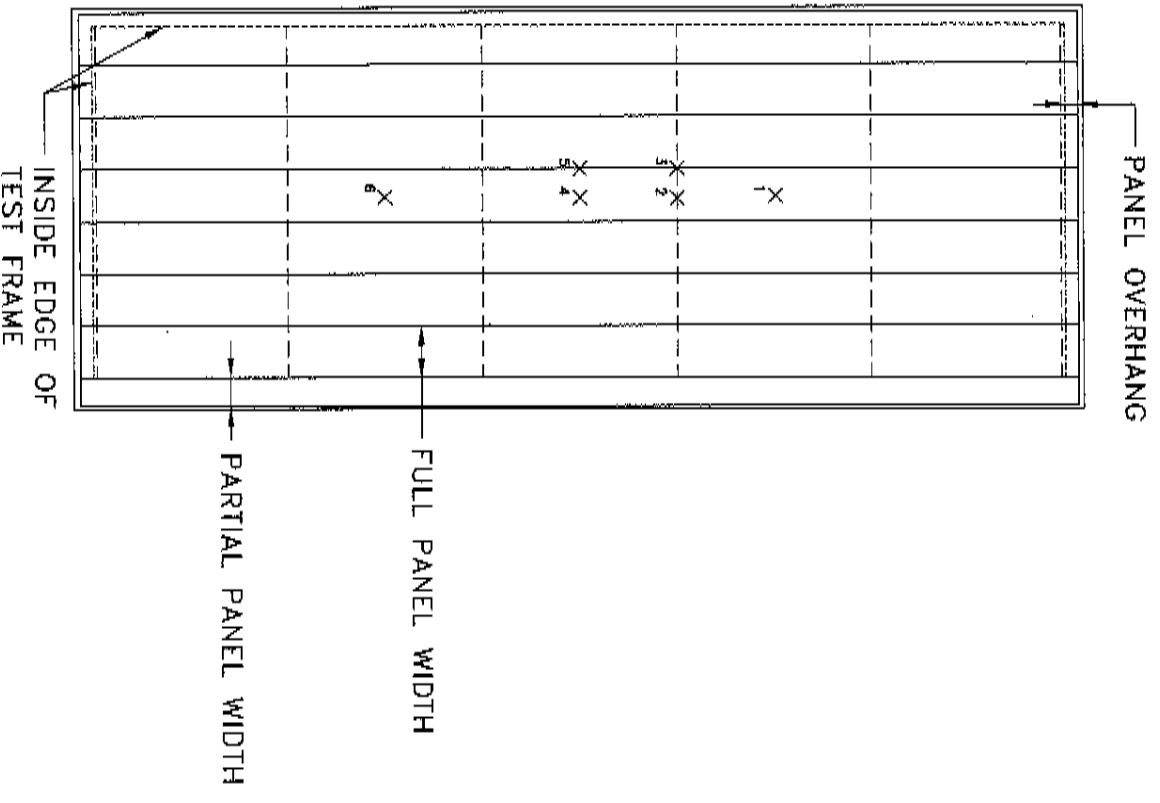
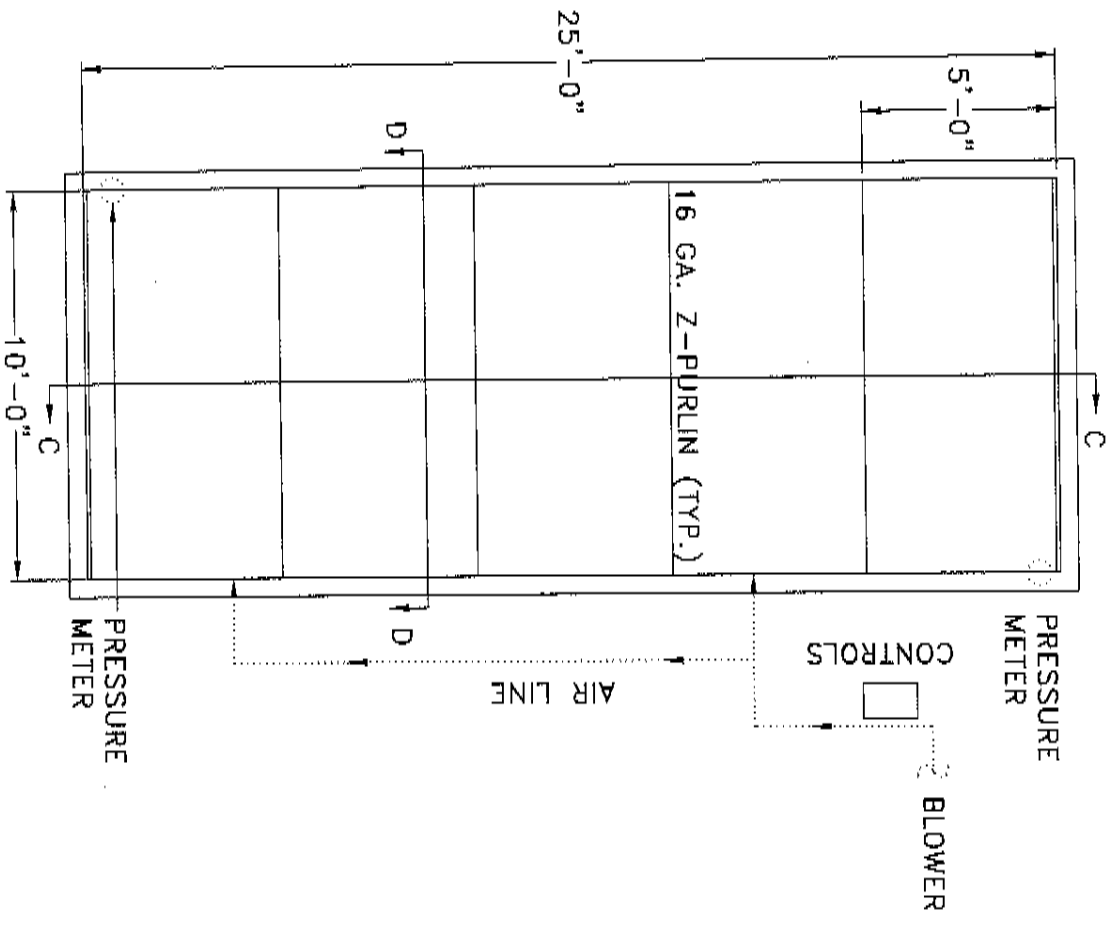
### THIN SEAM PROFILE



### SECTION A-A

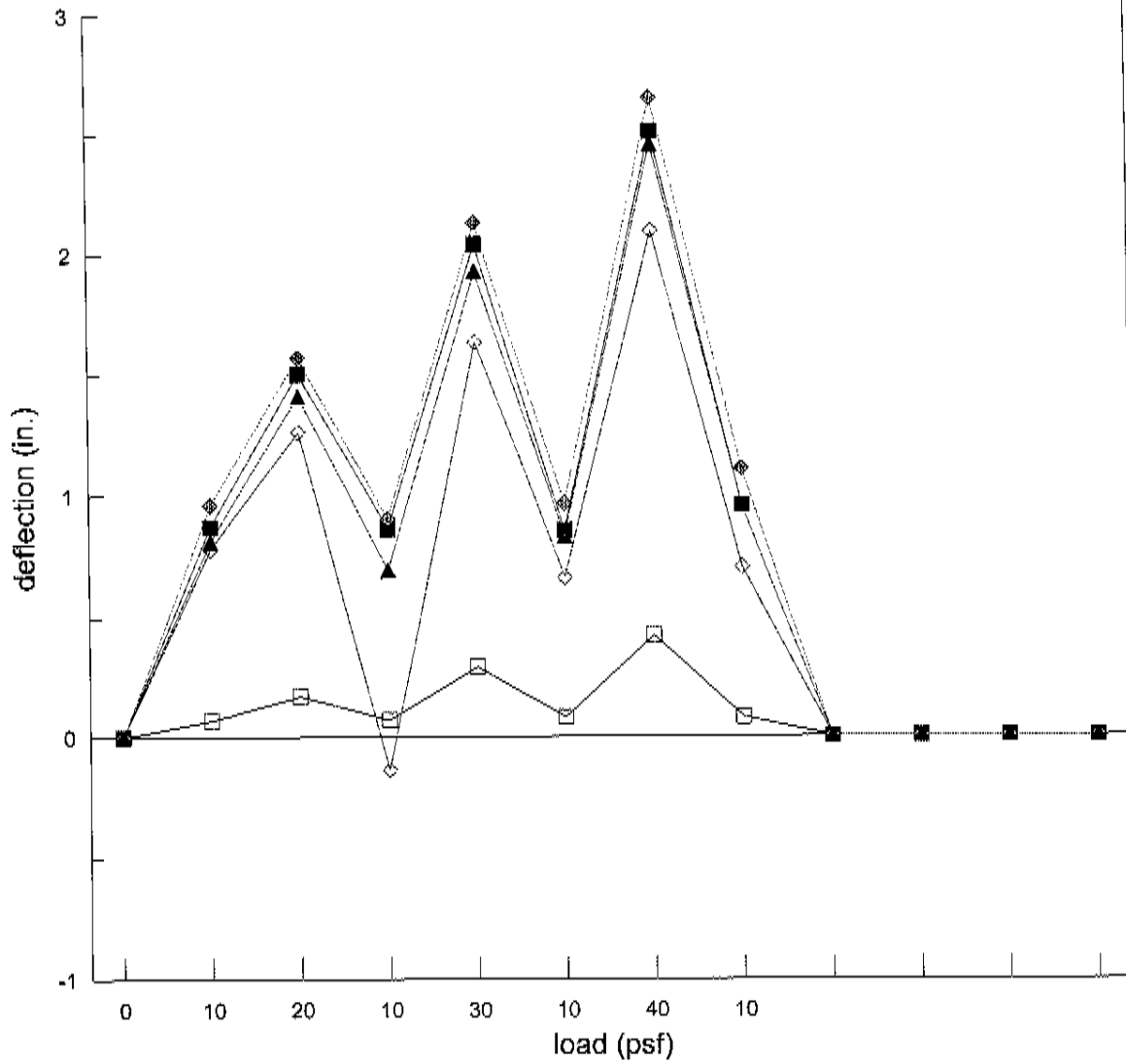


### SECTION B-B FIELD TEST



# FIELD TEST SETUP

Load vs. deflection for 24 ga. Thin Seam panels' static air pressure test as per Corp of Engineers (spacing is 5'-0")



mid pan 1  
 sup pan  
 mid pan 4  
 mid rib  
 mid pan 6



10/18/01 24 ga. 18" Thin Seam w/ clips 5'0" o.c.

7.39 Benchmark

Cycled 5 times to 20psf.

LOAD	#1	#2	#3	#4	#5	#6
0	3.29	3.17	3.04	3.18	3.05	3.38
ref. 0 → 10	4.26	4.23	3.14	4.09	3.22	4.26
20	4.93	4.88	3.18	4.73	3.36	4.78
0	4.25	4.17	3.14	3.97	3.22	3.34
10	5.49	5.46	3.21	5.27	3.57	5.18
30	4.19	4.18	3.09	4.06	3.18	4.09
0	5.90	5.92	3.16	5.74	3.59	5.58
10	4.39	4.42	3.19	4.28	3.28	4.23
50	failed during loading at 49 psf. 4 side joints disengaged.					

Cue D. Howe

10/18/01 24 ga. 18" Thin Seam w/ clips 5'0" o.c.

LOAD	#1	#2	#3	#4	#5	#6
5 CYCLES	TO 20PSF					
0 ✓						
10 ✓						
20 ✓						
0 ✓						
10 ✓						
30 ✓						
0 ✓						
10 ✓						
40 ✓						
0 ✓						
10 ✓						
50	SIDE JOINTS DISINTEGRATED AT 49PSF			4 SIDE JOINTS DISINTEGRATED		

measured by [unclear]

[Signature]