

Farabaugh Engineering and Testing, Inc.

Project No. T117-97

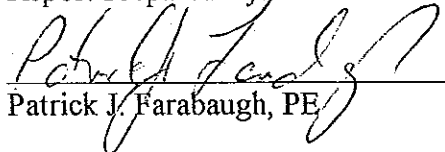
Report Date: May 22, 1997

**ASTM E-1680-95 AIR LEAKAGE TEST
ASTM E-1646-95 WATER PENETRATION TEST**

**ULTRADEK
(24 GA, 24" WIDE)**

**METAL BUILDING COMPONENTS, INC.
14031 W. HARDY
HOUSTON, TX 77060**

Report Prepared By:


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Reviewed and Approved By:


Daniel G. Farabaugh, PE

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AIR LEAKAGE AND WATER PENETRATION TESTING

Purpose

The purpose of this testing is to establish air and water infiltration rates on 24 ga Ultradek Panel in accordance with ASTM E-1680-95 "Rate of Air Leakage Through Exterior Metal Roof Panel Systems", and ASTM E-1646-95, "Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference".

Test Date

May 21, 1997

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Test Specimen

Manufacturer: Metal Building Components, Inc.
14031 W. Hardy
Houston, TX 77060

Panel: Ultradek, 24 ga, 24" wide
Panel Clip: Low Articulating Clip
Panel Mastic: factory applied Hot Melt Mastic
Panel Length: 9'-0"

Testing Apparatus

Test Chamber: 8' x 9' vacuum chamber composed of structural aluminum and Plexiglas.

Manometer: Inclined manometer from Dwyer Instruments, 3" capacity with a certified scale reading accuracy to one tenth of an inch, traceable to the National Bureau of Standards.

Blowers: Spencer Vortex Blower, 225 cfm, Model VB-055

Rotometer: 90 cfm capacity rotometer from Brooks Instruments, traceable to the National Bureau of Standards, Serial # 9303HC014050 and 30 cfm capacity rotometer from Brooks Instruments, traceable to the National Bureau of Standards, Serial # 9507HC022716.

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Theory of Procedure

Tests were conducted in accordance with ASTM E-1680-95 "Rate of Air Leakage Through Exterior Metal Roof Panel Systems", and ASTM E-1646-95, "Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference".

Installation

The Ultradek panels were installed on the chamber frame with clip assembly at intermediate support. The panels were fastened to the perimeter of the test chamber and then sealed to the perimeter frame with Silicone Sealant. Foam strips were installed at panel ends to allow for 1/2" of water ponding. The test chamber was set for panels to be on a horizontal position (no slope).

Air Leakage Test Procedure

The test procedure is as per ASTM 1680-95 and as provided herein.

The intermediate support was traversed 1 inch in both directions (from initial location) and returned to initial location. This was done twice for a total of 2 cycles.

A positive preload pressure of 15 psf was applied for 10 seconds. Panels were allowed to recover for a period of 2 minutes. A negative preload pressure of 15 psf was applied for 10 seconds. Panels were allowed to recover for a period of 2 minutes. The positive and negative preload cycle was repeated two additional times for a total of 3 cycles.

All panel joints were taped off for initial datum readings. Tape was removed from joints for final readings.

Water Penetration Test Procedure

The test procedure is as per ASTM 1646-95 and as provided herein.

The intermediate support was traversed 1 inch in both directions (from initial location) and returned to initial location. This was done twice for a total of 2 cycles.

Due to the panels being preloaded during the Air Leakage Test, no additional preload was performed for the Water Penetration Test.

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Ambient Temp. = 60 deg. F
Barometric Pressure = 29.65

Test Date 5/21/97

ASTM E-1680-95
AIR LEAKAGE TEST
Summary

Test Specimen	Static Pressure Differential (psf)	Datum Reading (cfm)	Final Reading (cfm)	Total Air Leakage (cfm) (corrected)	Air Infiltration Rate (cfm/lf)	Air Infiltration Rate (cfm/sf)
Ultradek 24 GA 24" Wide	6.24	14.25	14.75	0.502	0.014	0.007
	-6.24	10.5	11.0	0.502	0.014	0.007

Airflow Correction to Standard Conditions

$Q_{st} = Q(W/W_s)$
Barometric Pressure, B = 29.65" Hg
Temperature, T = 60 deg. F

$W = 1.326 (B/(T + 460))$
 $W = 1.326 (29.65/(60 + 460)) = 0.0756$

$W_s = 0.075 \text{ lb/cu ft (density of air at reference standard conditions)}$

$Q_{st} = 0.50 \text{ cfm} (0.0756/0.075) = 0.502 \text{ cfm}$

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Test Date 5/21/97

Panel Surface Temp. Prior to Test = 55 deg. F

Panel Surface Temp. During Test = 50 deg. F

Ponded Water Depth During Test = 1/2"

ASTM E-1646-95
WATER PENETRATION TEST
Summary

Test Specimen	Static Pressure Differential	Rate	Test Duration	Water Infiltration
Ultradek 24 GA 24" Wide	6.24 psf	5 gal./hr./sq.ft.	15 min	None

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Project No. T117-97

Ambient Temp. = 60 deg. F
Barometric Pressure = 29.65

Test Date 5/21/97

ASTM E-1680-95
AIR LEAKAGE TEST
Summary

Test Specimen	Static Pressure Differential (psf)	Datum Reading (cfm)	Final Reading (cfm)	Total Air Leakage (cfm) (corrected)	Air Infiltration Rate (cfm/lf)	Air Infiltration Rate (cfm/sf)
Ultradek 24 GA 24" Wide	12	23.0	23.75	0.753	0.021	0.011
	-12	16.0	17.0	1.004	0.028	0.014

Airflow Correction to Standard Conditions

$Q_{st} = Q(W/W_s)^{1/2}$
Barometric Pressure, B = 29.65" Hg
Temperature, T = 60 deg. F

$$W = 1.326 (B/(T + 460))$$
$$W = 1.326 (29.65/(60 + 460)) = 0.0756$$

$W_s = 0.075$ lb/cu ft (density of air at reference standard conditions)

$$Q_{st} = 0.75 \text{ cfm} (0.0756/0.075)^{1/2} = 0.753 \text{ cfm}$$

$$Q_{st} = 1.00 \text{ cfm} (0.0756/0.075)^{1/2} = 1.004 \text{ cfm}$$

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Test Date 5/21/97

Panel Surface Temp. Prior to Test = 55 deg. F

Panel Surface Temp. During Test = 50 deg. F

Ponded Water Depth During Test = 1/2"

ASTM E-1646-95
WATER PENETRATION TEST
Summary

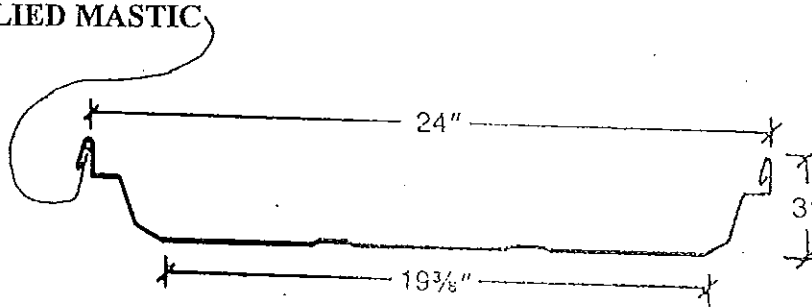
Test Specimen	Static Pressure Differential	Rate	Test Duration	Water Infiltration
Ultradek 24 GA 24" Wide	12.0 psf	5 gal./hr./sq.ft.	15 min	None

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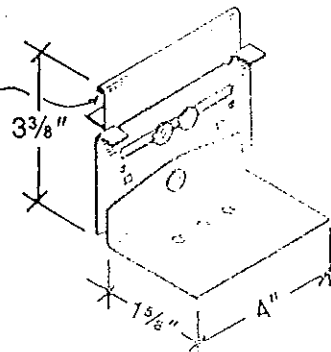
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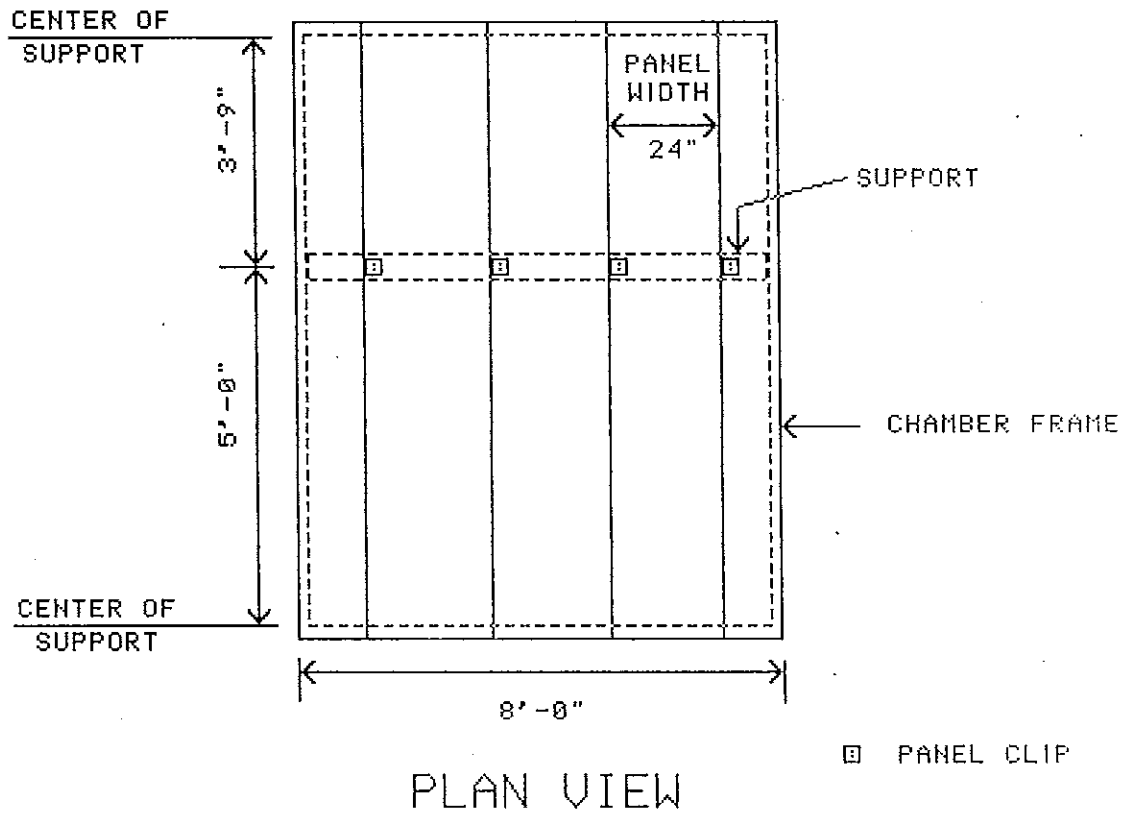
FACTORY APPLIED MASTIC



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