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Attn.: Mr. Derek Lindeberg

FROM : Thomas M. Shingler, P.E.
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President
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DATE : May 27, 2003

SUBJECT : Snap-Clad @ .040" Aluminum x 16" wide Roof Panel
Utilizing ASTM E-1592 Procedure for the
Determination of Wind Uplift Capacity
@ 1.0 ft & 4.0 ft clip spacings

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

PURPOSE : To determine the Ultimate Wind Uplift Capacity
followed by the establishment of the Allowable Wind
Uplift Capacity of the submitted metal roof system
when fastened at various clip spacings.

TEST DATE : May 7, 3000, (10 spans @ 1.0 ft o/c)
May 9, 3000, (3 spans @ 4.0 ft o/c)

TEST SPECIMEN :

TEST CHAMBER : Composed of a floor mounted reinforced
wooden frame capped with a simulated purlin
system consisting of 16 gauge steel hat
sections in combination with W6 x 15 wide
flange beam members designed to support
the test specimen.
The test pressures were applied to the
specimen via a 4 mil plastic film designed
to accurately configure to the panel profile
and give both the panel shape and the
joint elements full degree of freedom during
the loading process.

SPECIMEN SUPPORT : 16 gauge steel hat sections attached
to W6 x 15 structural steel beam members
supported the roof panels during the
uplift load application.
The minimum support (clip) spacing was
set at 1.0 ft o/c and the maximum support
(clip) spacing was set at 4.0 ft o/c

PRESSURE INDICATOR : Digital Pressure Indicators from
Micro-Pneumatic Logic, Inc.
Accuracy is (+/-) 0.10 psf and traceable
to the National Bureau of Standards
(NBS).

DIGIMATIC CALIPER : Mitutoyo Digital Caliper
Model No. CD-12 CP with a full-range
accuracy of 0.001 in.

INSTALLATION : The system was inverted and panels were
installed with Snap-Clad fixed clips
which were screw-attached to the 16 gauge
steel hat sections two (2) #10-16 x 1" long
Pancake Head self-drilling screws with #3 tip.
Side joints consisted of mating male/female
snap lock interlocking ribs.
Continuity fasteners were located at the
extreme ends of panels and consisted of single
self-drilling screws driven across the panel
webs.
Transparent/flexible plastic film (Visqueen @
4 mils thick) was applied over panels at the
edges and ends of the panels and sealed with
duct tape to every configuration to create a
vacuum seal. Lateral joints were also taped
the entire length of the panel to ensure
vacuum seal.

PROCEDURE : The individual panels were installed into the
test chamber as a seven (7) panel wide array per
standard field techniques. Specific deflection
measurement targets were established on key
panels.
These targets and their locations are illustrated
on an enclosed sketch in the Farabaugh
Engineering & Testing report.
Two (2) different pressure gauges were installed
onto the test chamber for cross checking of test
pressures and insuring accuracy of pressure data.

The pressure-indicating instruments were as
follows.....

Digital Pressure Indicators from Micro-Pneumatic
Logic, Inc.

Initially the system was preloaded to (-) .80 psf
to insure proper seating of the panels, clips
and plastic film.

After the preloading process, initial deflection measurements were taken at the six (6) key panel locations. These initial deflection readings represented the zero position/zero load specimen status from which all readings were referenced. Individual data sheets and graphic plots of the deflection readings are enclosed with the Farabaugh Engineering & Testing, Inc. report.

A "step loading" procedure was used with test pressure increments of 5.2 psf at both the 1.0 ft o/c and 4.0 ft o/c clip spacings.

At each incremental pressure level, the test pressure was maintained for sixty (60) seconds.

After the sixty (60) second pressure "hold" period, measurements were recorded at each of the six (6) critical panel locations.

Also during this time period....broad-flat areas of the panels, sidejoints and clips were visually checked for signs of localized distress.

At the end of each pressure "hold" phase, the test chamber was returned to a zero pressure status and deflection measurements were once again recorded to check for meaningful "set" in the system.

Ever-increasing pressure values were applied and deflection values recorded both at the pressure as well as at zero.

This procedure continued until the Ultimate Uplift Pressure of the panel or a panel system component demonstrated "distress".

The Allowable Uplift Capacity for the tested panel system is the Ultimate Uplift Pressure divided by a Factor-of-Safety of 1.65.

The Allowable Uplift Pressure for the panel system was established at 1.0 ft and 4.0 ft clip spacings, with intermediate Allowable Uplift Load/Span Pressures being determined via linear interpolation between the two (2) clip spacing extremes of 1.0 ft and 4.0 ft o/c.

E-1592 TEST RESULTS :

Span, ft.	Ultimate Pressure, psf	Allowable Pressure, psf
1.0	63.15	38.2
4.0	47.55	28.8

ALLOWABLE WIND UPLIFT LOAD/SPAN CHART :

Clip Spacing in feet	Allowable Wind Uplift Pressure, psf
1.0	38.2
1.5	36.6
2.0	35.0
2.5	33.5
3.0	31.9
3.5	30.3
4.0	28.8

General Notes :

1. The Allowable Pressure is the Ultimate Test Pressure divided by a Factor-of-Safety (Load Factor) of 1.65
2. The published Allowable Wind Uplift Pressure considers panel buckling strength, sidejoint disengagement resistance and clip/sidejoint interactive strength only.
3. The clip-to-substrate fastener capacity must be investigated by a design professional and consider the clip pry coefficient where applicable.

***** END OF REPORT *****

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