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TO : Petersen Aluminum Corporation
10551 PAC Road
Tyler, Texas 75707 Attention : Mr. Josh Jacobi

FROM : Thomas M. Shingler, PE
Licensed Structural Engineer
Design Dynamics, Inc.

DATE : August 21, 2020

SUBJECT : ASTM E-1592
Petersen Aluminum Corp. – Box Rib 2 Profile
1.375" dp. x 12" wide x 24 ga. Steel w/ clip
ASTM E-1592 Procedure for the Determination of Wind
Negative Wind Load Capacity @ 2.00 ft. & 5.00 ft. o/c

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 of the submitted metal wall system when fastened at various clip spacings.

TEST DATE : July 24, 2020 (5 spans @ 5.00 ft. o/c)
July 29, 2020 (12 spans @ 2.00 ft. o/c)

TEST SPECIMEN : Petersen Aluminum Corp. Box Rib 2 Profile @ 1.375" dp. x 12" wide x 24 ga. Steel with stainless steel clip

TEST CHAMBER : Composed of a floor mounted reinforced wooden frame capped with a reinforced wood frame/purlin system 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 sidejoint elements full degree of freedom during the loading process.

PURLIN MEMBERS : 16 ga. steel stud supports. Stud members were spaced at either 2.00 ft. or 5.00 ft. on centers and represent the minimum and maximum purlin spacing extremes for the roof panel being tested.

PRESSURE INDICATOR : Extech Model HD700 Differential Pressure Manometer with a 0-2 psi (0-288 psf) range and a min/max "hold" feature which "locks" at the ultimate test pressure.

DIGIMATIC CALIPER : Honeywell Model Short Longfellow Linear Position Transducer with 0-6" of travel.

INSTALLATION : The panels were installed using one (1) piece 2.50" lg. x 0.034" thick stainless steel fixed clips which were screw-attached to the top flanges of the 16 ga. steel support members using two (2) #14-13 x 1 ½" long DP1 self drilling flat head, CONCEALOR fasteners (two fasteners per clip).
Sidejoints consisted of -to-panel longitudinal edge engaged male/female joint.
Outer side panels were fastened using two (2) ¼-14 x 1 ½" long at each support along the each side of the mock-up.
Transparent/flexible plastic film (Visqueen @ 4 mils thick) was applied loosely between panels and the top flange of the various 16 ga. support members.
This plastic film was also tucked into each panel sidejoint to create a vacuum seal, but not restrict sidejoint movement under load.

PROCEDURE : The individual panels were installed into the test chamber as a seven (7) panel wide array per standard field techniques.
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. These locations are illustrated on an enclosed sketch.

Initially the system was preloaded to (-) 5 psf to insure proper seating of the panels, clips and plastic film.

After the preloading process, initial deflection measurements were taken at the eight (8) 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 this report.

A "step loading" procedure was used with load increments of 10 psf.

At each increment pressure level, the test pressure was maintained for a period of not less than sixty (60) seconds.

After the sixty (60) second pressure "hold" period, measurements were recorded at each of the eight (8) critical panel locations.

Also during this time period……broad-flat areas of the panels, sidejoints and clips were visually inspected 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 wells as at zero.

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

The Allowable Uplift Capacity for the tested system is the Ultimate Uplift Pressure divided by a Factor-of-Safety of 2.00.

The Allowable Uplift Pressure for the panel system established at both the 2.00 ft. and the 5.00 ft. stud spacing, with intermediate Allowable Uplift Pressures being determined via linear interpolation between the two (2) test-established extremes.

ASTM E-1592 TEST RESULTS :

Span, ft.	Ultimate Pressure, psf	Allowable Pressure, psf
2.00	(-) 177.0	(-) 88.5
5.00	(-) 73.0	(-) 36.5

ALLOWABLE WIND UPLIFT LOAD/SPAN CHART :

Panel Span, ft.	Allowable Wind Uplift Pressure, psf
2.00	(-) 88.5
2.50	(-) 79.8
3.00	(-) 71.2
3.50	(-) 62.5
4.00	(-) 53.8
4.50	(-) 45.2
5.00	(-) 36.5

General Notes :

1. The Allowable Pressure is the Ultimate Test Pressure divided by a Factor-of-Safety (Load Factor) of 2.00.
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 ********