

HTL

FLORIDA GEORGIA TEXAS
HTLTEST.COM

Dean Steel Buildings

2929 Industrial Avenue
Ft. Myers, FL 33901
RT, RS, & MS Roofing Panels

HTL Report #: 0445-0912-09



FLORIDA | GEORGIA | TEXAS

CORPORATE HEADQUARTERS

6655 Garden Road
Riviera Beach, Florida 33404
HTLTEST.COM
P: 888.477.2454
F: 561.881.0075

October 28, 2009

Mr. Gary Cummings
Dean Steel Buildings
2929 Industrial Avenue
Ft. Meyers, FL 33901
239-334-1051

Re: RT, RS, & MS Roofing Panels

Dear Mr. Cummings:

The enclosed test report package contains documents for Dean Steel Buildings RS, RT, & MS roofing panels tested by Hurricane Test Laboratory, LLC (HTL).

This test report package includes the following items:

- Laboratory Compliance Letter.
- HTL Test Report #0445-0912-09 (Sheets 1-8).
- Dean Steel Buildings labeled: RS Testing (1 of 1), RT Testing (1 of 1) MS Testing (1 of 1).

If you have any questions, please feel free to contact our office.

Sincerely,

HURRICANE TEST LABORATORY, LLC

Vinu J. Abraham, P.E.



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10/28/2009

Jaime D. Gascon
Miami-Dade Building Code Compliance Office
Metro-Dade Flagler Building, Suite 1603
140 West Flagler Street
Miami, Florida 33130-1563

Re: Laboratory Compliance Letter (HTL09065)

Dear Mr. Gascon:

The tests described in the reports for the below jobs and specimen numbers have been performed in full accordance of the requirements of the Florida Building Code, with no deviations.

Job #	Specimen #	TAS 125		
		UL-580	Maximum Combined Sustained Pressure	Combined Failed Pressure
0445-0912-09	RT	X	138.5	153.5
	RS	X	168.5	183.5
	MS	X	153.5	168.5

If you have any questions, please contact our office.

Sincerely,

HURRICANE TEST LABORATORY, LLC

Vinu J. Abraham, P.E.
FL Reg. # 53820



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Dean Steel Buildings
RT, RS, MS
Test Report #: 0445-0912-09

1.0 MANUFACTURER'S IDENTIFICATION

- 1.1 Name of Applicant: Dean Steel Buildings
2929 Industrial Avenue
Ft. Myers, FL 33901
Voice: 239-334-1051
- 1.2 Contact Person: Gary Cummings

2.0 LABORATORY IDENTIFICATION

- 2.1 HTL Test Notification: HTL09065
- 2.2 HTL Lab Certifications: Miami-Dade County (05-1014.01); Florida Building Code(TST1527); IAS (TL-244); AAMA; WDMA; Keystone Certificate; Texas Department of Insurance

3.0 SCOPE OF WORK

- 3.1 Introduction
Dean Steel Buildings retained Hurricane Test Laboratory, LLC (HTL) to conduct roof uplift testing per the requirements of UL 580.
- 3.2 Report Information
Table 3.1 provides the test dates for each specimen number.

Table 3.1: Specimen Test Dates

Specimen name	Specimen Name	Specimen #	Test Date
RT	Rib-12	1	10/12/2009
RS	Rib-Six	2	10/14/2009
MS	Master Seam (MS)	3	10/20/2009

4.0 PRODUCT IDENTIFICATION

- 4.1 Product Types: RT, RS, & MS
- 4.2 Overall Size: 120" (wide) x 120" (long) – Roof Deck
- 4.3 General Description: Each sample consisted of a 120" x 120" roof structural frame fabricated from nominal 2" x 12" wood rafters, with intermediate rafters spaced 24" on center. This assembly is sheathed with a single layer 1/2" (min 15/32" thick) structural CDX Plywood. The metal roof system was attached directly to the surface of the roof deck.

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- 4.4 Drawing: This test report is incomplete if not accompanied by Dean Steel Buildings drawings labeled: RS Testing (1 of 1), RT Testing (1 of 1), MS Testing (1 of 1) bearing the ink stamp of HTL.
- 4.5 Sample Source: Dean Steel Buildings

5.0 COMPONENT DESCRIPTION

- 5.1 Structural Support Frame:
Table 5.1 provides the structural support frame members and a description of each member.

Table 5.1: Structural Support Frame Members

Item	Description
Perimeter Support Frame	4 - C12 x 20.7 A36 C-Channels
Intermediate Rafters	6 - 2" x 12" (nominal) Southern Yellow Pine timber planks spaced at 24" o.c.
Plywood Substrate	A single layer of 1/2" (min 15/32") CDX Plywood was utilized across the entire surface of this sample. Each Sheet of plywood spanned and attached to a minimum of three (3) rafters.

- 5.2 Metal Roof System:
Table 5.2 provides the metal roof system components used in the test specimen.

Table 5.2:

Description	Overall Cross-Section	Material	Coil Width
RT Panel	36" Coverage x 1.25" x 24 Ga (0.019)	ASTM 792/A792M Grade D w/ painted Zinc Alloy	41-9/16"
RS Panel	36" Coverage x .75" x 26 Ga (0.019)	ASTM 792/A792M Grade D w/ painted Zinc Alloy	41-9/16"
MS Panel	16" Coverage x 3" x 26 Ga(0.019)	ASTM 792/A792M Grade D w/ painted Zinc Alloy	24-3/16"
MS Panel Clips(HW5649)	2-14" Base x 3-1/2"(h) x 1" back kick x 3/8" down leg x 4" long x 22 Ga (0.0299")	ASTM 792/A792M Grade D w/ painted Zinc Alloy	n/a

- 5.3 Accessories:
Table 5.3 provides a description of the accessories used in the test mock-up.

Table 5.3:

Item	Description
Felt Paper	30# Asphalt saturated organic paper (ASTM D226) meeting type II requirements.

6.0 SPECIMEN CONSTRUCTION

HTL verified the test specimen construction per Dean Steel Buildings drawings labeled MS Testing (Sheets 1 - 1) located in Appendix. Any deviations are noted herein or on the drawings. Table 6.1 provides the specimen construction materials and fastening.

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Table 6.1: Specimen Construction Materials and Fastening.

Location	Description		
Plywood Sheathing to Structural Support Frame	Location	Fastener Type	Spacing
	Perimeter	8d x 2" galvanized ring shank common nails	4" o.c.
	Field	8d x 2" galvanized ring shank common nails	6" o.c.
Felt Paper 30#	Location	Fastener Type	Spacing
	Perimeter	0.120" x 1-1/4" galvanized annular ring shank roofing nails with 32-ga tin caps with a 6" overlap between adjacent sheets of felt paper.	6" o.c.
	Field		12" o.c.
RT(Specimen #1) (Field)	Panel to Wood	HW5506 #14 x 1" Self Tapping Structural Screws were used at 24" oc. parallel to rib, and 12" o.c. perpendicular to the rib in a single row along the ribs which are spaced at 12". The Overlaps were fastened with HW5502 #14 x 3/4" Self Tapping Screws @ 18" to 24" Typ. The perimeter used HW5506 #14 x 1" Self Tapping Structural Screws fastened at 6" o.c..	
RS(Specimen #2) (Field)	Panel to Wood	HW5506 #14 x 1" Self Tapping Structural Screws were used at 24" oc. parallel to rib, and 12" o.c. perpendicular to the rib in a single row along the ribs which are spaced at 6" . The Overlaps were fastened with HW5502 #14 x 3/4" Self Tapping Screws @ 18" to 24" Typ. The perimeter used HW5506 #14 x 1" Self Tapping Structural Screws fastened at 6" o.c..	
MS(Specimen #3) (Field)	Panel to Wood	The MS panels were held down with clips spaced at 24" oc. Max. spacing. The clips were fastened with two (2) HW5509 #14 x 1-1/2" Self Tapping Clip Screw. The perimeter was fastened with HW5506 #14 x 1" self tapping Structural screws @ 6" o.c..	

7.0 TEST RESULTS

7.1 Test Conclusion

Table 7.1 provides the test results for all test conducted per TAS 125.

Table 7.1: Test Results

Specimen RT	
Test Method	Conclusion
TAS 125 (UL 580)	PASS (Class 30,60, and 90)
TAS 125 Maximum Combined Sustained Pressure	138.5 psf
TAS 125 Combined Failure Pressure	153.5 psf

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Specimen RS	
Test Method	Conclusion
TAS 125 (UL 580)	PASS (Class 30,60, and 90)
TAS 125 Maximum Combined Sustained Pressure	168.5 psf
TAS 125 Combined Failure Pressure	183.5 psf
Specimen MS	
Test Method	Conclusion
TAS 125 (UL 580)	PASS (Class 30,60, and 90)
TAS 125 Maximum Combined Sustained Pressure	153.5 psf
TAS 125 Combined Failure Pressure	168.5 psf

8.0 TEST SEQUENCE

Table 8.1 provides the test sequence for each specimen tested.

Table 8.1: Test Sequence

Test Sequence RT	Test Sequence RS	Test Sequence MS
1. UL 580 Class 30 Test	1. UL 580 Class 30 Test	1. UL 580 Class 30 Test
2. UL 580 Class 60 Test	2. UL 580 Class 60 Test	2. UL 580 Class 60 Test
3. UL 580 Class 90 Test	3. UL 580 Class 90 Test	3. UL 580 Class 90 Test
4. UL 1897 (optional per TAS 125)	4. UL 1897 (optional per TAS 125)	4. UL 1897 (optional per TAS 125)

9.0 UL 580 TEST RESULTS

The test results for each test specimen are presented in the following tables. Tables 9.1, 9.2, and 9.3 provide the Class 30, 60 and 90 test load data respectively. A single layer of 2 ml flat polyethylene film was applied across the entire surface of the plywood in order to seal against air leakage. This plastic film contacted all surfaces of the panels and or clips and did not interfere with air passage to the sample or the movement of adjacent parts. No signs of failure were noticed during class 30, 60, and 90 of the UL 580 test. No failures were observed in any components of the roof system or in any of the fasteners used to attach the roof system to the prepared structural roof frame.

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Table 9.1: Class 30 Load Data

Test Phase	Test Duration (min)	Positive Pressure (psf)	Negative Pressure (psf)	Test Status
1	5	0.0	16.2	PASS
2	5	13.8	16.2	PASS
3 ¹	60	13.8	8.1-27.7	PASS
4	5	0.0	24.2	PASS
5	5	20.8	24.2	PASS

1. Cyclic stage with 8-12 seconds per cycle.

Table 9.2: Class 60 Load Data

Test Phase	Test Duration (min)	Positive Pressure (psf)	Negative Pressure (psf)	Test Status
1	5	0.0	32.3	PASS
2	5	27.7	32.3	PASS
3 ¹	60	27.7	16.2-55.4	PASS
4	5	0.0	40.4	PASS
5	5	34.6	40.4	PASS

1. Cyclic stage with 8-12 seconds per cycle.

Table 9.3: Class 90 Load Data

Test Phase	Test Duration (min)	Positive Pressure (psf)	Negative Pressure (psf)	Test Status
1	5	0.0	48.5	PASS
2	5	41.5	48.5	PASS
3 ¹	60	41.5	24.2-48.5	PASS
4	5	0.0	56.5	PASS
5	5	40.5	56.5	PASS

1. Cyclic stage with 8-12 seconds per cycle.

10.0 SPECIMEN # RT (Field)

10.1 UL 580 TEST RESULTS:

10.1.1 Class 30 Test Load Data: See Table 9.1

10.1.2 Class 60 Test Load Data: See Table 9.2

10.1.3 Class 90 Test Load Data: See Table 9.3

10.1.4 REMARKS

A single layer of 2 ml flat polyethylene film was applied across the entire surface of the plywood in order to seal against air leakage. This plastic film contacted all surfaces of the panels and or clips and did not interfere with air passage to the sample or the movement of adjacent parts. No signs of failure were noticed during class 30, 60, and 90 of the UL 580 test. No failures were observed in any components of the roof system or in any of the fasteners used to attach the roof system to the prepared structural roof frame.

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11.0 OPTIONAL FAILURE TEST (per TAS 125)

"Subsequent to the completion of Phase 5 of the Class 90 test sequence, the test specimen may be subjected to additional static uplift pressures. Continuation of the test to increased pressure levels is the option of the manufacturer."

The highest combined pressure the test specimen successfully resisted for 1 minute was 138.5 psf. The specimen failed while attempting to resist a sustained combined pressure of 153.5 psf. Table 10.1 provides the detailed test results of the optional failure test per TAS 125.

Table 10.1: Load Sequence, Pressure Duration,
Negative, Positive, and Combined Pressures

Test Phase	Pressure Duration (min)	Negative Pressure (psf)	Positive Pressure (psf)	Combined Pressure (psf)	Status
1	1	30	48.5	78.5	PASS
2	1	45	48.5	93.5	PASS
3	1	60	48.5	108.5	PASS
4	1	75	48.5	123.5	PASS
5	1	90	48.5	138.5	PASS
6	1	105	48.5	153.5	FAIL

12.0 SPECIMEN # RS (Field)

12.1 UL 580 TEST RESULTS:

12.1.1 Class 30 Test Load Data: See Table 9.1

12.1.2 Class 60 Test Load Data: See Table 9.2

12.1.3 Class 90 Test Load Data: See Table 9.3

12.1.4 REMARKS

A single layer of 2 ml flat polyethylene film was applied across the entire surface of the plywood in order to seal against air leakage. This plastic film contacted all surfaces of the panels and or clips and did not interfere with air passage to the sample or the movement of adjacent parts. No signs of failure were noticed during class 30, 60, and 90 of the UL 580 test. No failures were observed in any components of the roof system or in any of the fasteners used to attach the roof system to the prepared structural roof frame.

13.0 OPTIONAL FAILURE TEST (per TAS 125)

"Subsequent to the completion of Phase 5 of the Class 90 test sequence, the test specimen may be subjected to additional static uplift pressures. Continuation of the test to increased pressure levels is the option of the manufacturer."

The highest combined pressure the test specimen successfully resisted for 1 minute was 168.5 psf. The specimen failed while attempting to resist a sustained combined pressure of 183.5 psf. Table 12.1 provides the detailed test results of the optional failure test per TAS 125.

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Table 12.1: Load Sequence, Pressure Duration,
Negative, Positive, and Combined Pressures

Test Phase	Pressure Duration (min)	Negative Pressure (psf)	Positive Pressure (psf)	Combined Pressure (psf)	Status
1	1	30	48.5	78.5	PASS
2	1	45	48.5	93.5	PASS
3	1	60	48.5	108.5	PASS
4	1	75	48.5	123.5	PASS
5	1	90	48.5	138.5	PASS
6	1	105	48.5	153.5	PASS
7	1	120	48.5	168.5	PASS
8	1	135	48.5	183.5	FAIL

14.0 SPECIMEN # MS (Field)

14.1.1 Class 30 Test Load Data: See Table 9.1

14.1.2 Class 60 Test Load Data: See Table 9.2

14.1.3 Class 90 Test Load Data: See Table 9.3

14.1.4 REMARKS

A single layer of 2 ml flat polyethylene film was applied across the entire surface of the plywood in order to seal against air leakage. This plastic film contacted all surfaces of the panels and or clips and did not interfere with air passage to the sample or the movement of adjacent parts. No signs of failure were observed during class 30, 60, and 90 of the UL 580 test. No failures were observed in any components of the roof system or in any of the fasteners used to attach the roof system to the prepared structural roof frame.

15.0 OPTIONAL FAILURE TEST (per TAS 125)

"Subsequent to the completion of Phase 5 of the Class 90 test sequence, the test specimen may be subjected to additional static uplift pressures. Continuation of the test to increased pressure levels is the option of the manufacturer."

The highest combined pressure the test specimen successfully resisted for 1 minute was 153.5 psf. The specimen failed while attempting to resist a sustained combined pressure of 168.5 psf. Table 13.1 provides the detailed test results of the optional failure test per TAS 125.

Table 13.1: Load Sequence, Pressure Duration,
Negative, Positive, and Combined Pressures

Test Phase	Pressure Duration (min)	Negative Pressure (psf)	Positive Pressure (psf)	Combined Pressure (psf)	Status
1	1	30	48.5	78.5	PASS
2	1	45	48.5	93.5	PASS
3	1	60	48.5	108.5	PASS
4	1	75	48.5	123.5	PASS
5	1	90	48.5	138.5	PASS
6	1	105	48.5	153.5	PASS
7	1	120	48.5	168.5	FAIL



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16.0 CERTIFICATION AND DISCLAIMER STATEMENT

All tests performed on these test specimens were conducted in accordance with the specifications of the applicable codes, standards and test methods listed below by HTL, LLC. HTL, LLC does not have, nor does it intend to acquire or will it acquire, a financial interest in any company manufacturing or distributing products tested at HTL. HTL is not owned, operated or controlled by any company manufacturing or distributing products it tests. This report is only intended for the use of the entity named in Section 1.0 of this report. Detailed assembly drawings showing wall thickness of all members, corner construction and hardware applications are on file and have been compared to the test specimens submitted. A copy of this test report along with representative sections of the test specimen will be retained at HTL for a period of three (3) years. All results obtained apply only to the specimens tested and they do indicate compliance with the performance requirements of the test methods and specifications listed in the following section.

17.0 APPLICABLE CODES, STANDARDS, AND TEST METHODS

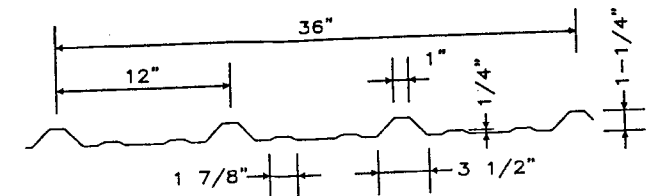
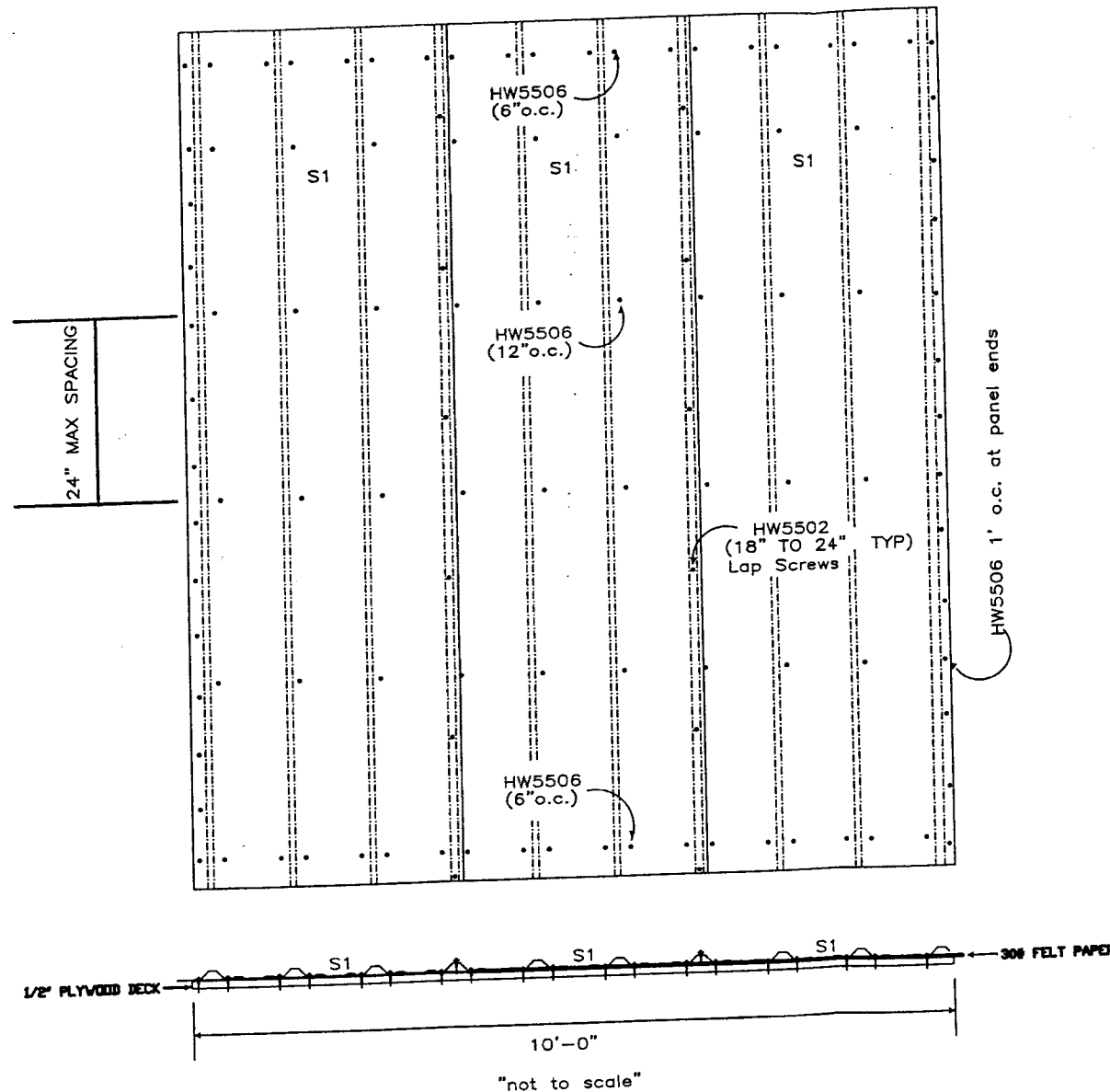
Florida Building Code TAS 125-03 – Standard Requirements for Metal Roofing Systems.
UL 580 – Tests for Uplift Resistance of Roof Assemblies

18.0 WITNESSES (ALL OR PARTIAL)

Vinu J. Abraham, P.E.	CEO	HTL, LLC
Kristin Norville, E.I.	Assistant Operations Manager	HTL, LLC
Fred Henderson	Head Technician	HTL, LLC
Alan Rule	Technician	HTL, LLC
Howard Bennett	Technician	HTL, LLC
Martin Gibbard	Technician	HTL, LLC

ENGINEER OF RECORD

REPORT WRITER



RIB-12 (RT) ROOF/WALL PANEL
 26 GA. (0.019) ASTM 792/A792M Grade D
 W/ PAINTED ALUMINUM ZINC ALLOY COATING
 36" COVERAGE - 41-9/16" FLAT WIDTH

SCREWS:

HW5506 #14 X 1" SELF TAPPING STRUC SCREW
 HW5502: #14 X 3/4" SELF TAPPING LAP SCREW

STRUCTURAL:

1/2" PLYWOOD DECK OVER WOOD TRUSSES
 30# FELT PAPER

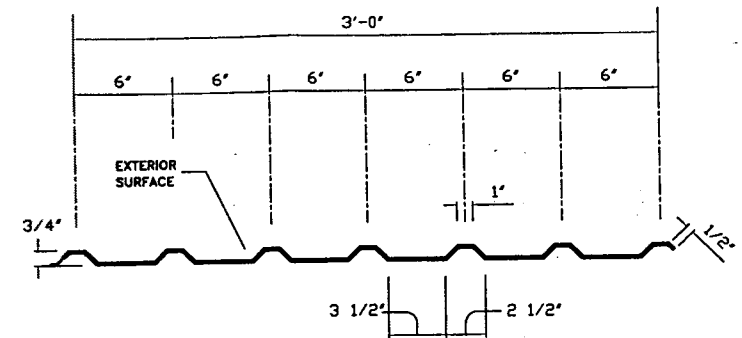
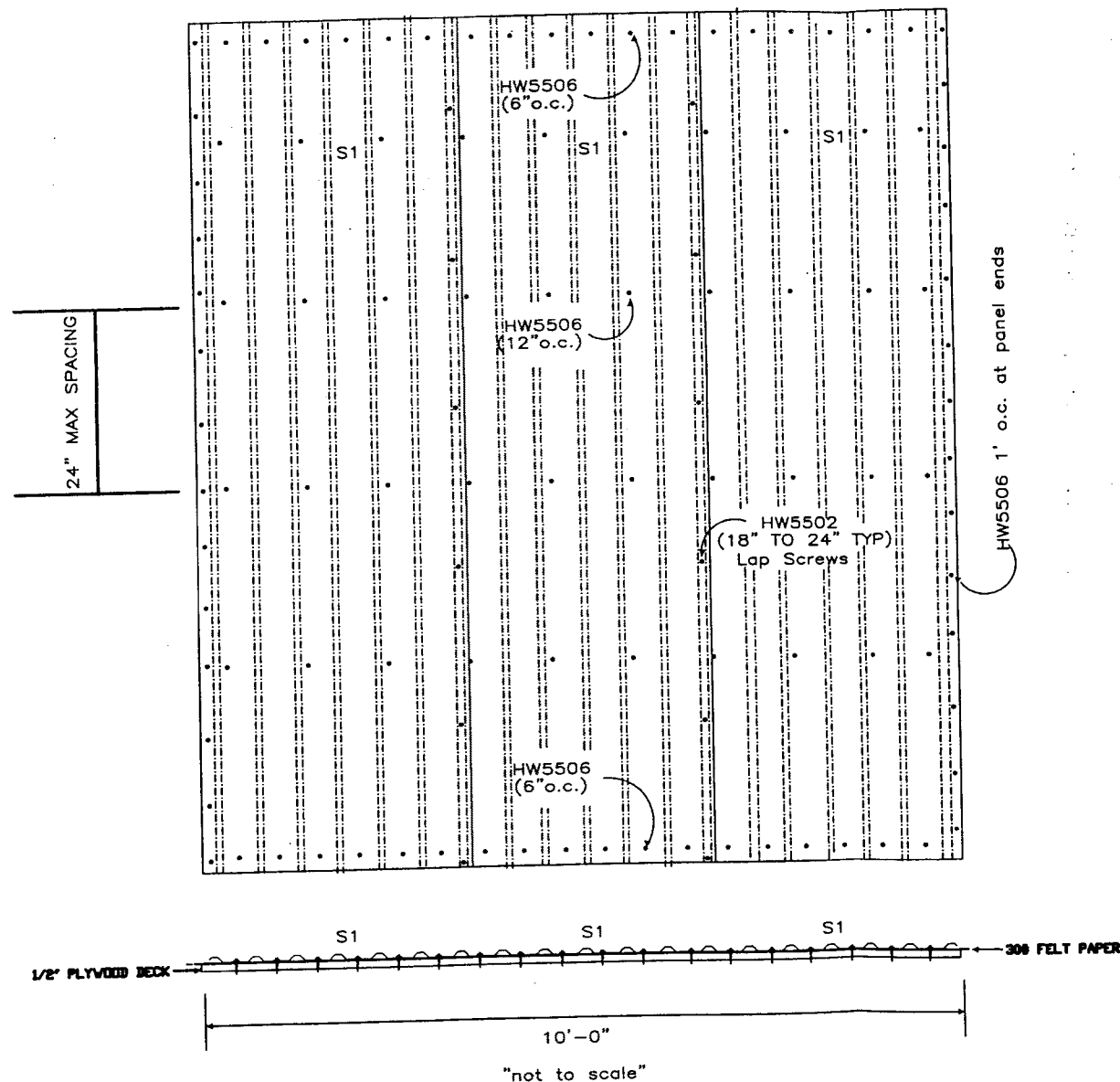


Drawn By
 Date
 10-28-09

0445-0912-09

JOB NUMBER	
RT TESTING	
DRAWN	DATE
GEC	9.29.09
CHECKED	DATE
GEC	9.29.09
SHEET NUMBER	
1 OF 1	

2929 INDUSTRIAL AVE.
 FORT MYERS, FLORIDA
 33901



RIB-6 (RS) ROOF/WALL PANEL

26 GA. (0.019) ASTM 792/A792M Grade D
W/ PAINTED ALUMINUM ZINC ALLOY COATING
36" COVERAGE - 41-9/16" FLAT WIDTH

SCREWS:

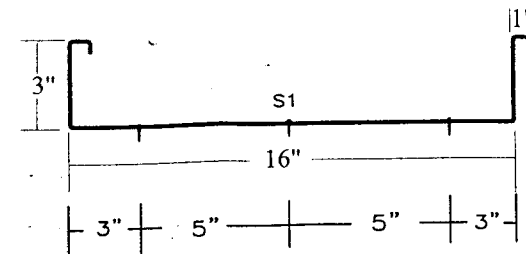
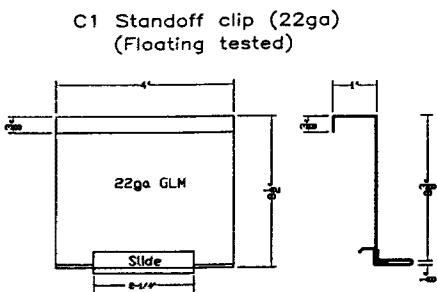
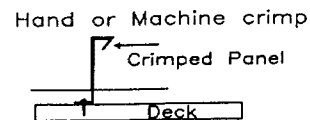
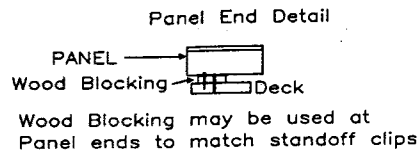
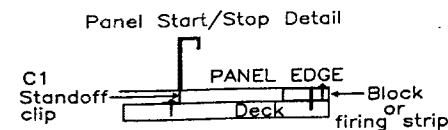
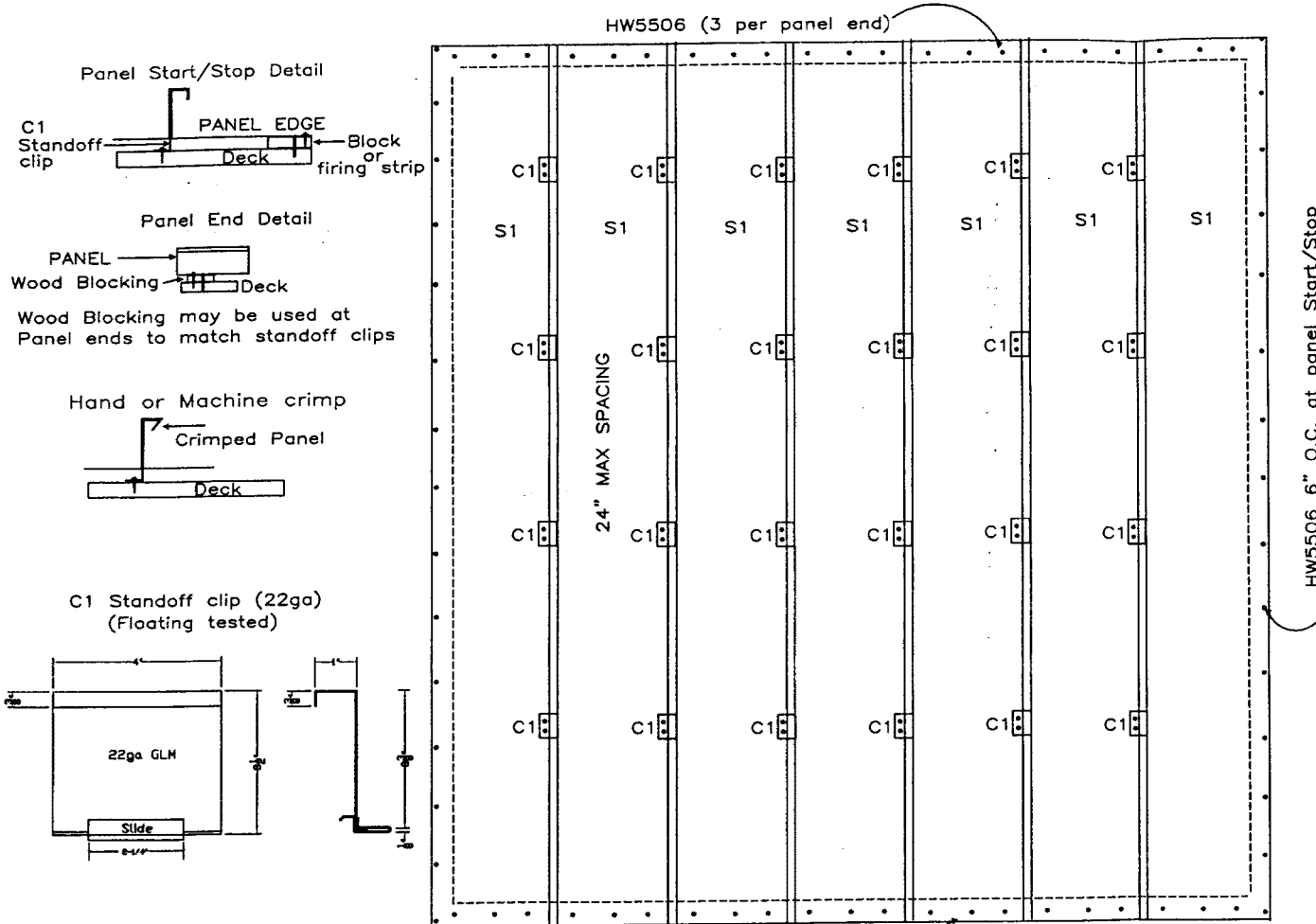
HW5506 #14 X 1" SELF TAPPING STRUC SCREW
HW5502: #14 X 3/4" SELF TAPPING LAP SCREW

STRUCTURAL:

1/2" PLYWOOD DECK OVER WOOD TRUSSES
30# FELT PAPER



DEAN STEEL BUILDINGS, INC. 2929 INDUSTRIAL AVE. FORT MYERS, FLORIDA 33901	JOB NUMBER	
	RS TESTING	
	DRAWN	DATE
	GEC	9.29.09
	CHECKED	DATE
	GEC	9.29.09
	SHEET NUMBER	
	1 OF 1	



MASTER SEAM (MS) ROOF PANEL

26 GA. (0.0239) ASTM 792/A792M GRADE D
W/ ALUMINUM ZINC ALLOY COATING
16" COVERAGE - 24-3/16" FLAT WIDTH

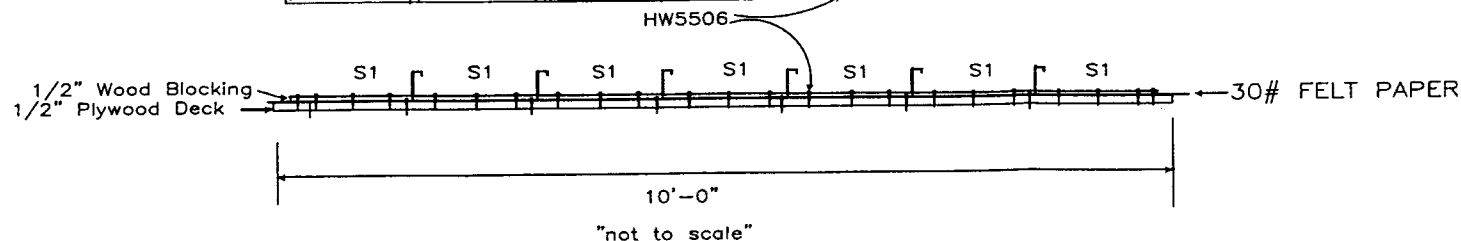
Hand or Machine crimp vertical leg to interlock

SCREWS:

HW5506 #14 X 1" SELF TAPPING STRUC SCREW
HW5502: #14 X 3/4" SELF TAPPING LAP SCREW
HW5509 #14 X 1-1/2" SELF TAPPING CLIP SCREW

STRUCTURAL:

C1 Floating Clip (Tested) HW5649 (2-HW5509)
Floating and Non-Floating clips available
1/2" Wood Blocking around perimeter for standoff
1/2" PLYWOOD DECK OVER WOOD TRUSSES
30# FELT PAPER



Printed Under
Otherwise Note
DATE
2009
0445-0912-09

JOB NUMBER MS TESTING	
DRAWN	DATE
GEC	9-30-09
CHECKED	DATE
GEC	9-30-09
SHEET NUMBER 1 OF 1	

DEAN
STEEL BUILDINGS, INC.

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