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ROLL-A-WAY

ROLL SHUTTERS.
WITH STORM BAR
(SLSB)
50", 100" & 140"
WIDE

***HURRICANE
ENGINEERING
& TESTING INC.***

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HURRICANE ENGINEERING & TESTING INC.

Computer Controlled Product Testing & Design,
.....Wind Load Analysis

Uniform Static Air Pressure Test

August 20th, 1999

REPORT NUMBER: **HETI-99-830A**

MANUFACTURER: Roll-A-Way
10601 Oak Street N.E., St. Petersburg, FL, 33716

TEST LOCATION: Hurricane Engineering & Testing Inc.
8532 N.W. 64 Street Miami, FL 33166

LAB. CERTIFICATION NUMBER: 98-0413.03

DADE NOTIFICATION NUMBER: HETI99025

SBCCI LISTING No. TL - 9596A

PRODUCT: Roll shutter.

MATERIAL: 6063-T6 Aluminum (*Reference tensile test Report No. 99-T186*)

PRODUCT SIZE: **100" wide x 97 1/8" high overall**

DRAWING NUMBER: 98-43 by Al-Farooq Corporation. Dated 12-24-1998. Rev. A 5-24-99
NOTE: HETI stamped drawing is an integral part of this report.

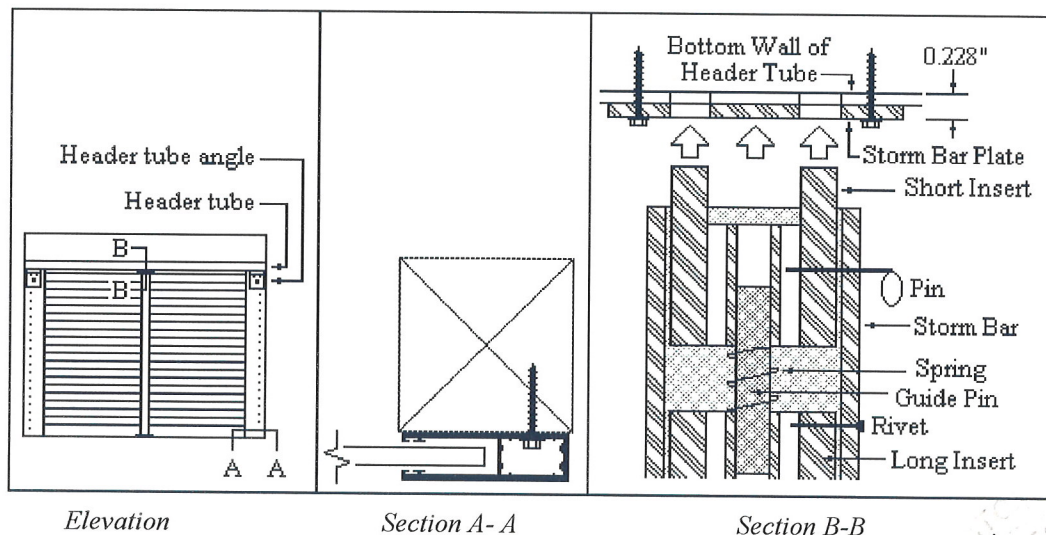
TEST PRESSURE (psf): **-210** (Per Dade County Letter dated 5/21/1999 regarding application for product approval #99-0311.04, received 03/11/99).

TEST WITNESSED BY:

Dr. Syed Waqar Ali (HETI)
Dr. Nasreen K. Ali (HETI)
Mr. Leonardo D. Savini (HETI)

WITNESSING ENGINEER:

Mr. Hector M. Medina, P.E.(HETI)



Typical configuration (not to scale).

Note: Storm bar shown separated from storm bar plate for clarity.

9/30/99

Construction Details

Product Extruded 6063-T6 aluminum slat roll shutter.

General Description of Units:

Single hollow 2 1/2" high x 0.055" deep x 0.046" wall thickness **slats** with (1) 2 1/4" h x 1/2" deep x 0.050" single hollow **bottom slat**. (2) single hollow 3" wide x 1" deep x 0.074" min. outside wall thickness and 0.063" inside wall **non-radius tracks**. The aluminum rolling mechanism was covered with a 0.033" thickness 6063-T5 **cover**. 12" x 12" cast aluminum cover **end caps** supported the rolling mechanism and each included (2) 1" x 1 1/2" x 0.099" thick x 6" long 6063-T6 aluminum **end cap angles** each fastened to the inside of the end cap wall with (3) 3/16" DIA SS rivets @ 2" o.c.

(1) Storm bar and header tube assembly was composed of:

- (1) 7 1/4" x 1.500" x 0.103" min thickness and 0.240" max. thickness x 99 5/8" long triple hollow 6063-T5 aluminum **header tube**.
- (2) 3" x 3" x 2" long x 3/8" thick 6063-T6 aluminum **header tube radius angles**. See elev. in figure.
- (2) 4" x 1 1/2" x 1/4" thick max and 1/8" min thickness (one 82 11/16" long on the exterior and one 96 3/16" long on the interior) 6005-T5 aluminum **storm bars**.
- (4) 4" x 4" x 1/8" 6063-T6 aluminum **storm bar plates** were used, each with two 7/16" x 1 1/4" holes for the storm bar insert (resembling a strike plate).

Note: (2) 7/16" x 1 1/4" holes were perforated on midspan of the header tube. The wholes coincided with the storm bar plates. See section B-B on figure.

- (2) 1.212" wide x 3.265" deep x 0.0119" thick min. and 0.382" max. thickness (one 82 11/16" long on the exterior and one 96 3/16" long on the interior) 6005-T5 aluminum **storm bar inserts**.

1/2" of web was removed at both ends. The inserts were cut in two pieces @ 5 3/4" from top end.

The **longer insert** was fixed to the storm bar with (2) #14 x 1" SMS SS @ 1" and 11" from the bottom end and (2) 1/8" rivets on the top end.

A **spring and guide pin** was added in between the two insert pieces.

The **shorter insert** was secured with a 1/4" DIA x 1 3/4" pin after it was installed. When in place, the storm bar inserts were 1/8" into the storm bar plate holes at the top and bottom of the interior storm bar and bottom of the exterior storm bar (where connecting to the concrete substratum). The storm bar insert was 1/2" inside the storm bar plate holes on the top side of the exterior storm bar (where there was a storm bar to header tube connection (illustrated in cross-section B-B on Page 1 of this report).

Installation

Configuration	Out-rolled wall to wall mounting.
Overall Size	100" wide x 97 1/8" high.
Size of Opening	93 1/2" w x 97 1/4" high.
Track to Track	94" w x 84 15/16" track height.
Slat length	96".
Substratum	wood on tracks, concrete on header and sill.
Track Edge Distance	1 15/16".
Storm bar plates	2 1/2" edge distance.



9/30/99

Fastener Chart

<i>Connection</i>	<i>Fastener Type</i>	<i>Quantity</i>	<i>Spacing</i>	<i>Comments</i>
track -substratum	1/4"x 2 1/4" Elco Textron Tapcon	27 / side	3" O.C.	in line
end cap and end cap angle - substratum	1/4"x 2 1/4" Elco Textron Tapcon	1 / side	--	at end caps
Header tube angles - 4" x 4" substratum	5/16" - 18 x 6" long tap bolt, (3) 1" DIA washer and nut	1 / angle	center of angle	fastener passed thru track & substratum
Header tube angles - header tube ends	#14 x 1 1/2" SS SMS	4 / angle	1 1/8"	two rows in line
end cap and end cap angle - header tube	#12 x 1" SS SMS	5 / side	1" O.C.	in line
storm bar retaining plate - header tube	#12 x 1" SS SMS	3 per plate	3" O.C.	at 1" from retaining plate corners
storm bar retaining plate - substratum	1/4"x 2 1/4" Elco Textron Tapcon	3 per plate	3" O.C.	at 1" from retaining plate corners

Uniform Load Test Results

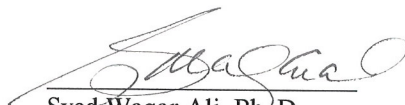
Test Pressure (psf)	Deflection (in)	Set (in)	Recovery (%)	Duration (Sec)
Negative Pressure				
-158	0.36	0	100	30
-210	0.76	0.040	97	30

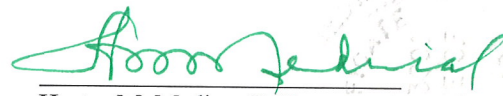
Note: The deflection was measured on the slat close to the storm bar at midspan.

Conclusion

The sample was tested in accordance with Dade County letter dated May 21, 1999 regarding application for product approval #99-0311.04, received 03/11/99. The shutter was operational before the beginning of the uniform static air pressure test.

NOTE: The above results were obtained using the designated test methods or specification, and indicate compliance with the performance requirements of the referenced specifications. This report does not constitute certification of the specimens tested.


 Syed Waqar Ali, Ph. D.
 President
 (HETI)


 Hector M. Medina, P. E.
 Resident Engineer

9/30/99

HURRICANE ENGINEERING & TESTING INC.

Computer Controlled Product Testing & Design,
.....Wind Load Analysis

Uniform Static Air Pressure Test

August 20th, 1999

REPORT NUMBER: **HETI-99-830B**

MANUFACTURER: Roll-A-Way
10601 Oak Street N.E., St. Petersburg, FL, 33716

TEST LOCATION: Hurricane Engineering & Testing Inc.
8532 N.W. 64 Street Miami, FL 33166

LAB. CERTIFICATION NUMBER: 98-0413.03

DADE NOTIFICATION NUMBER: HETI99025

SBCCI LISTING No. TL - 9596A

PRODUCT: Roll shutter.

MATERIAL: 6063-T6 Aluminum (*Reference tensile test Report No. 99-T186*)

PRODUCT SIZE: **140" wide x 133 1/2" high overall**

DRAWING NUMBER: 98-43 by Al-Farooq Corporation. Dated 12-24-1998. Rev. A 5-24-99
NOTE: HETI stamped drawing is an integral part of this report.

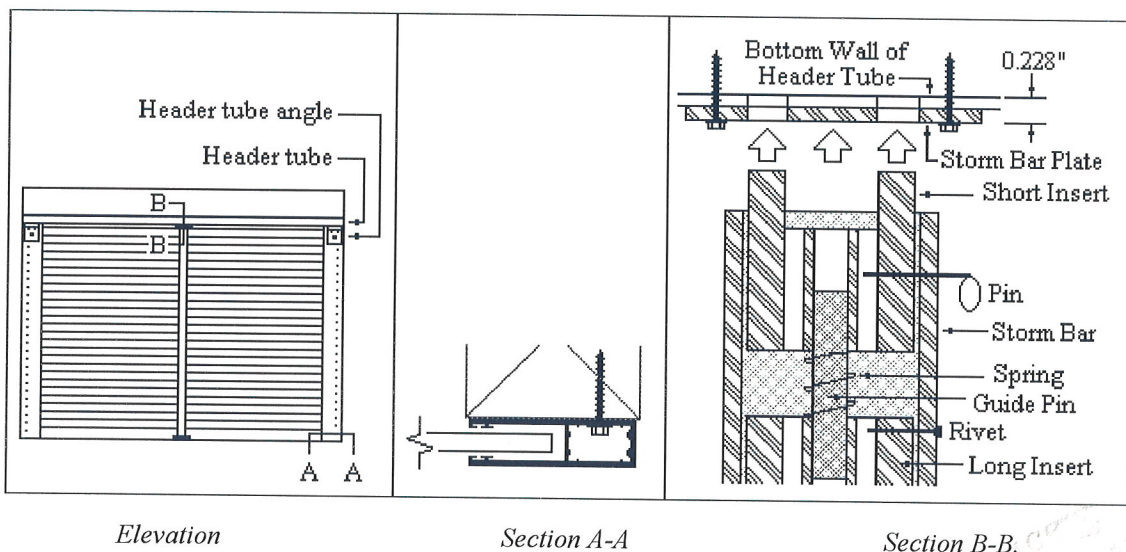
TEST PRESSURE (psf): **-70** (Per Dade County letter dated May 21, 1999 regarding application for product approval #99-0311.04, received 03/11/99).

TEST WITNESSED BY:

Dr. Syed Waqar Ali (HETI)
Dr. Nasreen K. Ali (HETI)
Mr. Leonardo D. Savini (HETI)

WITNESSING ENGINEER:

Mr. Hector M. Medina, P.E.(HETI)



Elevation

Section A-A

Section B-B.

Typical configuration (not to scale).

Note: Storm bar shown separated from storm bar plate for clarity.

Handwritten signature: Hector Medina
Handwritten date: 9/30/99

Construction Details

Product Extruded 6063-T6 aluminum slat roll shutter.

General Description of Units:

Single hollow 2 1/2" high x 0.055" deep x 0.046" wall thickness **slats** with (1) 2 1/4" h x 1/2" deep x 0.050" single hollow **bottom slat**. (2) single hollow 3" wide x 1" deep x 0.074" min. outside wall thickness and 0.063" inside wall **non-radius tracks**. The aluminum rolling mechanism was covered with a 0.033" thickness 6063-T5 **cover**. 12" x 12" cast aluminum cover **end caps** supported the rolling mechanism and each included (2) 1" x 1 1/2" x 0.099" thick x 6" long 6063-T6 aluminum **end cap angles**. Top end cap angle was fastened to the inside of the end cap wall with (3) #10 x 3/4" SDS @ 2" o.c. Bottom end cap angle was fastened to the inside of the end cap wall with (3) #12 x 1" SS SMS @ 2" o.c.

(1) Storm bar and header tube assembly was composed of:

(1) 7 1/4" x 1.500" x 0.103" min thickness and 0.240" max. thickness x 139 3/4" long triple hollow 6063-T5 aluminum **header tube**.

(2) 3" x 3" x 2" long x 3/8" thick 6063-T6 aluminum **header tube radius angles**. See elev. in figure.

(2) 4" x 1 1/2" x 1/4" thick max and 1/8" min thickness (one 119 1/8" long on the exterior side and one 132 1/8" long on the interior side) 6005-T5 aluminum **storm bars**.

(2) 4" x 4" x 1/8" 6063-T6 aluminum **storm bar plates** were used on the interior storm bar and (1), 4" x 4" x 1/4" steel **storm bar plate**. All plates had with two 7/16" x 1 1/4" holes for the storm bar insert (plates resembled the function of a strike plate in a door).

Note: (2) 7/16" x 1 1/4" holes were perforated on midspan of the header tube. The wholes coincided with the storm bar plates. See section B-B on figure.

(2) 1.212" wide x 3.265" deep x 0.0119" thick min. and 0.382" max. thickness (one 119 1/8" long on the exterior side and one 132 1/8" long on the interior side) 6005-T5 aluminum **storm bar inserts**. 1/2" of web was removed at both ends. The inserts were cut in two pieces @ 5 3/4" from top end.

The **longer insert** was fixed to the storm bar with (2) #14 x 1" SMS SS @ 1" and 11" from the bottom end and (2) 5/32" aluminum rivets on the top end.

A **spring and guide pin** was added in between the two insert pieces.

The **shorter insert** was secured with a 1/4" DIA x 1 3/4" pin after it was installed. When in place, the storm bar inserts were 1/8" into the storm bar plate holes at the top and bottom of the interior storm bar and bottom of the exterior storm bar (where connecting to the concrete substratum). The storm bar insert was 1/2" inside the storm bar plate holes on the top side of the exterior storm bar (where there was a storm bar to header tube connection (illustrated in cross-section B-B on Page 1 of this report).

Installation

Configuration	Out-rolled wall to wall mounting.
Overall Size	140" wide x 133 1/2" high.
Size of Opening	133 7/8" w x 133 3/4" high.
Track to Track	134" w x 121 5/8" track height.
Slat length	136".
Substratum	wood on tracks, concrete on header and sill.
Track Edge Distance	1 15/16".
Storm bar plates	2 1/2" edge distance.

9 / 30 / 99

Fastener Chart

Connection	Fastener Type	Quantity	Spacing	Comments
track -substratum	1/4"x 2 1/4" Elco Textron Tapcon	39 / side	3" O.C.	in line
end cap and end cap angle - substratum	1/4"x 2 1/4" Elco Textron Tapcon	1 / side	--	at end caps
Header tube angles - 4" x 4" substratum	5/16" - 18 x 6" long tap bolt, (3) 1" DIA washer and nut	1 / angle	center of angle	fastener passed thru track & substratum
Header tube angles - header tube ends	#14 x 1 1/2" SS SMS	4 / angle	1 1/8"	two rows in line
end cap and end cap angle - header tube	#12 x 1" SS SMS	5 / side	1" O.C.	in line
storm bar retaining plate - header tube	#12 x 1" SS SMS	4 per plate	3" O.C.	at 1" from retaining plates corners
storm bar retaining plate - substratum	1/4"x 2 1/4" Elco Textron Tapcon	3 per plate	3" O.C.	at 1" from retaining plates corners

Uniform Load Test Results

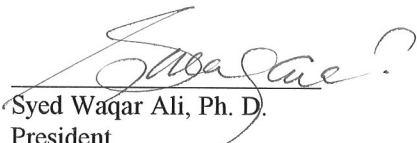
Test Pressure (psf)	Deflection (in)	Set (in)	Recovery (%)	Duration (Sec)
Negative Pressure				
-53	1.78	0.073	97	30
-70	2.20	0.052	99	30

Note: The deflection was measured on the slat close to the storm bar at midspan.

Conclusion

The sample was tested in accordance with Dade County letter dated May 21, 1999 regarding application for product approval #99-0311.04, received 03/11/99. The shutter was operational before the beginning of the uniform static air pressure test.

NOTE: The above results were obtained using the designated test methods or specification, and indicate compliance with the performance requirements of the referenced specifications. This report does not constitute certification of the specimens tested.


 Syed Waqar Ali, Ph. D.
 President
 (HETI)


 Hector M. Medina, P. E.
 Resident Engineer

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HURRICANE ENGINEERING & TESTING INC.

Computer Controlled Product Testing & Design,
.....Wind Load Analysis

Uniform Static Air Pressure Test

August 20th, 1999

REPORT NUMBER: **HETI-99-830C**

MANUFACTURER: Roll-A-Way
10601 Oak Street N.E., St. Petersburg, FL, 33716

TEST LOCATION: Hurricane Engineering & Testing Inc.
8532 N.W. 64 Street Miami, FL 33166

LAB. CERTIFICATION NUMBER: 98-0413.03

DADE NOTIFICATION NUMBER: HETI99025

SBCCI LISTING No. TL - 9596A

PRODUCT: Roll shutter.

MATERIAL: 6063-T6 Aluminum (*Reference tensile test Report No. 99-T186*)

PRODUCT SIZE: **50" wide x 183 5/8" high overall**

DRAWING NUMBER: 98-43 by Al-Farooq Corporation. Dated 12-24-1998. Rev. A 5-24-99
NOTE: HETI stamped drawing is an integral part of this report.

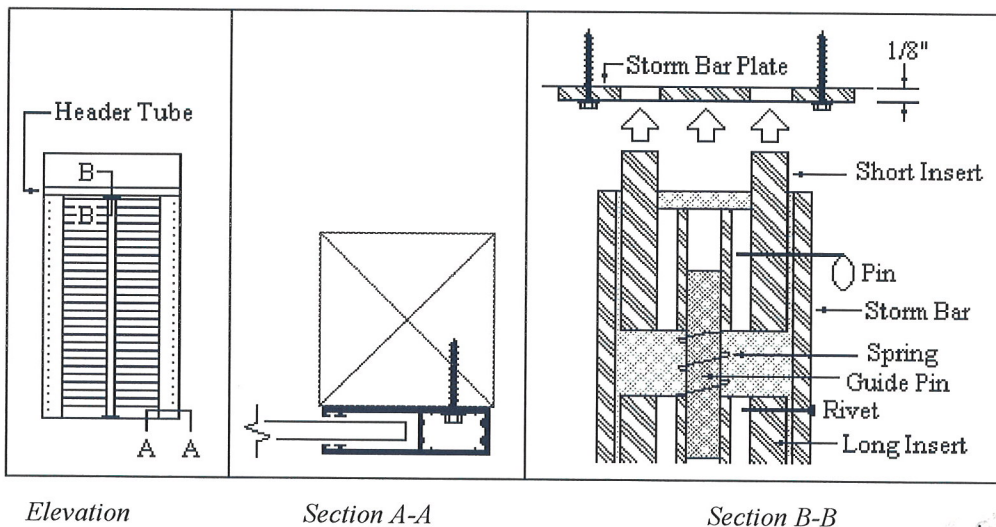
TEST PRESSURE (psf): **-60** or above (Per Dade County letter dated May 21, 1999 regarding application for product approval #99-0311.04, received 03/11/99.)

TEST WITNESSED BY:

Dr. Syed Waqar Ali (HETI)
Dr. Nasreen K. Ali (HETI)
Mr. Leonardo D. Savini (HETI)

WITNESSING ENGINEER:

Mr. Hector M. Medina, P.E.(HETI)



Typical configuration (not to scale).
Note: Storm bar shown separated from storm bar plate for clarity.

8532 NW 64th Street, Miami, Florida, 33166. Phone (305) 597-5590, Fax: (305) 597-7023
www.hurricanetesting.com

9/30/99

Construction Details

Product Extruded 6063-T6 aluminum slat roll shutter.

General Description of Units: Single hollow 2 1/2" high x 0.055" deep x 0.046" wall thickness **slats** with (1) 2 1/4" h x 1/2" deep x 0.050" single hollow **bottom slat**. (2) single hollow 3" wide x 1" deep x 0.074" min. outside wall thickness and 0.063" inside wall **non-radius tracks**. The aluminum rolling mechanism was covered with a 0.033" thickness 6063-T5 **cover**. 14" x 14" cast aluminum cover **end caps** supported the rolling mechanism and each included (2) 1" x 1 1/2" x 0.099" thick x 6" long 6063-T6 aluminum **end cap angles** each fastened to the inside of the end cap wall with (3) 3/16" DIA SS rivets @ 2" o.c.

(1) Storm bar and header tube assembly was composed of:

- (1) 5.884" x 1.500" x 0.110" x 49 3/4" wide triple hollow 6063-T5 aluminum **header tube**.
- (2) 4" x 1 1/2" x 1/4" thick max and 1/8" min thickness (one 166 7/8" long on the exterior and one 182 1/4" long on the interior) 6005-T5 aluminum **storm bars**.
- (4) 4" x 4" x 1/8" 6063-T6 aluminum **storm bar plates** were used, each with two 7/16" x 1 1/4" holes for the storm bar insert (resembling a strike plate).
- (2) 1.212" wide x 3.265" deep x 0.0119" thick min. and 0.382" max. thickness (one 166 7/8" long on the exterior and one 182 1/4" long on the interior) 6005-T5 aluminum **storm bar inserts**. 1/2" of web was removed at both ends. The inserts were cut in two pieces @ 5 3/4" from top end. The **longer insert** was fixed to the storm bar with (2) #14 x 1" SMS SS @ 1" and 11" from the bottom end and (2) 1/8" rivets on the top end.

A **spring** and **guide pin** was added in between the two insert pieces.

The **shorter insert** was secured with a 1/4" DIA x 1 3/4" pin after it was installed. When in place, the storm bar inserts were 1/8" into the storm bar plate holes. See section B-B on figure.

Installation

Configuration	Out-rolled wall to wall mounting
Overall Size	50" wide x 183 5/8" high
Size of Opening	44 1/2" w x 183 5/8" high
Track to Track	44" w x 159 5/8" track height
Slat length	46"
Substratum	wood on tracks, concrete on header and sill
Edge Distance	1 15/16" on tracks and 2 1/2" on storm bar plates.

Fastener Chart

Connection	Fastener Type	Quantity	Spacing	Comments
track -substratum	1/4"x 2 1/4" Elco Textron Tapcon	55 / side	3" O.C.	in line
end cap and end cap angle - substratum	1/4"x 2 1/4" Elco Textron Tapcon	1 / side	--	at end caps
end cap and end cap angle - header tube	#12 x 1" SS SMS	4 / side	1" O.C.	in line
storm bar retaining plate - header tube	#12 x 1" SS SMS	4 per plate	3" O.C.	at 1" from corners
storm bar retaining plate - substratum	1/4"x 2 1/4" Elco Textron Tapcon	3 per plate	3" O.C.	at 1" from corners

Good Detail

2/30/99

Uniform Load Test Results

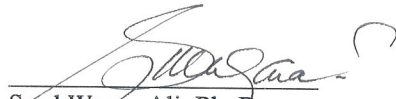
Test Pressure (psf)	Deflection (in)	Set (in)	Recovery (%)	Duration (Sec)
Negative Pressure				
-45	0.18	0.000	100	30
-60	0.31	0.021	97	30
-90	0.61	0.000	100	30

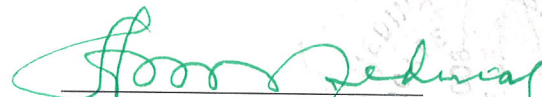
Note: The deflection was measured on the slat close to the storm bar at midspan.

Conclusion

The sample was tested in accordance with Dade County letter dated May 21, 1999 regarding application for product approval #99-0311.04, received 03/11/99. The shutter was operational before the beginning of the uniform static air pressure test.

NOTE: The above results were obtained using the designated test methods or specification, and indicate compliance with the performance requirements of the referenced specifications. This report does not constitute certification of the specimens tested.


Syed Waqar Ali, Ph. D.
President
(HETI)


Hector M. Medina, P. E.
Resident Engineer

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