

HURRICANE ENGINEERING & TESTING INC.

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

Uniform Static Air Pressure Test

November 29th, 2001.

REPORT NUMBER: **HETI-01-1117**

MANUFACTURER: Wayne-Dalton Door Systems Division.
2589 Country Road 168, Dundee, OH 44624

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

SBCCI LISTING No.: TL - 9596A

LAB. CERTIFICATION NUMBER: 01-0417.03 (MIAMI-DADE COUNTY, FLORIDA)

PRODUCT: **Rolling Door**

MODEL: Mini DS-75

PRODUCT DESCRIPTION: 0.018" thick steel
(Tensile Test Report No. HETI-01-T111)

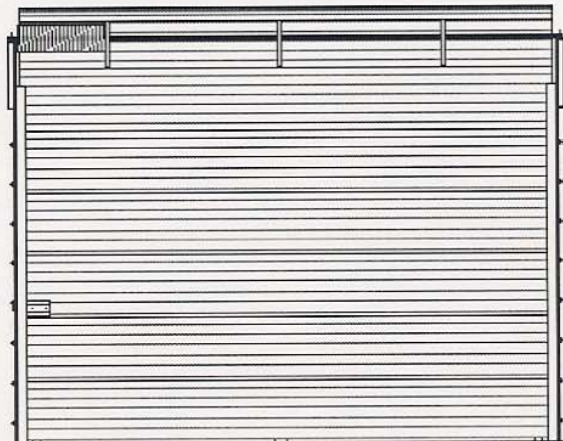
PRODUCT SIZE: 120" w x 96"h (size of opening)

DRAWING NUMBERS: 701-0542-2, 701-0543-2 and 701-0544-2 by Wayne-Dalton
Rolling Door Division. Dated 12-10-01.

NOTE: *HETI stamped drawing is an integral part of this report.*

DESIGN LOADS (psf): **+30, -34**

TEST WITNESSED BY: (full or partial)
Syed Waqar Ali, Ph. D. (HETI)
Mr. Leonardo D. Savini, E.I. (HETI)
Mr. Eddy Philippe (HETI)



Inrolled interior elevation, not to scale.

Construction Details

PRODUCT Rolling Door
MODEL Mini DS-75

PRODUCT SIZE(S) 126 3/4" w x 110 3/8" (excluding roll).
120" w x 96" h (size of opening).

SPECIAL NOTE Inrolled. The panels were located @ 19" O.C. vertically and joined with a continuous horizontal seam that consisted of a 1/4" to 3/8" fold in the top and bottom of every panel.

TABLE OF COMPONENTS (EXCLUDING INSTALLATION)

COMPONENT	QUANTITY PER SAMPLE	SIZE	FASTENING PER COMPONENT
(5/16" BOLT & FLANGE NUT)	SEE COMPONENT	5/16"-18 X 5/8" TRUSS HEAD	----
(CARRIAGE BOLT)	SEE COMPONENT	1/4-20 x 5/8" CARRIAGE BOLT	----
PANELS	SIX	19.38" H X 124" X 0.63" D X 26 GA	SEE END WIND LOCKS AND SPECIAL NOTE
WIND LOCKS (GUIDES)	THREE PER SECTION END @ 6 1/2" O.C.	2.20" X 1.30" X 1.1" X 0.33" TO 0.21" THICKNESS	TWO 1/8" X 0.42" STEEL RIVETS
GALV. STEEL BOTTOM BAR SHEET	ONE	3.26" H X 0.53" W X 124" L X 26 GA	CONNECTED TO BOTTOM SEAM DESCRIBED IN SPECIAL NOTE
BOTTOM ANGLE	ONE	1 1/2" X 1 1/2" X 124" X 12 GA	(2) (CARRIAGE BOLT) AND NUT PER END. SPACING = 5 1/2" O.C. EDGE DISTANCE = 4 7/8". SEE HANDLE FOR CENTER.
TRACK	TWO	2.44" W X 1.41" D X 98 3/4" H X 13 GA. ONE SIDE 1" DOUBLED	(8) (5/16" BOLT & FLANGE NUT) @ 12" O.C. START 6" FROM BOTTOM CONNECTED TO TRACK ADAPTER ANGLE.
TRACK ADAPTER ANGLE	ONE PER TRACK	2" X 2" X 103 1/2" H X 12 GA	SEE INSTALLATION

All steel components unless specified otherwise.

HARDWARE

Locks

(1) The lock was located @ 38" from the bottom of the door and was engaged but not secured with any lock or pin. The lock consisted of two 13 GA steel parts. The acting part (throw) was 9 3/8" long x 1 7/8" h. The part fixed to the section was 9 1/2" wide x 3.16" h and was fastened with two (carriage bolts) and nuts @ 6 1/2" O.C.

Handle

(1) Located at midspan of the bottom angle and fastened with two (carriage bolts) which were inserted through the bottom angle, the bottom angle galv. steel sheet and the handle. Then, one flange nut per bolt was installed.

Counterbalance

The door was mounted with a wound spring mechanism.

INSTALLATION

JAMB SUBSTRATUM One side 1/8" thick steel and one side grout filled masonry blocks.

Connection	Fastener Type	Quantity	Spacing
track adapter angle - masonry substratum	3/8" x 5" Kingpin Wedge Anchor	8 per angle	12" O.C. starting 6" from bottom
track adapter angle - steel substratum	5/16"-12 x 1" Tek	8 per angle	12" O.C. starting 6" from bottom

The track angle was connected to the substratum prior to connecting it to the track.

The track adapter angle fasteners were located behind the track.

Test Results

Uniform Static Air Pressure Test

	Pressure (psf)	Deflection (inches)	Set (inches)	Recovery (%)	Duration (seconds)
Positive Load					
Half test load	+23	6.24	0.00	100	60
Design Load	+30	7.12	0.07	99	60
Test Load	+45	8.61	0.36	96	10
Negative Load					
Half Test Load	-26	8.14	0.07	99	60
Design Load	-34	8.80	0.22	98	60
Test Load	-51	9.64	0.29	97	10

Tested in accordance with ASTM E330-90 and Standard Building Code section 1707.4 requirements

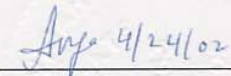
Conclusion

The sample was tested as indicated along with the test results. At the end of the tests, the door was operational, all components were securely in place with no openings, ruptures or structural damage.

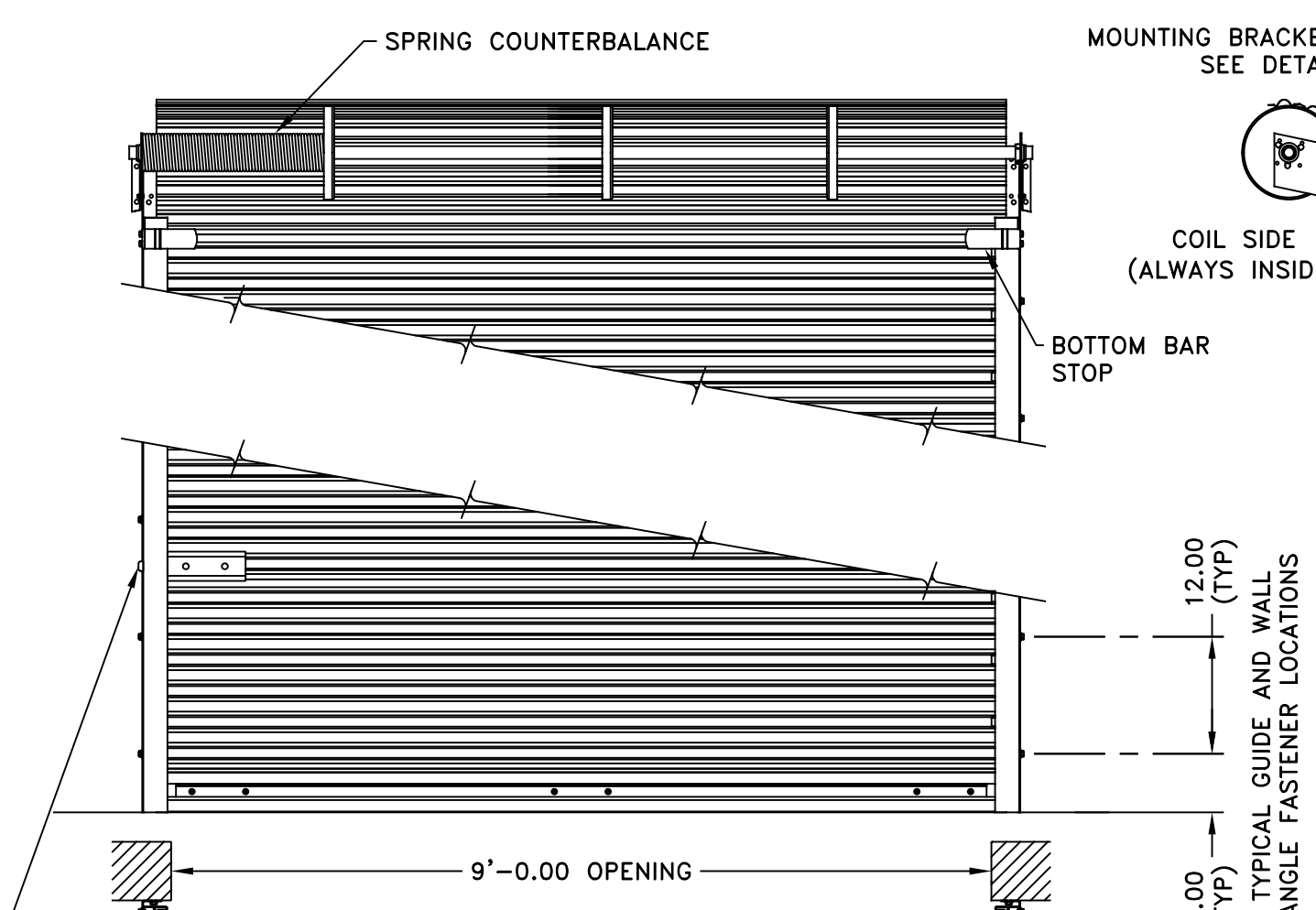
NOTE: The above results were obtained using the designated test methods which indicates compliance with the performance requirements of the referenced specifications. This report does not constitute certification of the specimens tested.



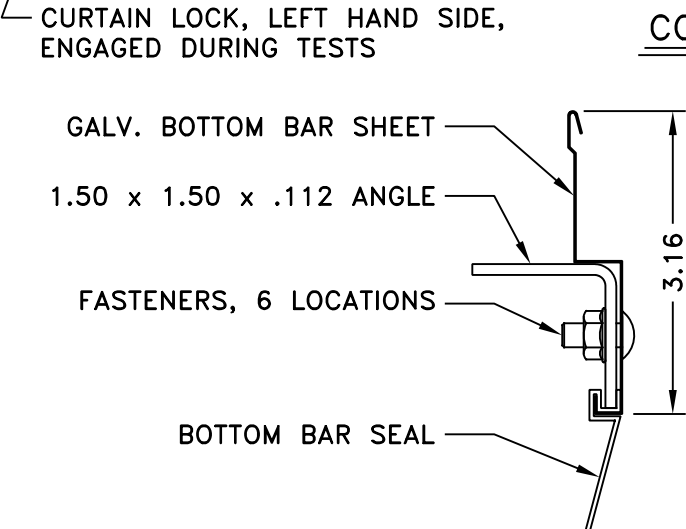
Syed Waqar Ali, Ph. D.
President



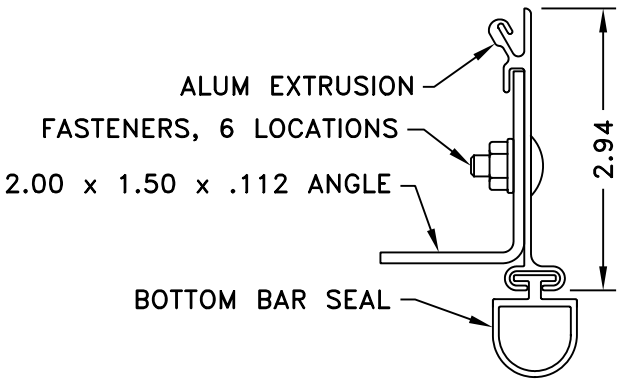
Arshad Viqar, P.E.
Engineer of Record



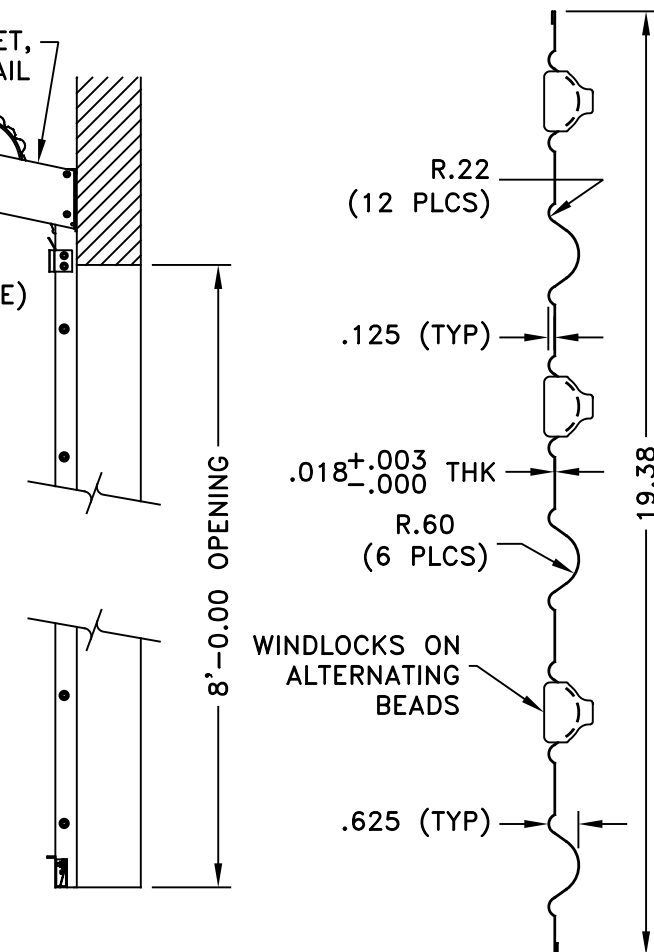
COILSIDE ELEVATION
SCALE = NONE



DS-75 BOTTOM BAR DETAIL
SCALE = 1:2



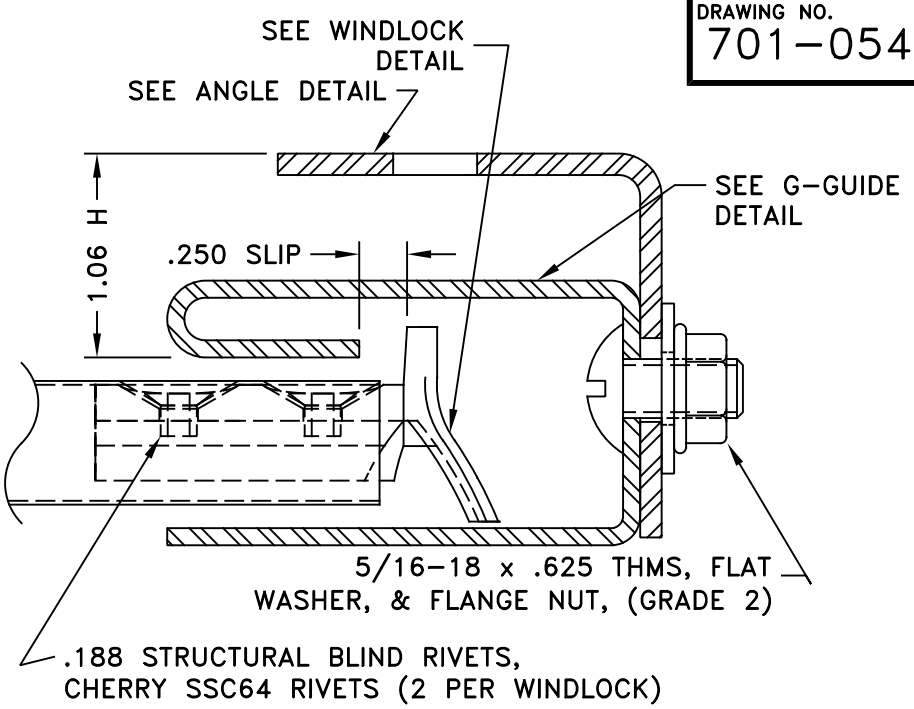
DS-100 BOTTOM BAR DETAIL*
SCALE = 1:2



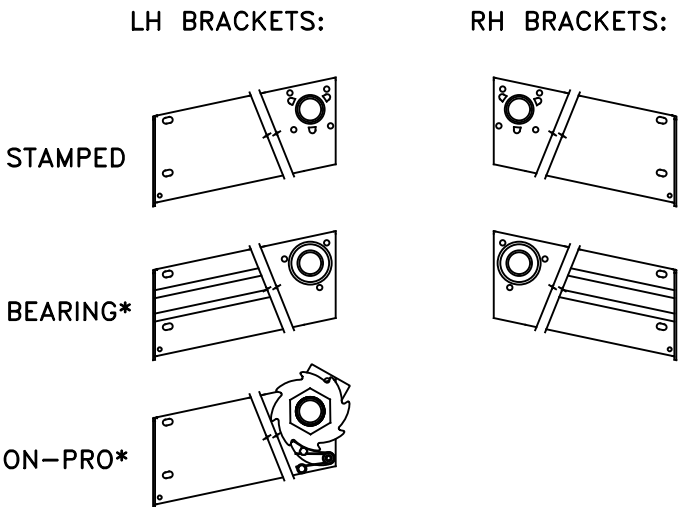
MAT'L SPECS: .018MIN THK, G-30
HOT DIPPED GALV., TYPE B, PER
ASTM A653, MIN SPANGLE, EXTRA
SMOOTH
PAINT: .2/.3 MIL DFT PRIMER BOTH
SIDES, .55/.65 MIL DFT TOP COAT
BOTH SIDES

PANEL DETAIL
SCALE = 1:4

TEST	TEST REPORT NUMBER
UNIFORM STATIC AIR PRESSURE	HETI-01-1115
LARGE MISSILE IMPACT	HETI-01-1114
TENSILE	HETI-01-T112



GUIDE DETAIL
SCALE = FULL



BRACKET DETAIL
SCALE = 1:12

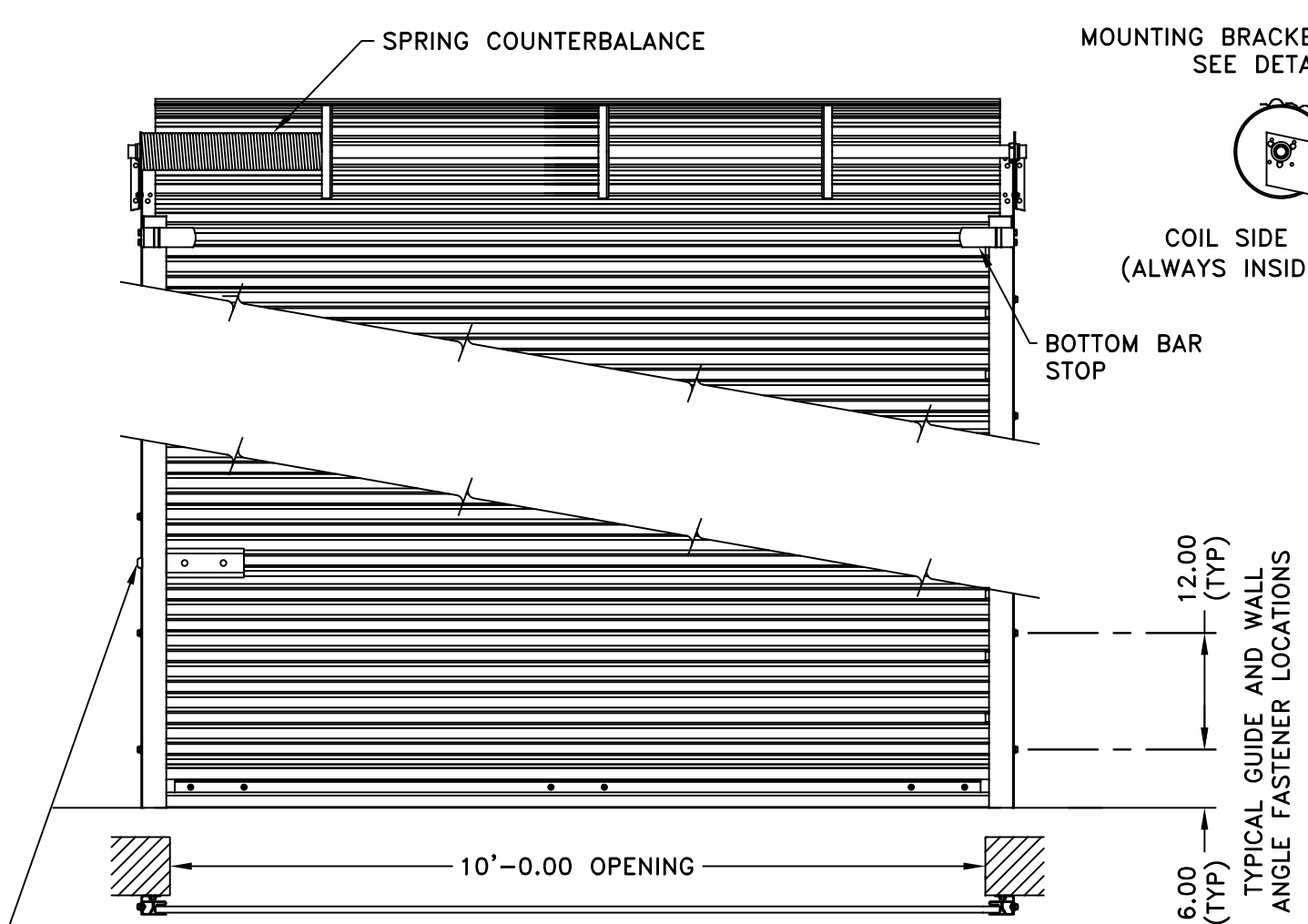
- NOTES:
1. UNIFORM STATIC AIR PRESSURE TESTS PERFORMED PER ASTM E330-90
 2. LARGE MISSILE IMPACT TESTS PERFORMED PER PA-201
 3. TENSILE TESTS PERFORMED PER ASTM E8-96
 4. IMPACT TESTING PERFORMED ON OPPOSITE COIL SIDE ONLY
 5. ALL TESTING PERFORMED BY HURRICANE ENGINEERING & TESTING INC.

*DENOTES UNTESTED CONFIGURATIONS APPROVED BY SIMILARITY

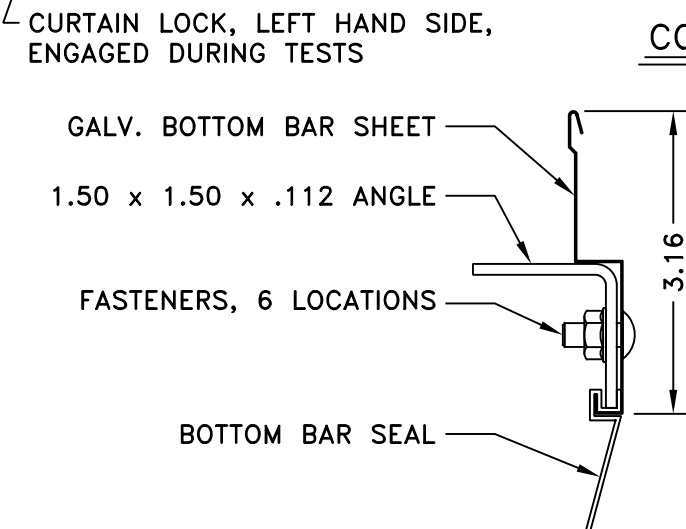
REV.	REV. BY	APPVD. BY	RELEASE	DESCRIPTION
01	MED 08/08/02	DLM 08/21/02	PCR#D-00052	ADDED TEST NUMBERS AND REV PROTOCOLS
REVISIONS				

PART NUMBER ZZ-----	WEIGHT (LB.) .	TITLE MINI WINDLOAD TEST CONSTRUCTION +30PSF/-34PSF DESIGN PRESSURE (+45PSF/-51PSF TEST PRESSURE)	DRAWN BY M. DAUS 12/10/2001	CHECKED BY A. STEIDL 12/17/2001	APPVD. BY D. MONSOUR 12/17/2001	TOLERANCES (UNLESS OTHERWISE SPECIFIED) LINEAR .X ± .060 LINEAR .XX ± .030 LINEAR .XXX ± .010 ANGULAR ± .50° DIMENSIONS IN INCHES	 Wayne Dalton Rolling Door Division 14512 Lincoln Way E. Dalton, Ohio 44618
REFERENCE PAGE 2: 701-0543 PAGE 3: 701-0544	MATERIAL AS SHOWN	SCALE - WHEN THIS BOX IS .50" HIGH AS SHOWN	ORIGINAL RELEASE PCR #D-00052	SIZE B	DRAWING NO. 701-0542	REVISION 01	

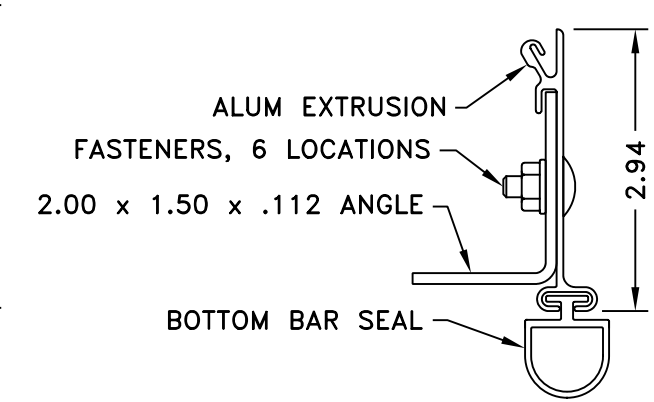
THIS DRAWING IS THE PROPERTY OF WAYNE DALTON AND IS LOANED WITH THE EXPRESSED AGREEMENT THAT THE DRAWINGS AND INFORMATION THEREIN CONTAINED ARE THE PROPERTY OF WAYNE DALTON AND WILL NOT BE REPRODUCED, COPIED, OR OTHERWISE DISPOSED OF, DIRECTLY OR INDIRECTLY, AND WILL NOT BE USED IN WHOLE OR IN PART TO ASSIST IN MAKING OR TO FURNISH ANY INFORMATION FOR THE MAKING OF DRAWINGS, PRINTS, OR OTHER REPRODUCTION THEREOF, OR FOR THE MAKING OF APPARATUS OR PARTS THEREOF, EXCEPT UPON WRITTEN PERMISSION OF WAYNE DALTON FIRST OBTAINED AND SPECIFIC AS TO EACH CASE. THE ACCEPTANCE OF THIS DRAWING WILL BE CONSTRUED AS AN ACCEPTANCE OF THE FOREGOING AGREEMENT.



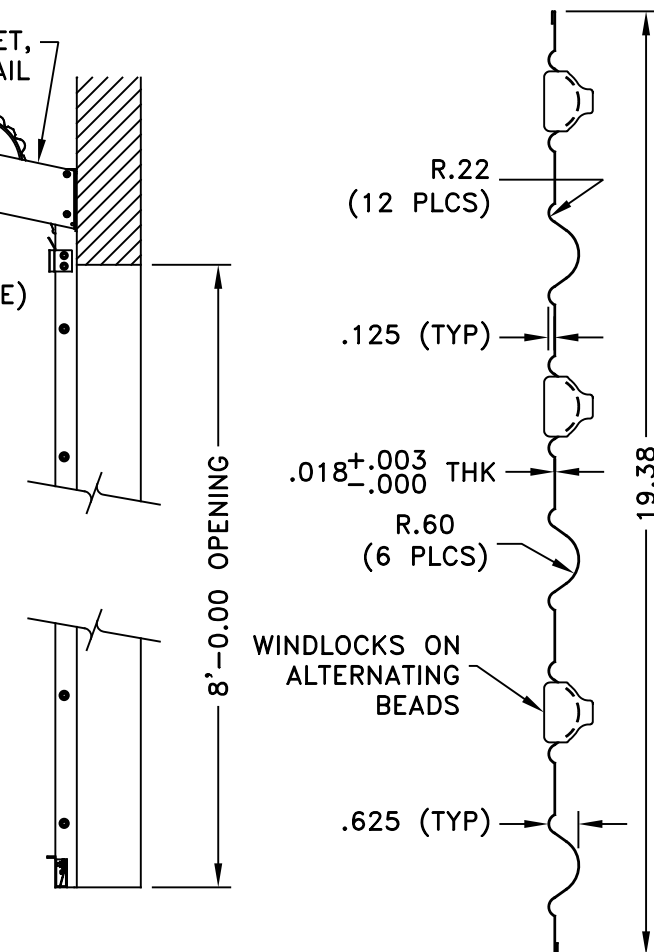
COILSIDE ELEVATION
SCALE = NONE



DS-75 BOTTOM BAR DETAIL
SCALE = 1:2

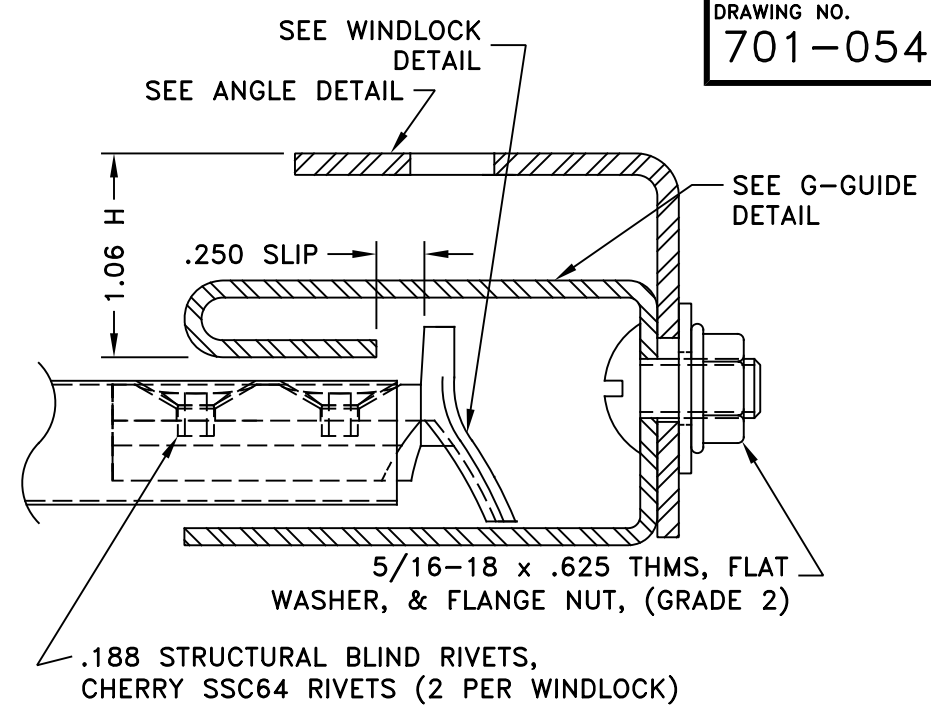


DS-100 BOTTOM BAR DETAIL*
SCALE = 1:2

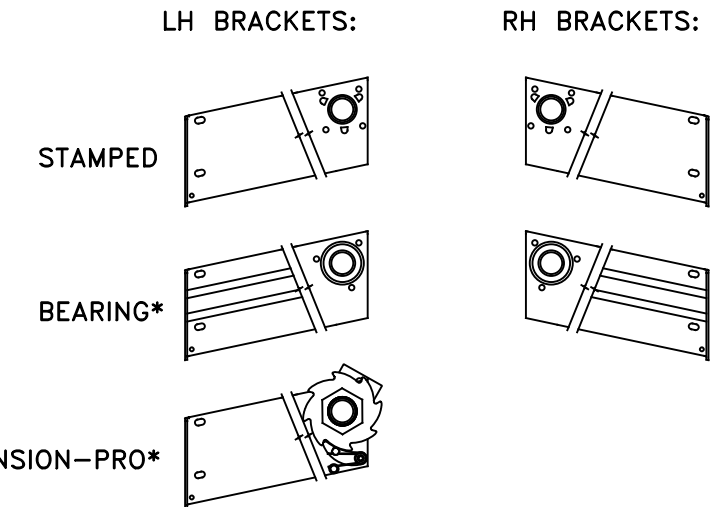


MAT'L SPECS: .018MIN THK, G-30 HOT DIPPED GALV., TYPE B, PER ASTM A653, MIN SPANGLE, EXTRA SMOOTH
PAINT: .2/.3 MIL DFT PRIMER BOTH SIDES, .55/.65 MIL DFT TOP COAT BOTH SIDES

PANEL DETAIL
SCALE = 1:4



GUIDE DETAIL
SCALE = FULL



BRACKET DETAIL
SCALE = 1:12

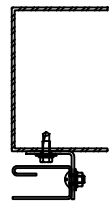
TEST	TEST REPORT NUMBER
UNIFORM STATIC AIR PRESSURE	HETI-01-1117
LARGE MISSILE IMPACT	HETI-01-1118
TENSILE	HETI-01-T111

- NOTES:
1. UNIFORM STATIC AIR PRESSURE TESTS PERFORMED PER ASTM E330-90
 2. LARGE MISSILE IMPACT TESTS PERFORMED PER PA-201
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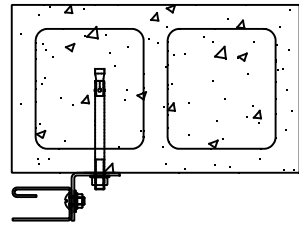
*DENOTES UNTESTED CONFIGURATIONS APPROVED BY SIMILARITY

REV.	REV. BY	APPVD. BY	RELEASE	DESCRIPTION
01	MED 08/08/02	DLM 08/21/02	PCR#D-00052	ADDED TEST NUMBERS AND REV PROTOCOLS
REVISIONS				

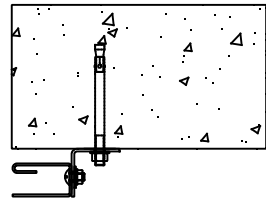
PART NUMBER ZZ_____	WEIGHT (LB.) .	TITLE MINI WINDLOAD TEST CONSTRUCTION +30PSF/-34PSF DESIGN PRESSURE (+45PSF/-51PSF TEST PRESSURE)	DRAWN BY M. DAUS 12/10/2001	CHECKED BY A. STEIDL 12/17/2001	APPVD. BY D. MONSOUR 12/17/2001	TOLERANCES (UNLESS OTHERWISE SPECIFIED) LINEAR .X ± .060 LINEAR .XX ± .030 LINEAR .XXX ± .010 ANGULAR ± .50° DIMENSIONS IN INCHES	 Wayne Dalton Rolling Door Division 14512 Lincoln Way E Dalton, Ohio 44618
REFERENCE PAGE 1: 701-0542 PAGE 3: 701-0544			MATERIAL AS SHOWN	SCALE - WHEN THIS BOX IS .50" HIGH AS SHOWN	ORIGINAL RELEASE PCR #D-00052		
THIS DRAWING IS THE PROPERTY OF WAYNE DALTON AND IS LOANED WITH THE EXPRESSED AGREEMENT THAT THE DRAWINGS AND INFORMATION THEREIN CONTAINED ARE THE PROPERTY OF WAYNE DALTON AND WILL NOT BE REPRODUCED, COPIED, OR OTHERWISE DISPOSED OF, DIRECTLY OR INDIRECTLY, AND WILL NOT BE USED IN WHOLE OR IN PART TO ASSIST IN MAKING OR TO FURNISH ANY INFORMATION FOR THE MAKING OF DRAWINGS, PRINTS, OR OTHER REPRODUCTION THEREOF, OR FOR THE MAKING OF APPARATUS OR PARTS THEREOF, EXCEPT UPON WRITTEN PERMISSION OF WAYNE DALTON FIRST OBTAINED AND SPECIFIC AS TO EACH CASE. THE ACCEPTANCE OF THIS DRAWING WILL BE CONSTRUED AS AN ACCEPTANCE OF THE FOREGOING AGREEMENT.							
SIZE B		DRAWING NO. 701-0543				REVISION 01	



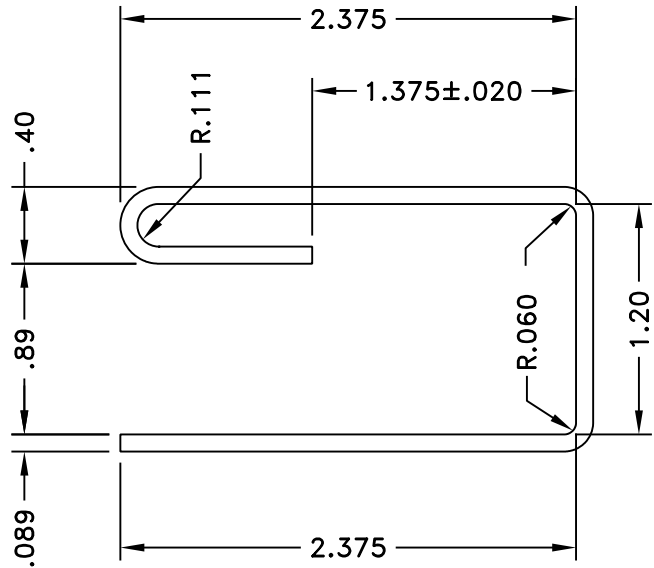
STEEL JAMB
1/8" MIN THICKNESS
5/16-12 x 1.00 TEK SCREW



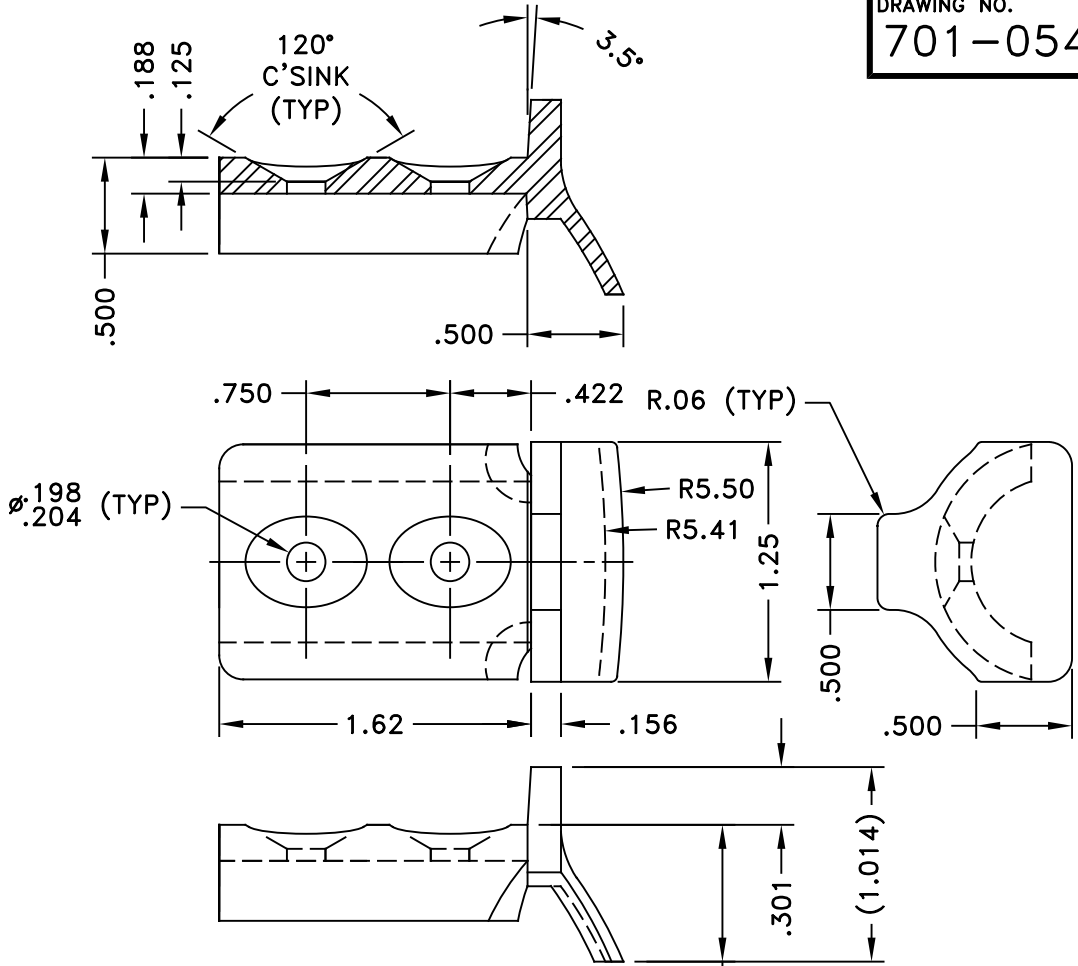
MASONRY JAMB #1
GROUT FILLED BLOCK, 3000PSI MIN GROUT
3/8 x 5.00 KINGPIN WEDGE ANCHOR



MASONRY JAMB #2*
CONCRETE, 3000PSI MIN
3/8 x 5.00 KINGPIN WEDGE ANCHOR

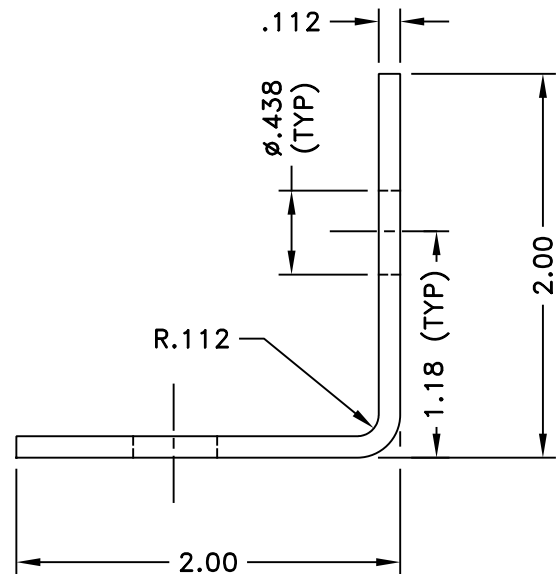


G-GUIDE DETAIL
SCALE = FULL



WINDLOCK DETAIL
SCALE = FULL

JAMB DETAIL
SCALE = NONE



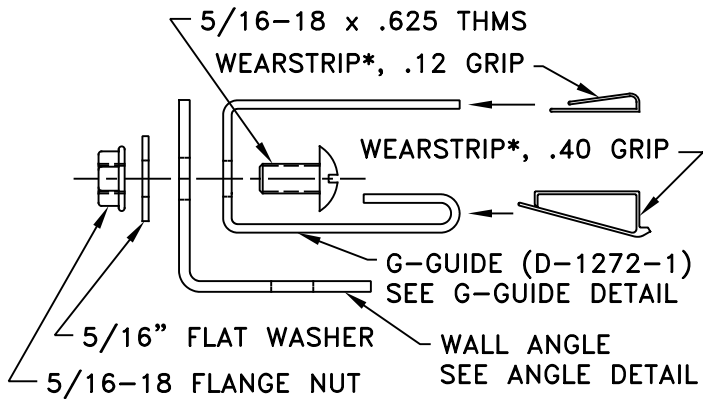
ANGLE DETAIL
SCALE = FULL

TEST	TEST REPORT NUMBER
UNIFORM STATIC AIR PRESSURE	HETI-01-1115
	HETI-01-1117
LARGE MISSILE IMPACT	HETI-01-1114
	HETI-01-1118
TENSILE	HETI-01-T111
	HETI-01-T112

NOTE:

1. UNIFORM STATIC AIR PRESSURE TESTS PERFORMED PER ASTM E330-90
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4. ALL TESTING PERFORMED BY HURRICANE ENGINEERING & TESTING INC.

*DENOTES UNTESTED CONFIGURATIONS APPROVED BY SIMILARITY



GUIDE ASSEMBLY DETAIL
SCALE = 1:2

PART NUMBER ZZ_____		WEIGHT (LB.) .	TITLE MINI WINDLOAD TEST CONSTRUCTION COMPONENT DETAILS		DRAWN BY M. DAUS 12/10/2001	CHECKED BY A. STEIDL 12/17/2001	APPVD. BY D. MONSOUR 12/17/2001	TOLERANCES (UNLESS OTHERWISE SPECIFIED) LINEAR .X ± .060 LINEAR .XX ± .030 LINEAR .XXX ± .010 ANGULAR ± .50° DIMENSIONS IN INCHES		Wayne Dalton Wayne Dalton Rolling Door Division 14512 Lincoln Way E. Dalton, Ohio 44618		
REFERENCE PAGE 1: 701-0542 PAGE 2: 701-0543					MATERIAL AS SHOWN		SCALE - WHEN THIS BOX IS .50" HIGH AS SHOWN					ORIGINAL RELEASE PCR #D-00052
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REV.	REV. BY	APPVD. BY	RELEASE	DESCRIPTION
01	MED 08/08/02	DLM 08/21/02	PCR#D-00052	ADDED TEST NUMBERS AND REV PROTOCOLS
REVISIONS				

HURRICANE ENGINEERING & TESTING INC.

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

Large Missile Impact Test

December 4th, 2001.

REPORT NUMBER:

HETI-01-1118

MANUFACTURER:

Wayne-Dalton Door Systems Division.
2589 Country Road 168, Dundee, OH 44624

TEST LOCATION:

Hurricane Engineering & Testing Inc.
8532 NW 64 Street Miami, FL 33166

SBCCI LISTING No.:

TL - 9596A

LAB. CERTIFICATION NUMBER:

01-0417.03 (MIAMI-DADE COUNTY, FLORIDA)

PRODUCT:

Rolling Door

MODEL:

Mini DS-75

PRODUCT DESCRIPTION:

0.018" thick steel
(Tensile Test Report No. HETI-01-T111)

PRODUCT SIZE:

120" w x 96"h (size of opening)

DRAWING NUMBERS:

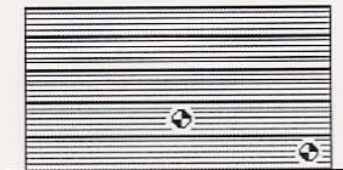
701-0542-2, 701-0543-2 and 701-0544-2 by Wayne-Dalton
Rolling Door Division. Dated 12-10-01.

NOTE:

HETI stamped drawing is an integral part of this report.

TEST WITNESSED BY:

Syed Waqar Ali, Ph. D. (HETI)
Mr. Leonardo D. Savini, E.I. (HETI)
Mr. Eddy Philippe (HETI)



*Typical impact locations of all samples.
Not to scale.*

Construction Details

PRODUCT MODEL **Rolling Door**
Mini DS-75

PRODUCT SIZE(S) 126 3/4" w x 110 3/8" (excluding roll).
120" w x 96" h (size of opening).

SPECIAL NOTE Inrolled. The panels were located @ 19" O.C. vertically and joined with a continuous horizontal seam that consisted of a 1/4" to 3/8" fold in the top and bottom of every panel.

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BOTTOM ANGLE	ONE	1 1/2" X 1 1/2" X 124" X 12 GA	(2) (CARRIAGE BOLT) AND NUT PER END. SPACING = 5 1/2" O.C. EDGE DISTANCE = 4 7/8". SEE HANDLE FOR CENTER.
TRACK	TWO	2.44" W X 1.41" D X 98 3/4" H X 13 GA. ONE SIDE 1" DOUBLED	(8) (5/16" BOLT & FLANGE NUT) @ 12" O.C. START 6" FROM BOTTOM CONNECTED TO TRACK ADAPTER ANGLE.
TRACK ADAPTER ANGLE	ONE PER TRACK	2" X 2" X 103 1/2" H x 12 GA	SEE INSTALLATION

All steel components unless specified otherwise.

HARDWARE

- | | |
|----------------|---|
| Locks | (1) The lock was located @ 38" from the bottom of the door and was engaged but not secured with any lock or pin. The lock consisted of two 13 GA steel parts. The acting part (throw) was 9 3/8" long x 1 7/8" h. The part fixed to the section was 9 1/2" wide x 3.16" h and was fastened with two (carriage bolts) and nuts @ 6 1/2" O.C. |
| Handle | (1) Located at midspan of the bottom angle and fastened with two (carriage bolts) which were inserted through the bottom angle, the bottom angle galv. steel sheet and the handle. Then, one flange nut per bolt was installed. |
| Counterbalance | The door was mounted with a wound spring mechanism. |

INSTALLATION

JAMB SUBSTRATUM One side 1/8" thick steel and one side grout filled masonry blocks.

<i>Connection</i>	<i>Fastener Type</i>	<i>Quantity</i>	<i>Spacing</i>
track adapter angle - masonry substratum	3/8" x 5" Kingpin Wedge Anchor	8 per angle	12" O.C. starting 6" from bottom
track adapter angle - steel substratum	5/16"-12 x 1" Tek	8 per angle	12" O.C. starting 6" from bottom

The track angle was connected to the substratum prior to connecting it to the track.

The track adapter angle fasteners were located behind the track.

Test Results

Large Missile Impact Test Results

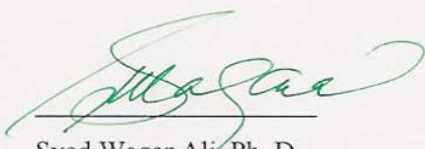
<i>Impact Location</i>	<i>Speed (feet per second)</i>	<i>Deflection max. (inches)</i>	<i>Permanent Set (inches)</i>
Sample I			
1) Center inrolled	50	7 3/4	2 1/4
2) Corner inrolled	50	5	4
Sample II			
1) Center inrolled	50	6 7/8	2 3/8
2) Corner inrolled	50	6 1/2	4 1/2
Sample III			
1) Center inrolled	50	6 7/8	2 3/8
2) Corner inrolled	50	6 1/8	4 7/8

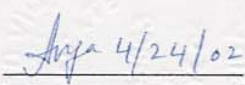
The samples were impacted with a #2 Southern Yellow Pine S4S, 2 x 4 missile, 9 lbs 96" long.

Conclusion

The system was tested in accordance with Miami-Dade County Protocols PA 201 with no deviations. The samples were structurally intact and operational and all parts were securely in place at the conclusion of each test.

NOTE: The above results were obtained using the designated test methods which indicates 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


Arshad Viqar, P.E.
Engineer of Record

HURRICANE ENGINEERING & TESTING INC.

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

Tensile Test

December 11th, 2001

REPORT NUMBER: **HETI-01-T112**

MANUFACTURER: Wayne-Dalton Corporation
3395 Addison Dr., Pensacola, FL 32514

TEST LOCATION: Hurricane Engineering & Testing Inc.
8532 NW 64 St., Miami, Florida 33166

LAB. CERTIFICATION: No. 01-0417.03

SBCCI LISTING No.: TL - 9596A

TEST EQUIPMENT: Accutek (tensile test)

PRODUCT: 9' Rolling door
MODEL DS-75

SOURCE: Samples collected by HETI from tested samples in referenced tests

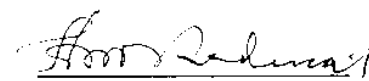
MATERIAL: **SECTION SKIN**
Reference Test Report Number(s):
HETI-01-1114
HETI-01-1115

COMMENT: Tested as per ASTM E 8 - 96, current revision

Test Results

Sample (No.)	Width (in)	Thickness (in)	Area (in ²)	Ultimate Load (lbs)	Ultimate Stress (psi)	Yield Stress (psi)	Elong- ation (%)	Hardness Rockwell B Scale
1	0.5100	0.01710	0.00872	565	64,786	64,576	16	67
2	0.5100	0.01710	0.00872	577	66,162	63,289	12	67
3	0.5100	0.01710	0.00872	586	67,194	65,022	13	67
Average				576	66,047	64,296	14	67

Hardness not measured due to embossment.


Hector M. Medina, P.E.
Resident Engineer

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

4/15/02

HURRICANE ENGINEERING & TESTING INC.

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

Tensile Test

December 11th, 2001

REPORT NUMBER: **HETI-01-T111**

MANUFACTURER: Wayne-Dalton Corporation
3395 Addison Dr., Pensacola, FL 32514

TEST LOCATION: Hurricane Engineering & Testing Inc.
8532 NW 64 St., Miami, Florida 33166

LAB. CERTIFICATION: No. 01-0417.03

SBCCI LISTING No.: TL - 9596A

TEST EQUIPMENT: Accutek (tensile test)

PRODUCT: 10' Rolling door
MODEL DS-75

SOURCE: Samples collected by HETI from tested samples in referenced tests

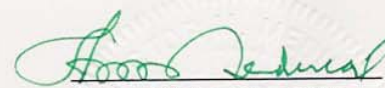
MATERIAL: **SECTION SKIN**
Reference Test Report Number(s):
HETI-01-1117
HETI-01-1118

COMMENT: Tested as per ASTM E 8 - 96, current revision

Test Results

Sample (No.)	Width (in)	Thickness (in)	Area (in ²)	Ultimate Load (lbs)	Ultimate Stress (psi)	Yield Stress (psi)	Elong- ation (%)	Hardness Rockwell B Scale
1	0.5100	0.01710	0.00872	577	66,162	63,639	16	66
2	0.5100	0.01710	0.00872	584	66,965	64,415	17	67
3	0.5100	0.01710	0.00872	589	67,538	61,126	17	67
Average				583	66,888	63,060	17	67

Hardness not measured due to embossment.


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Resident Engineer

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