



PERFORMANCE TEST REPORT

Rendered to:

WAYNE DALTON CORPORATION

PRODUCT: Series 800 Steel Rolling Garage Door

Report No: ATI-18315-5
Report Date: 04/03/97
Revised Report Date: 10/20/97
Expiration Date: 03/14/05
Dade County Notification No: ATI96076



PERFORMANCE TEST REPORT

Rendered to:

WAYNE DALTON CORPORATION
P.O. Box 67
Mt. Hope, Ohio 44660

Report No: ATI-18315-5

Test Date: 01/06/97

thru: 03/14/97

Report Date: 05/01/01

Expiration Date: 03/14/05

Dade County Notification No: ATI96076

Project Summary: Architectural Testing, Inc. (ATI) was contracted by Wayne Dalton Corporation to perform testing per Dade County Protocols PA 201-94, PA 202-94, and PA 203-94. The tests were performed upon steel rolling garage doors. The samples tested met the performance requirements set forth in each of the protocols for a 56 psf *Design Load Rating*.

Test Procedure: The test specimens were evaluated in accordance with Dade County Building Code Compliance Office Protocols PA 201-94, *"Impact Test Procedures"*; PA 202-94, *"Criteria for Testing Impact and Non Impact Resistant Building Envelope Components Using Uniform Static Air Pressure"*; and PA 203-94, *"Criteria For Testing Products Subject To Cyclic Wind Pressure Loading."*

Test Specimen Description:

Product: Series 800 Steel Rolling Garage Door

Door Opening: 22' 0" wide by 10' 0" high

Distance Between Guides: 22' 0-1/2"

Overall Size: 22' 11" wide by 11' 9" high

General Description:

Three identical steel rolling doors were tested. The doors are referenced throughout this report as Test Unit #1, #2, and #3.

Test Units #2 and #3 were tested to PA 201-94 (Impact) and PA 203-94 (Cyclic Wind Loads) only. Test Unit #1 was tested to PA 202-94 (Wind Loads), PA 201-94, and PA 203-94. Test Unit #1 was installed onto steel jambs, Test Unit #2 was installed onto concrete column jambs, and Test Unit #3 was installed onto grout filled CMU jambs.

130 Derry Court
York, PA 17402-9405
phone: 717.764.7700
fax: 717.764.4129
www.testati.com

Allen N. Remer
1 MAY 2001



General Description: (Continued)

The doors were constructed from 20 gauge steel slats and used alternating type 14FW and 14JW windlocks at each end of the slats, which were riveted to the slats (2 rivets per end). The slat profile measured 3" overall. The hood and roller assembly was tested to qualify an interior or exterior mounting configuration. The doors were operated via a compound chain operator. There were four types of anchorage tested. The steel jamb conditions were as follows: the left jamb used dual welds (5/16" x 1" long) located in the slot and adjacent edge of the 3" x 3" x 1/2" angle. The spacing of the welds were located on 15" centers. The right jamb was drilled and tapped into the steel jamb. The 3" x 3" x 1/2" angle was attached to the steel jamb using a 5/8" grade 5 HHCS bolt. The spacing of the bolts was 15" on center. The concrete jambs condition employed a 5/8" multi-set (2-1/2" long) anchor located on 15" centers. The grout filled CMU block jambs used 5/8" sleeve anchors (2-1/2" long) located on 15" centers.

There were two guide track assemblies utilized. A "masonry" guide assembly (used on concrete and grout-filled CMU jambs) was constructed using three angles; a 3" x 3" x 1/2" angle for connection to the jamb substrate, a 2-1/2" x 2" x 3/8" angle with a 1" x 3/8" square edge bar welded to the 2-1/2" face and a 3-1/2" x 3" x 1/4" angle created the track. The angles were connected into the masonry guide configuration using 5/8" x 1-3/4" HHCS (Grade 5) nuts and bolts located on 15" centers. (Refer to Drawing #2 of 2 for detail.) A "steel" guide assembly (used on steel jambs) was constructed using three steel angles; a 3" x 3" x 1/2" angle for connection to the jamb substrate, a 2-1/2" x 2" x 3/8" angle with a 1" x 3/8" square edge bar welded to the 2-1/2" face and a 4" x 3" x 1/4" angle created the track. The angles were connected into the steel guide configuration using 5/8" x 1-3/4" Grade 5 HHCS nuts and bolts located on 15" centers. (Refer to Drawing #2 of 2 for detail.)

Refer to the attached drawings for additional information regarding door construction and installation details.

Test Results: The following results have been recorded:

Protocol PA 201-94: "Impact Test Procedures"

Missile weight: 8.9 lbs

Muzzle distance from test specimen: 17 ft.

Test Unit #1 (Steel Jambs/Left Jamb Welded/Right Jamb Drilled and Tapped as Shown on Drawings)

Impact #1: Missile Velocity: 50.1 fps

Impact Area¹: Center of hood (coilside elevation)

Observations²: No separation; - Passed

Impact #2: Missile Velocity: 49.8 fps

Impact Area¹: Center of door

Observations²: No separation; - Passed

Allen M. Rivera
1 MAY 2001



Test Results: (Continued)

Protocol PA 201-94: (Continued)

Missile weight: 8.9 lbs

Muzzle distance from test specimen: 17 ft.

Test Unit #2 (Concrete Jambs/5/8" Sleeve Anchors at Both Jambs as Shown on Drawings)

Impact #1: Missile Velocity: 49.5 fps

Impact Area¹: Center of door (flush side)

Observations²: No separation; - Passed

Impact #2: Missile Velocity: 50.0 fps

Impact Area¹: Lower left corner of door (flush side)

Observations²: No separation; - Passed

Test Unit #3 (Grout Filled CMU Jambs/Both Jambs Used 5/8" Multi-Set Bolts as Shown on Drawings)

Impact #1: Missile Velocity: 50.3 fps

Impact Area¹: Center of door (flush side)

Observations²: No separation; - Passed

Impact #2: Missile Velocity: 50.0 fps

Impact Area¹: Lower right corner of door (flush side)

Observations²: No separation; - Passed

¹Refer to ATI Drawing No. 1, 2, and 3 for specific location areas.

²A particular system of construction shall be deemed to comply with this recommended practice if three test specimens reject the two missile impacts without penetration and resist the cyclic pressure loading with no crack forming longer than five inches and 1/16" wide through which air can pass. (Reference SFBC; Section 2315.2, Paragraph h.)

Allen M. Reuser
1 MAY 2001



Test Results: (Continued)

Protocol PA 202-94: "Static Air Pressure Tests"

Note: Polyethylene film and tape were used in a manner that did not influence the test results. All deflection measurements were taken at the horizontal midspan of the doors.

Test Data				
	Load (psf)	Midspan Deflection	Permanent Set	Percent Recovery
Half Test Load	+42.0	14.49"	0.22"	99%
Design Load	+56.0	15.66"	0.39"	98%
Test Load	+84.0	17.53"	0.49"	97%
Half Test Load	-42.0	15.04"	0.17"	99%
Design Load	-56.0	15.95"	0.31"	98%
Test Load	-84.0	17.41"	0.39"	98%

Protocol PA 203-94: "Cyclic Wind Pressure Loading"

Table 23F "Fatigue Loading Sequence" Section 2314.5, South Florida Building Code.

Design Load: 56 psf

Maximum Allowed Cycle Time: 54 seconds

Test Unit #1
(Steel Jambs)

INWARD ACTING

PRESSURE RANGE	NO. OF CYCLES	AVG. CYCLE TIME	MAXIMUM DEFLECTION	PERMANENT ¹ SET
0 psf to +28 psf	600	15.7 sec.	13-5/16"	---
0 psf to +34 psf	70	16.0 sec.	13-3/4"	---
+73 psf	1	27.0 sec.	16-5/16"	5/16"

OUTWARD ACTING

PRESSURE RANGE	NO. OF CYCLES	AVG. CYCLE TIME	MAXIMUM DEFLECTION	PERMANENT ¹ SET
0 psf to -28 psf	600	25.1 sec.	13-1/2"	---
0 psf to -34 psf	70	22.0 sec.	14"	---
-73 psf	1	29.1 sec.	16-1/2"	5/16"

Allen N. Rivera
1 MAY 2001



Test Results: (Continued)

Protocol PA 203-94: (Continued)

Design Load: 56 psf

Test Unit #2
(Concrete Jams)

INWARD ACTING

PRESSURE RANGE	NO. OF CYCLES	AVG.CYCLE TIME	MAXIMUM DEFLECTION	PERMANENT ¹ SET
0 psf to +28 psf	600	23.1 sec.	11"	---
0 psf to +34 psf	70	27.6 sec.	12-1/8"	---
+73 psf	1	36.0 sec.	14"	1/8"

OUTWARD ACTING

PRESSURE RANGE	NO. OF CYCLES	AVG.CYCLE TIME	MAXIMUM DEFLECTION	PERMANENT ¹ SET
0 psf to -28 psf	600	25.4 sec.	11-3/8"	---
0 psf to -34 psf	70	38.3 sec.	12-1/2"	---
-73 psf	1	45.0 sec.	14-1/16"	1/8"

Design Load: 56 psf

Test Unit #3
(Grout Filled CMU Jams)

INWARD ACTING

PRESSURE RANGE	NO. OF CYCLES	AVG.CYCLE TIME	MAXIMUM DEFLECTION	PERMANENT ¹ SET
0 psf to +28 psf	600	23.1 sec.	14-5/8"	---
0 psf to +34 psf	70	27.6 sec.	15-1/8"	---
+73 psf	1	36.0 sec.	16-1/4"	1/8"

OUTWARD ACTING

PRESSURE RANGE	NO. OF CYCLES	AVG.CYCLE TIME	MAXIMUM DEFLECTION	PERMANENT ¹ SET
0 psf to -28 psf	600	25.4 sec.	12-5/8"	---
0 psf to -34 psf	70	38.3 sec.	12-13/16"	---
-73 psf	1	45.0 sec.	15-3/8"	1/16"

Note: Following all testing, all three doors remained operable, and all anchors were intact.

Allen M. Ruelas
1 MAY 2001



Test Equipment:

Cannon: Constructed from PVC pipe utilizing compressed air to propel the missile(s)

Missile(s): 2 by 4 Southern Pine

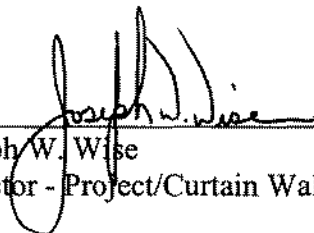
Timing Device: Electronic Beam Type

Cycling Mechanism: Computer driven squirrel cage blower with electronic pressure measuring device

Deflection Measuring Device: Linear transducers and tape measure with 1/16" graduations

Representative samples of the test specimen and a copy of this report will be retained by ATI for a period of eight years. This report is the exclusive property of the client so named herein and is applicable to the sample tested. Results obtained are tested values and do not constitute an opinion or endorsement by this laboratory.

For ARCHITECTURAL TESTING, INC.:



Joseph W. Wise
Director - Project/Curtain Wall Testing

JWW:cat:nlb
18315-5



Allen N. Reeves, P.E.
Director of Engineering Services
1 MAY 2001



DOCUMENT CONTROL ADDENDUM ATI-18315

Current Issue Date: 05/01/01

Report No.: ATI-18315

Requested by: David Monsour, Wayne Dalton Corporation

Purpose: PA 201-94 and PA 203-94 Metro Dade County testing of Series 800, steel rolling garage door.

Issued Date: 04/03/97

Comments:

Report No.: ATI-18315-1

Requested by: David Monsour, Wayne Dalton Corporation

Purpose: Revise Report No ATI-18315.

Issued Date: 10/20/97

Comments: Page 1, Test Specimen Description, added additional information to General Descriptions section.

Replaced drawings.

Report No.: ATI-18315-2

Requested by: David Monsour, Wayne Dalton Corporation

Purpose: Tensile strength testing of steel coupons

Issued Date: 04/10/97

Comments:

Report No.: ATI-18315-3

Requested by: David Monsour, Wayne Dalton Corporation

Purpose: Summary of original report ATI-18315 (56 psf design load)

Issued Date: 02/04/98

Comments:

Report No.: ATI-18315-4

Requested by: David Monsour, Wayne Dalton Corporation

Purpose: Summary of original report ATI-18315 (56 psf design load)

Issued Date: 02/04/98

Comments:

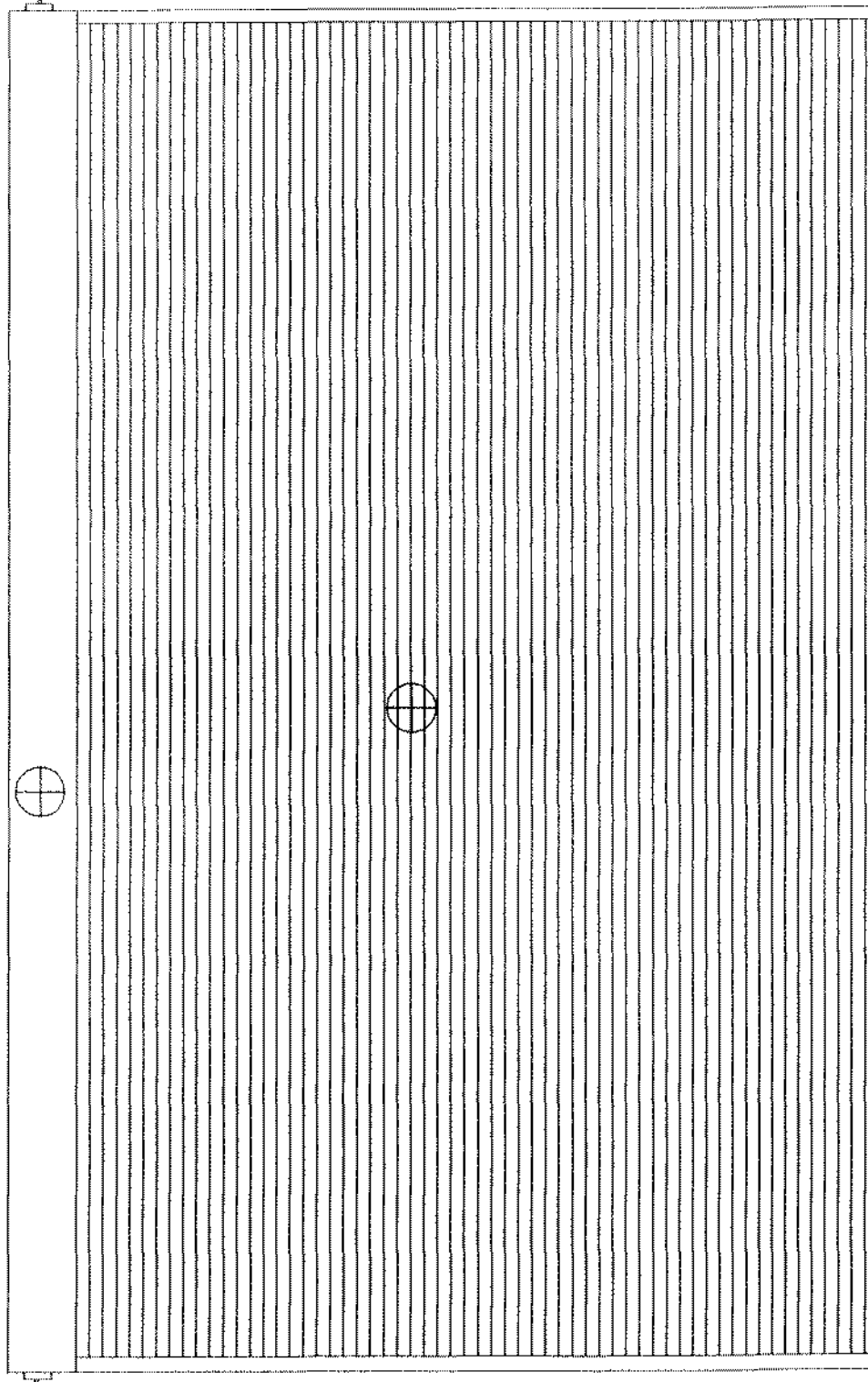
Report No.: ATI-18315-5

Requested by: David Monsour, Wayne Dalton Corporation

Purpose: Revise Report No. ATI-18315-1 dated 10/20/97

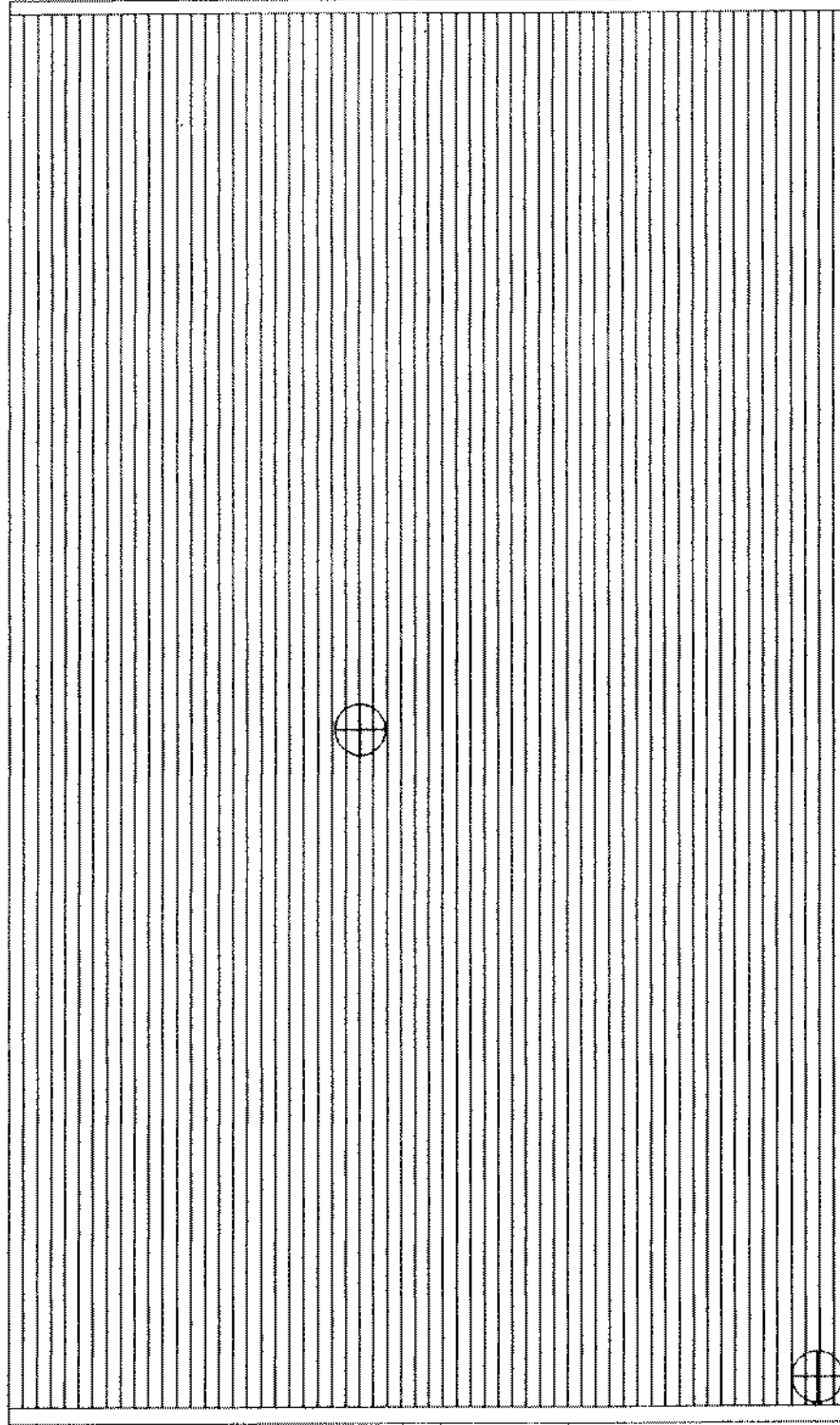
Issued Date: 05/01/01

Comments: Corrected Expiration date from "03/14/01" to "03/14/05".



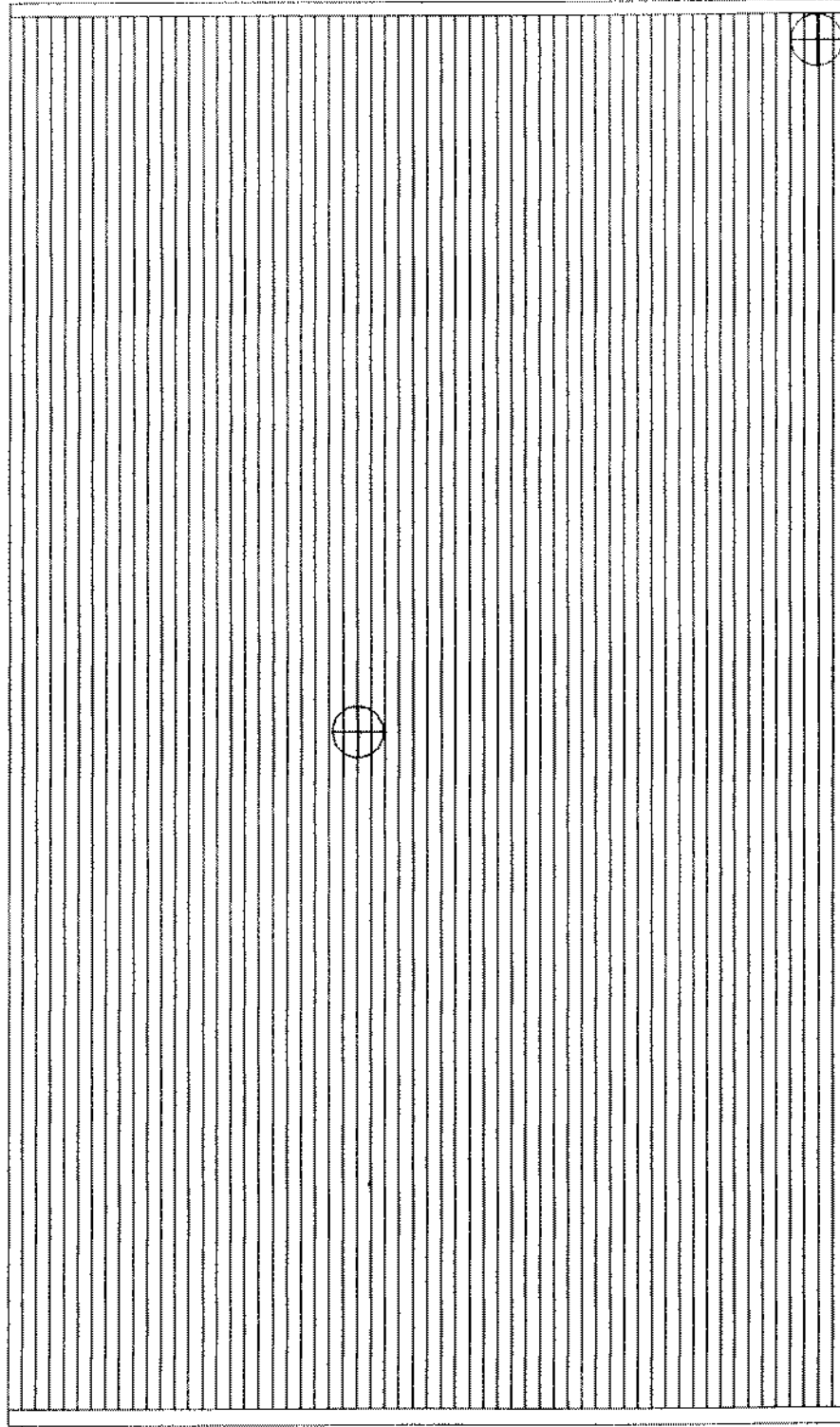
DRAWING NO. 1 / STEEL JAMBS

PROJECT NO. 18315-1	PROJECT NAME SERIES 800 STEEL ROLLING DOOR	ARCHITECTURAL TESTING INC.	DRAWING IMPACT AREAS	DWG BY: JWW DATE: 04/01/99	SHEET 1/2
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DRAWING NO. 2 / CONCRETE JAMBS

PROJECT NO. 18315-1	PROJECT NAME SERIES 800 STEEL ROLLING DOOR WAYNE DALTON	ARCHITECTURAL TESTING INC.	DRAWING IMPACT AREAS	DWG BY: JMW DATE: 04/01/97	SHEET 4/5
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DRAWING NO. 3 / GROUT FILLED CMU JAMBS

PROJECT NO.

18315-

PROJECT NAME

SERIES 800 STEEL ROLLING DOOR

CLIENT

WAYNE DALTON

ARCHITECTURAL
TESTING INC.

DRAWING

IMPACT AREAS

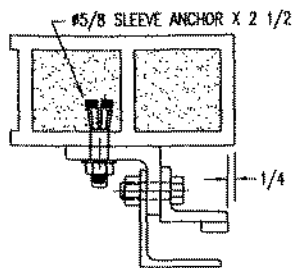
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DATE

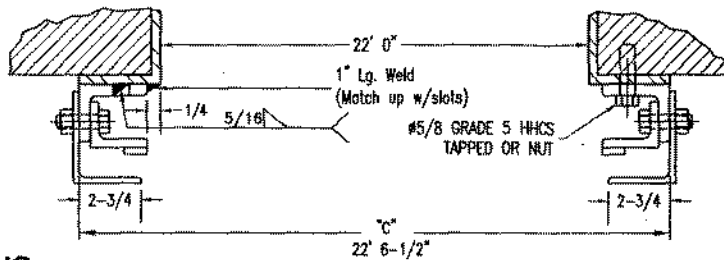
04/01/97

SHEET

3/3

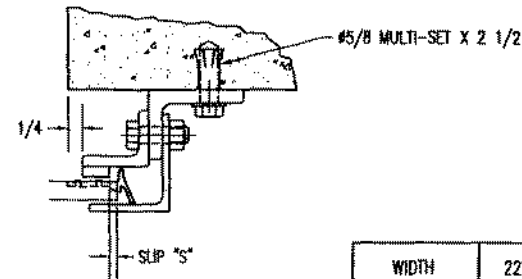


GROUT FILLED BLOCK



STEEL

MOUNTING DETAIL



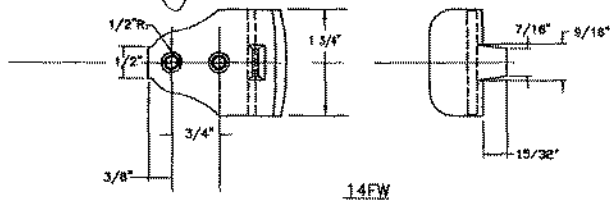
CONCRETE

ARCHITECTURAL TESTING, INC.

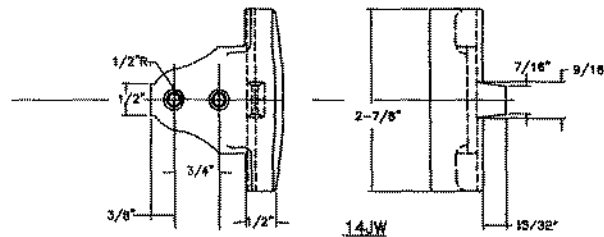
Test specimen complies with these details
any deviation is noted

Proj. AT- 18315-1 Test Date 03/14/97

Initials

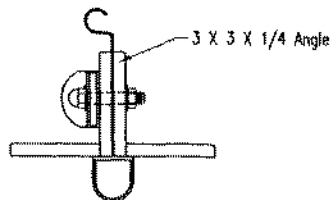


14FW

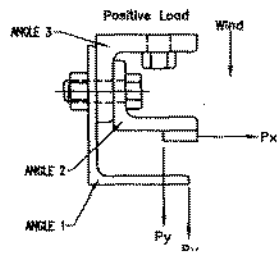


14JW

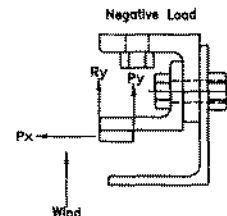
WINDLOCK DETAIL



VIEW X-X
(SEE DETAIL 1)

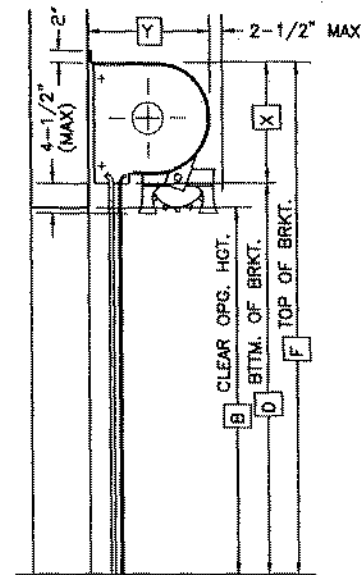


FORCES DETAIL



WIDTH	22'	16'	14'	12'	10'
SLIP "S"	1/2"	3/8"	3/8"	1/4"	1/8"
ANGLE 1	1/4"	1/4"	1/4"	1/4"	1/4"
ANGLE 2	3/8"	3/8"	3/8"	3/8"	3/8"
ANGLE 3	1/2"	1/2"	1/2"	3/8"	3/8"
ASSEMBLY BOLT	5/8"	5/8"	5/8"	5/8"	1/2"
ASSEMBLY BOLT SPACING	1'-3"	1'-6"	2'-0"	2'-0"	2'-0"
MOUNTING BOLT MASONRY	5/8"	5/8"	5/8"	5/8"	5/8"
MOUNTING BOLT STEEL	5/8"	5/8"	5/8"	5/8"	5/8"
MOUNTING BOLT SPACING-STEEL	1'-3"	1'-3"	1'-6"	2'-0"	2'-0"
WELD SPACING STEEL	1'-3"	1'-3"	1'-6"	2'-0"	2'-0"
SLEEVE ANCHOR SPG.-CONCRETE	1'-3"	1'-3"	1'-3"	1'-3"	1'-3"
MULTI-SET SPG.-CONCRETE	1'-3"	1'-3"	1'-6"	2'-0"	2'-0"
Px (LBS/FT)	5876	3911	2972	2842	2543
Py (LBS/FT)	889	599	486	382	284
Ry (LBS/FT)	924	672	588	504	420

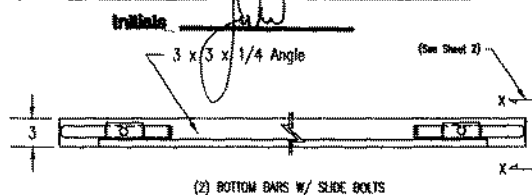
Wayne Dalton	Rolling Door Division		
			
ROLLING SERVICE DOOR		MODEL : 800	
PROJECT :			
DADE COUNTY TESTING			
DRAWN BY:	DLS	ENG:	DATE:
		AE	3/31/97

COILSIDE ELEVATION

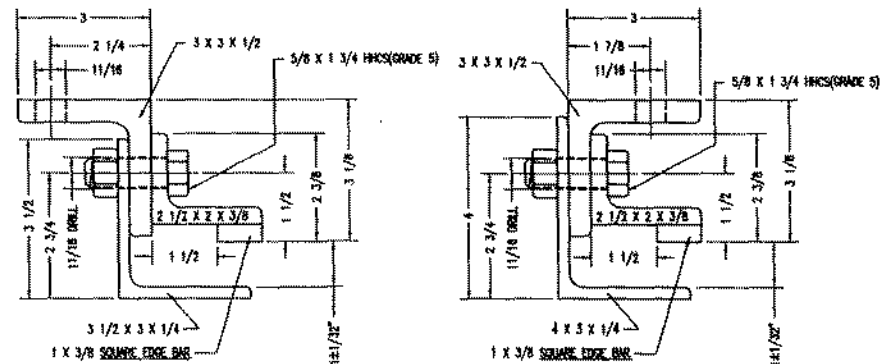
VERTICAL SECTION

Test specimen complies with these details
any deviation is noted

Proj. AT- 18315-1 Test Date 03/14/97



BOTTOM BAR DETAIL



MASONRY GUIDE

STEEL GUIDE

HAND OF OPER.	WIDTHS		HEIGHTS			FOR BRACKET		SLAT LENGTH	B.B. LENGTH
	A	C	B	D	F	X	Y		
RH	22'0"	22'6-1/2"	10'0"	10'2"	11'8-1/2"	18-1/2"	17"	22'3-1/2"	22'3-1/2"

1. Design pressure = ± 56 P.S.F.
2. This door shall be tested according to Dade County protocols PA 201,202, and 203 for each jamb and fastener condition noted on this drawing.
3. All welding to conform to American Welding Society's latest edition and the South Florida Building Code. Use A.W.S. A5.1 or A5.5 E70xx electrodes.
4. The contractor shall ensure that the wall can support the jamb forces indicated on this drawing
5. Windlocks on both ends of every slot, 14FW and 14JW alternately.
6. Bottom bar is galvanized steel, double angle with astragal. Guides are three angle structural steel. Hoods are 24 Ga. galvanized steel. Shop coat of rust inhibitive primer on nongalvanized steel surfaces.
7. All galvanizing is done per ASTM. A-525 standards.
8. Door is operated by means of reduction gears or roller chain sprockets, with lift effort not to exceed 25 lbs.
9. Galvanized hand chain furnished with padlockable chain keeper.

COMPONENT	SPEC.	MIN. YIELD (PSI)
Slot material	SQ Steel Grade C ASTM A-653	40,000 work hardened
Guide angles	ASTM A-36	36,000
Windlocks	Malleable Iron	1800 lbs
Windlock bar	Cold Rolled	36,000
Bottom bar material	ASTM A-36	36,000
Assembly bolts	Grade 5	92,000 Min.
Cherry "N" rivets	1F1-114 standards	940 lbs Tension

Wayne Dalton

Rolling Door Division



ROLLING SERVICE DOOR MODEL : 800

PROJECT :

DADE COUNTY TESTING

DRAWN BY:	DLS	ENG:	AE	DATE:	3/31/97
FLORIDA P.E.:	DLM	DWG. NO.	DC-3A-22	1 OF 2	