



Architectural Testing

PERFORMANCE TEST REPORT

Rendered to:

WAYNE-DALTON CORPORATION
Door and Systems Division

Model DS-350 Square
16'x 8'

Report No:	01-46385.03
Test Date:	09/08/03
Report Date:	11/13/03
Expiration Date:	09/08/07

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

PERFORMANCE TEST REPORT

Rendered to:

WAYNE-DALTON CORPORATION
Door and Systems Division
1 Door Drive
Mount Hope, Ohio 44660

Report No: 01-46385.03

Test Date: 09/08/03

Report Date: 11/13/03

Project Summary: Architectural Testing, Inc. (ATT) was contracted by Wayne-Dalton Corporation to perform wind load testing per ASTM E 330-97. The test was performed upon a Model DS-350 Square commercial roll-up sheet door. The door was 16' wide by 8' high. The door was tested to a +/-34.0 psf design pressure. This report includes test data and drawings.

Test Procedure: The test specimen was evaluated in accordance with ASTM E 330-97, *Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference*. Testing was conducted at positive and negative loads as listed in the test results.

General Description: The steel test chamber provided a clear opening measuring 16' 0" wide by 8' 0" high. Two jamb conditions were provided. Steel tube with a 5/16" wall thickness was utilized on the left jamb and a 3,000 psi grout filled concrete block column for the right jamb. The head was comprised of two 12" steel channels that were stacked and welded.

Test Specimen:

Product: Model DS-350 Square commercial roll-up sheet door

Door Opening: 16' 0" wide by 8' 0" high

Assembly Details: "G" guides were utilized for both the steel and the grout filled concrete block jambs. The guide anchor spacing was 6" from the bottom and 12" on center thereafter for the steel and the grout filled concrete block jambs. The curtain was fabricated with .018" sheet steel with windlocks on every bead. The windlocks were fastened with two rivets per lock. Reference Wayne-Dalton Drawing # 035-0009 and 035-0012 for these details.

Test Results: The following results have been recorded:

ASTM E 330-97: *"Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference."*

Note: Polyethylene film and tape were used in a manner that did not influence the test results. Deflection was measured at the midspan and ends of the door with linear transducers.

Test Pressure	Duration	Maximum Deflection (Inch) Transducer Number			Permanent Set (Inch) Transducer Number		
		#1	#2	#3	#1	#2	#3
+15.5 psf (1/2 Design)	10 sec	Remove Slack					
+31.0 psf (Design)	10 sec	0.420	10.120	0.330	0.010	0.130	0.010
+47.0 psf (Overload)	10 sec	0.620	12.220	0.410	0.080	0.370	0.010
-15.5 psf (1/2 Design)	10 sec	Remove Slack					
-31.0 psf (Design)	10 sec	0.780	11.940	1.350	0.020	0.040	0.040
-47.0 psf (Overload)	10 sec	0.930	12.840	1.550	0.000	0.050	0.030
-51.0 psf (Overload)	10 sec	0.960	13.020	1.610	0.000	0.030	0.070
+25.5 psf (1/2 Test)	10 sec	Remove Slack					
+51.0 psf (Overload)	10 sec	0.650	12.480	0.440	0.360	0.280	0.280

There was no visible damage and the door was operational at the conclusion of testing.

List of Official Observers:

Mark Daus	Wayne-Dalton Corporation
Michael Mendez	Wayne-Dalton Corporation
Scott Kramer	Architectural Testing, Inc.

ASTM E8-01

Test Method: The test specimens were evaluated in accordance with ASTM E8-01, *Standard Test Methods for Tensile Testing of Metallic Materials*. The test specimens were machined and sized in compliance with section 6.0 of the standard. The specimens were tested using a Satec 50UD Universal Machine with a cross head speed of 0.2 in/min

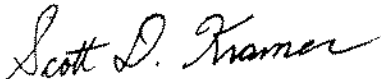
Test Results: The test results are shown on test logs 18857 through 18862 (attached) and summarized in the following table.

Specimen	Yield Strength (psi)	Yield Strain (in/in)	Tensile Load (lbf)	Tensile Strength (psi)	Elongation (%)	Area Reduction (%)
1	37,584	0.0035	518	42,837	27.80	46.30
2	40,478	0.0035	519	46,713	35.00	34.20
3	41,407	0.0033	515	48,625	34.50	36.80
4	40,649	0.0037	520	46,870	35.10	38.70
5	39,279	0.0032	520	46,406	31.50	44.60
6	39,518	0.0038	519	46,791	36.50	35.10
Average	39,819	0.0035	519	46,374	33.40	39.30

The average Tangent Modulus for the tested specimens was 24.8×10^6 psi.

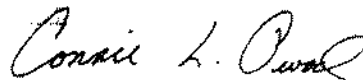
A copy of this report will be retained by ATI for a period of four years. This report is the exclusive property of the client so named herein and is applicable to the samples tested. Results obtained are tested values and do not constitute an opinion or endorsement by this laboratory. This report may not be reproduced except in full without the approval of Architectural Testing.

For ARCHITECTURAL TESTING, INC.:



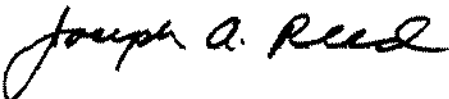
Digitally Signed by: Scott D. Kramer

Scott D. Kramer
Technician



Digitally Signed by: Connie L. Owad

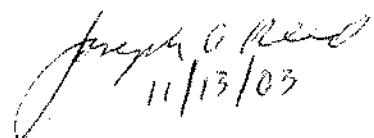
Connie Owad
Technician



Digitally Signed by: Joseph A. Reed

Joseph A. Reed, P.E.
Director - Engineering and Product Testing

SDK:baw
01-46385.03



DOCUMENT CONTROL ADDENDUM #01-46385.00

Current Issue Date: 11/13/03

Report No.: 01-46385.01

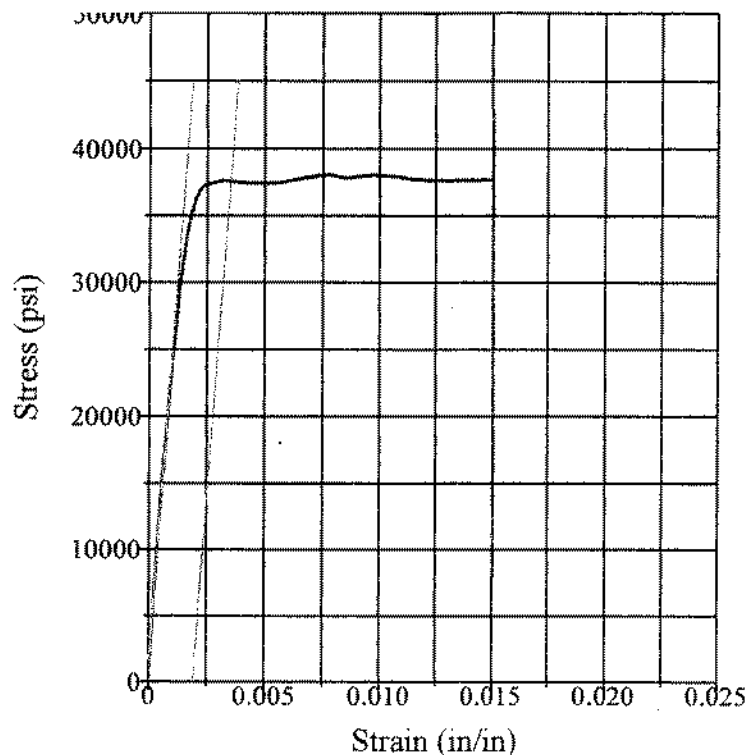
Requested by: Mark Daus, Wayne Dalton Corporation
Purpose: ASTM E 330 testing of Series/Model DS-350, 10' x 8'.
Issued Date: 11/13/03
Comments: Florida P.E. seal required on report.

Report No.: 01-46385.02

Requested by: Mark Daus, Wayne Dalton Corporation
Purpose: ASTM E 330 testing of Series/Model DS-350, 12' x 8'.
Issued Date: 11/13/03
Comments: Florida P.E. seal required on report.

Report No.: 01-46385.03

Requested by: Mark Daus, Wayne Dalton Corporation
Purpose: ASTM E 330 testing of Series/Model DS-350, 16' x 8'.
Issued Date: 11/13/03
Comments: Florida P.E. seal required.

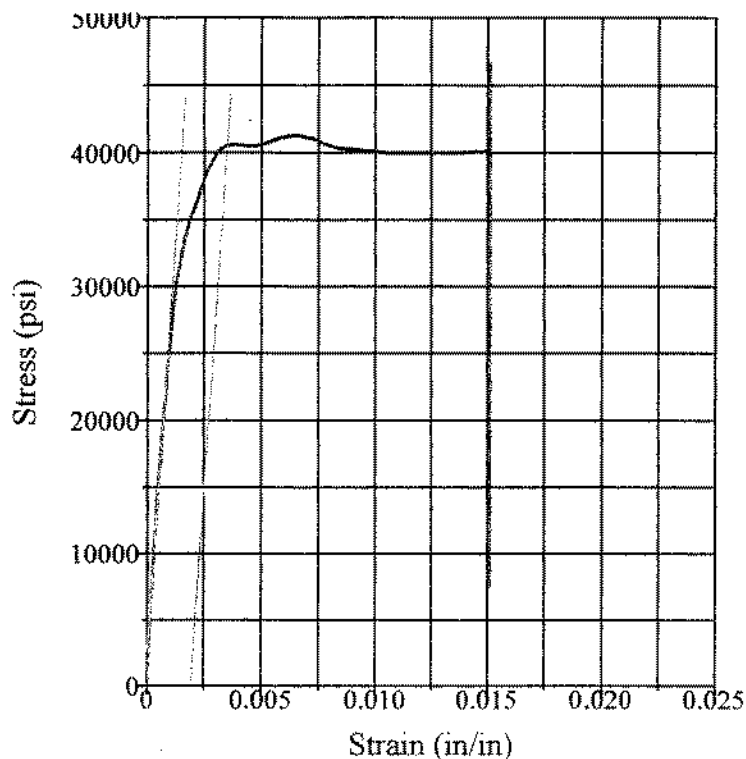


Test Results

Width: 0.5050 in
 After Test Width: 0.3945 in
 Thickness: 0.0240 in
 After Test Thickness: 0.0165 in
 Area: 0.0121 in²
 After Test Area: 0.0065 in²
 Tensile Strength: 42837 psi
 Peak Load: 518 lbf
 Load at Yield: 454.7618 lbf
 Position at Yield: 0.0778 in
 Time at Yield: 0.3926 min
 Strain at Yield: 0.0035 in/in
 Stress at Yield: 37583.6200 psi
 Elongation at Yield: 0.0070 in
 Reduction of Area: 46.3 %
 Total Elongation: 27.8000 %
 Pretest Punch Length: 2.000 in
 Posttest Punch Length: 2.556 in
 Modulus of Elasticity: 23278400 psi

Test Summary

Counter: 18857
 Elapsed Time: 00:03:56
 ATI #: 01-46385
 Client: Wayne Dalton Corporation
 Material Type: Steel Door
 Sample #: 1
 Comments: 16 x 8 Square 120-32
 Procedure Name: ASTM E 8-01, Tensile Testing of
 Start Date: 10/16/03
 Start Time: 1:01:40 PM
 End Date: 10/16/03
 End Time: 1:05:36 PM
 Workstation: Architectural Testing Inc.
 Tested By: Connie

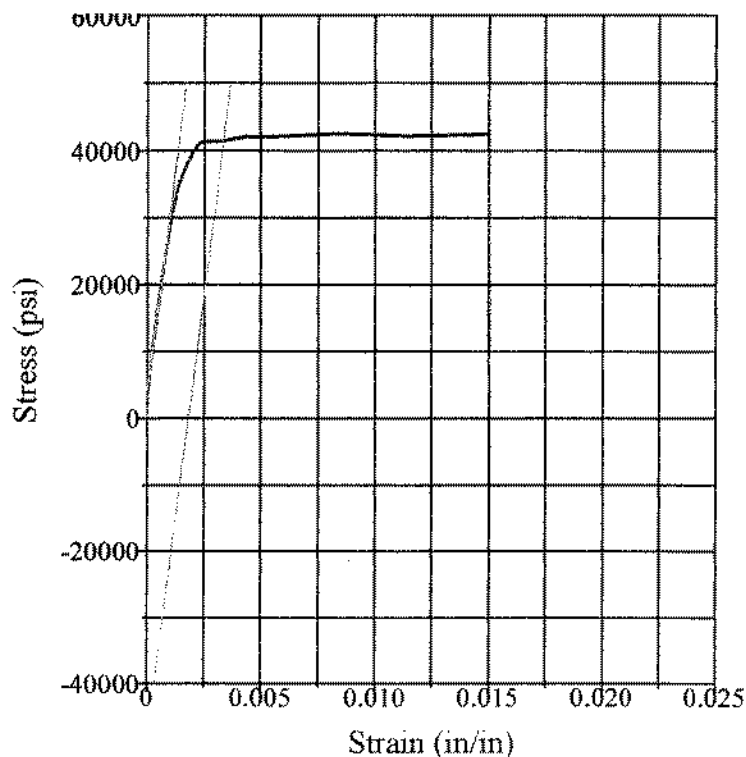


Test Results

Width: **0.5025 in**
 After Test Width: **0.4060 in**
 Thickness: **0.0220 in**
 After Test Thickness: **0.0180 in**
 Area: **0.0111 in²**
 After Test Area: **0.0073 in²**
 Tensile Strength: **46713 psi**
 Peak Load: **519 lbf**
 Load at Yield: **449.3052 lbf**
 Position at Yield: **0.0851 in**
 Time at Yield: **0.4291 min**
 Strain at Yield: **0.0035 in/in**
 Stress at Yield: **40477.9400 psi**
 Elongation at Yield: **0.0070 in**
 Reduction of Area: **34.2 %**
 Total Elongation: **35.0000 %**
 Pretest Punch Length: **2.000 in**
 Posttest Punch Length: **2.70 in**
 Modulus of Elasticity: **24947400 psi**

Test Summary

Counter: **18858**
 Elapsed Time: **00:04:39**
 ATI #: **01-46385**
 Client: **Wayne Dalton Corporation**
 Material Type: **Steel Door**
 Sample #: **2**
 Comments: **16 x 8 Square 120-32**
 Procedure Name: **ASTM E 8-01, Tensile Testing of**
 Start Date: **10/16/03**
 Start Time: **1:08:59 PM**
 End Date: **10/16/03**
 End Time: **1:13:38 PM**
 Workstation: **Architectural Testing Inc.**
 Tested By: **Connie**

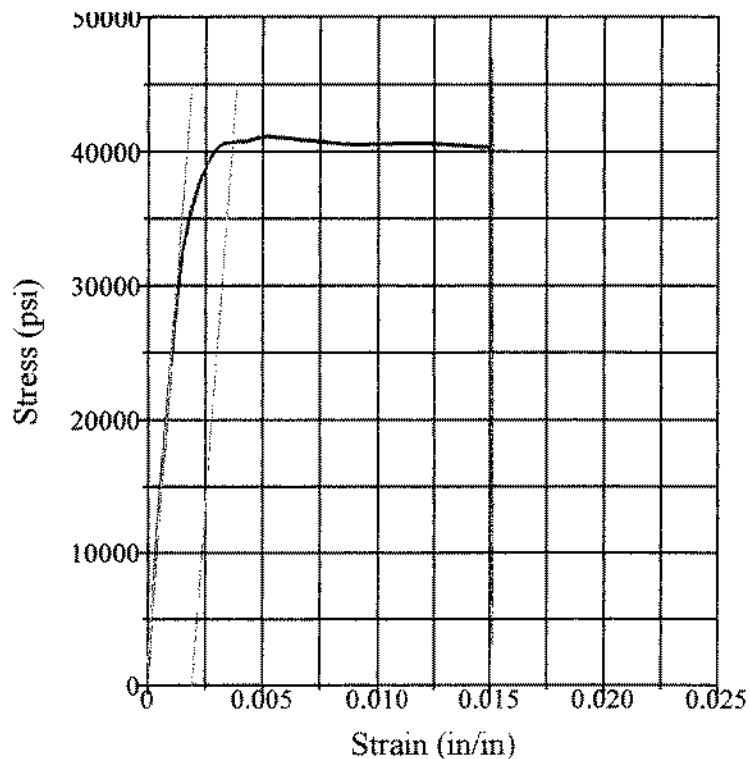


Test Results

Width: 0.5028 in
 After Test Width: 0.3930 in
 Thickness: 0.0210 in
 After Test Thickness: 0.0170 in
 Area: 0.0106 in²
 After Test Area: 0.0067 in²
 Tensile Strength: 48625 psi
 Peak Load: 515 lbf
 Load at Yield: 438.9126 lbf
 Position at Yield: 0.0856 in
 Time at Yield: 0.4312 min
 Strain at Yield: 0.0033 in/in
 Stress at Yield: 41406.8500 psi
 Elongation at Yield: 0.0067 in
 Reduction of Area: 36.8 %
 Total Elongation: 34.5000 %
 Pretest Punch Length: 2.000 in
 Posttest Punch Length: 2.69 in
 Modulus of Elasticity: 26852400 psi

Test Summary

Counter: 18859
 Elapsed Time: 00:04:41
 ATI #: 01-46385
 Client: Wayne Dalton Corporation
 Material Type: Steel Door
 Sample #: 3
 Comments: 16 x 8 Square 120-32
 Procedure Name: ASTM E 8-01, Tensile Testing of
 Start Date: 10/16/03
 Start Time: 1:16:10 PM
 End Date: 10/16/03
 End Time: 1:20:51 PM
 Workstation: Architectural Testing Inc.
 Tested By: Connie

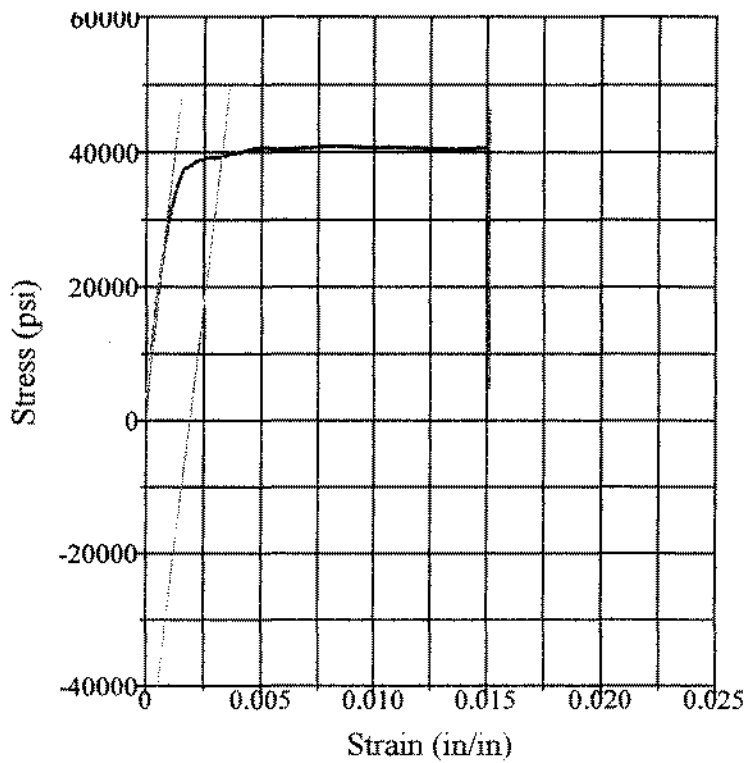


Test Results

Width: 0.5045 in
 After Test Width: 0.4000 in
 Thickness: 0.0220 in
 After Test Thickness: 0.0170 in
 Area: 0.0111 in²
 After Test Area: 0.0068 in²
 Tensile Strength: 46870 psi
 Peak Load: 520 lbf
 Load at Yield: 451.2086 lbf
 Position at Yield: 0.0802 in
 Time at Yield: 0.4043 min
 Strain at Yield: 0.0037 in/in
 Stress at Yield: 40649.4200 psi
 Elongation at Yield: 0.0073 in
 Reduction of Area: 38.7 %
 Total Elongation: 35.1000 %
 Pretest Punch Length: 2.000 in
 Posttest Punch Length: 2.702 in
 Modulus of Elasticity: 22931000 psi

Test Summary

Counter: 18860
 Elapsed Time: 00:04:41
 ATI #: 01-46385
 Client: Wayne Dalton Corporation
 Material Type: Steel Door
 Sample #: 4
 Comments: 16 x 8 Square 120-32
 Procedure Name: ASTM E 8-01, Tensile Testing of
 Start Date: 10/16/03
 Start Time: 1:23:09 PM
 End Date: 10/16/03
 End Time: 1:27:50 PM
 Workstation: Architectural Testing Inc.
 Tested By: Connie

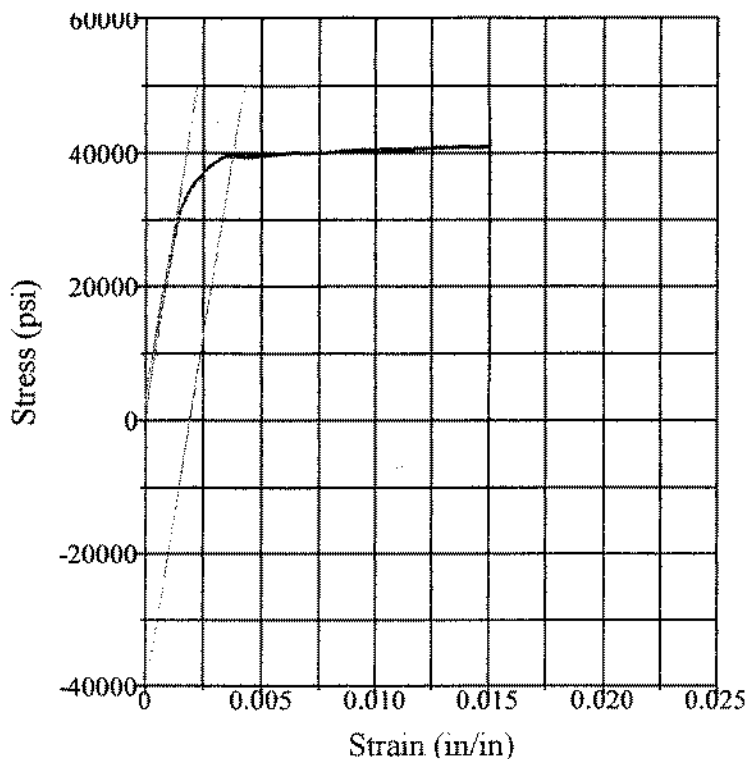


Test Results

Width: 0.5070 in
 After Test Width: 0.3890 in
 Thickness: 0.0220 in
 After Test Thickness: 0.0160 in
 Area: 0.0112 in²
 After Test Area: 0.0062 in²
 Tensile Strength: 46406 psi
 Peak Load: 520 lbf
 Load at Yield: 439.9208 lbf
 Position at Yield: 0.0831 in
 Time at Yield: 0.4190 min
 Strain at Yield: 0.0032 in/in
 Stress at Yield: 39278.6400 psi
 Elongation at Yield: 0.0065 in
 Reduction of Area: 44.6 %
 Total Elongation: 31.5000 %
 Pretest Punch Length: 2.000 in
 Posttest Punch Length: 2.63 in
 Modulus of Elasticity: 29177400 psi

Test Summary

Counter: 18861
 Elapsed Time: 00:04:29
 ATI #: 01-46385
 Client: Wayne Dalton Corporation
 Material Type: Steel Door
 Sample #: 5
 Comments: 16 x 8 Square 120-32
 Procedure Name: ASTM E 8-01, Tensile Testing of
 Start Date: 10/16/03
 Start Time: 1:30:02 PM
 End Date: 10/16/03
 End Time: 1:34:31 PM
 Workstation: Architectural Testing Inc.
 Tested By: Connie

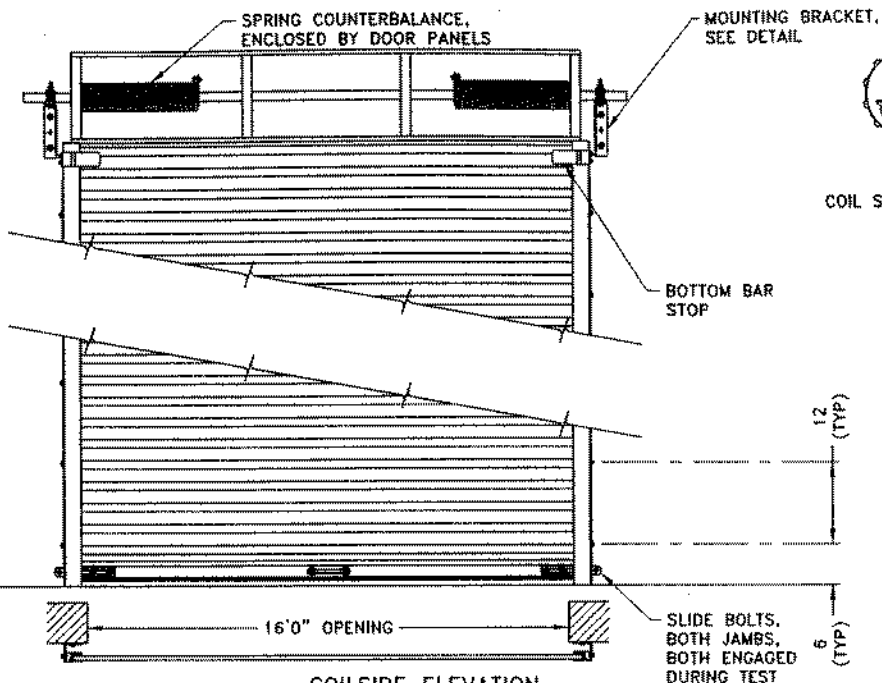


Test Results

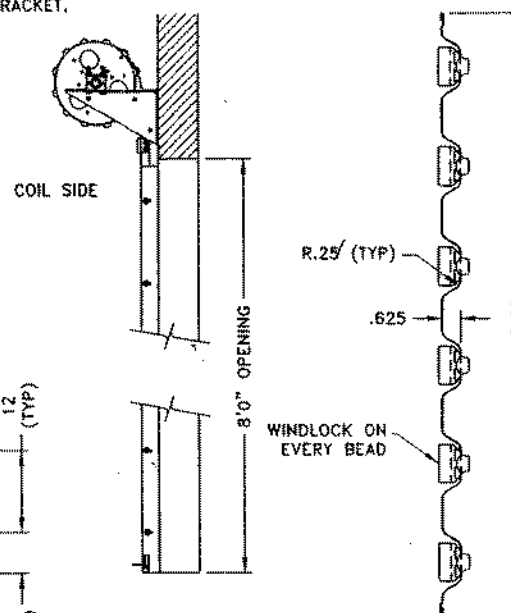
Width: 0.5035 in
 After Test Width: 0.4130 in
 Thickness: 0.0220 in
 After Test Thickness: 0.0175 in
 Area: 0.0111 in²
 After Test Area: 0.0072 in²
 Tensile Strength: 46791 psi
 Peak Load: 519 lbf
 Load at Yield: 438.6500 lbf
 Position at Yield: 0.0976 in
 Time at Yield: 0.4914 min
 Strain at Yield: 0.0038 in/in
 Stress at Yield: 39518.0200 psi
 Elongation at Yield: 0.0075 in
 Reduction of Area: 35.1 %
 Total Elongation: 36.5000 %
 Pretest Punch Length: 2.000 in
 Posttest Punch Length: 2.73 in
 Modulus of Elasticity: 21278800 psi

Test Summary

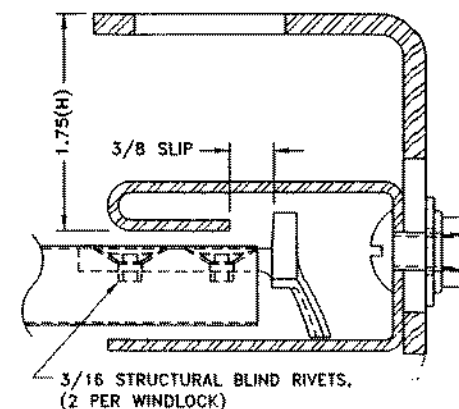
Counter: 18862
 Elapsed Time: 00:04:38
 ATI #: 01-46385
 Client: Wayne Dalton Corporation
 Material Type: Steel Door
 Sample #: 6
 Comments: 16 x 8 Square 120-32
 Procedure Name: ASTM E 8-01, Tensile Testing of
 Start Date: 10/16/03
 Start Time: 1:37:08 PM
 End Date: 10/16/03
 End Time: 1:41:46 PM
 Workstation: Architectural Testing Inc.
 Tested By: Connie


COILSIDE ELEVATION

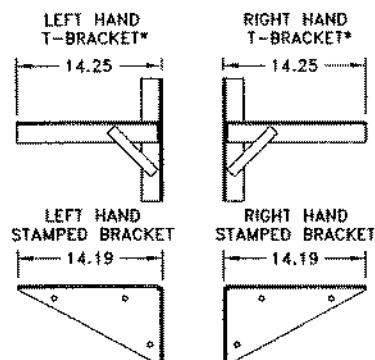
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PANEL DETAIL

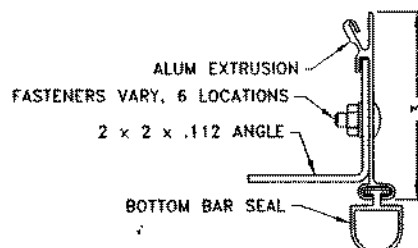
SCALE = 1:4


GUIDE DETAIL

SCALE = FULL


BRACKET DETAIL

SCALE = 1:12


BOTTOM BAR DETAIL

SCALE = 1:2

*DENOTES UNTESTED CONFIGURATIONS APPROVED BY COMPARATIVE ANALYSIS


Test sample complies with these details.
Deviations are noted.

Report# **01-46,385.03**

Date **10-31-03** Tech **SOK**
NOTES:

1. UNIFORM STATIC AIR PRESSURE TEST PERFORMED PER ASTM E 330
2. TENSILE TEST PERFORMED PER ASTM E 8
3. TESTED BY ARCHITECTURAL TESTING, INC.
4. CURTAIN IS .018 MIN STEEL PER ASTM A 653, GR.40
5. SEE 035-0012 FOR COMPONENT DETAILS

TEST	DATE	TEST REPORT NUMBER	RESULTS
UNIFORM STATIC AIR PRESSURE			
TENSILE			

PART NUMBER	WEIGHT (LB.)	TITLE	DRAWN BY	CHECKED BY	APPVD. BY	TOLERANCES (UNLESS OTHERWISE SPECIFIED)
REFERENCE		WINDLOAD TEST, DS-350, 16' x 8', SQUARE PROFILE PANEL, ±34 PSF DESIGN (±51 PSF TEST)	M. DAUS 10/13/2003			LINEAR .X ± .050 LINEAR .XX ± .030 LINEAR .XXX ± .010 ANGULAR ± .50° DIMENSIONS IN INCHES
		MATERIAL	AS SHOWN	SCALE - WHEN THIS BOX IS .50" HIGH	ORIGINAL RELEASE	
			AS SHOWN			

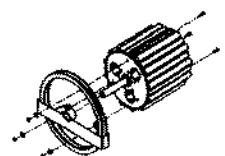

Wayne Dalton
Rolling Door Division
24512 Lincoln Way E.
Dalton, Ohio 44018

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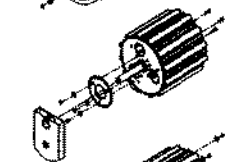
REV.	REV'D. BY	APPVD. BY	RELEASE	DESCRIPTION

REVISIONS

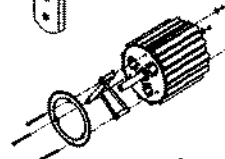
SIZE	DRAWING NO.	REVISION
B	035-0009	



DIRECT DRIVE CHAIN HOIST OPERATION



REDUCED DRIVE CHAIN HOIST OPERATION*



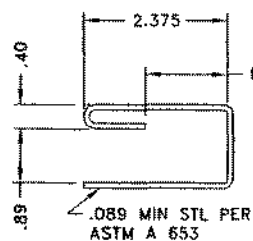
MOTOR OPERATION*



MANUAL OPERATION*

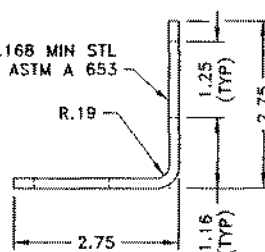
OPERATION DETAIL

SCALE = NONE



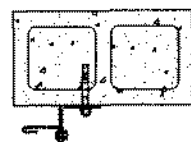
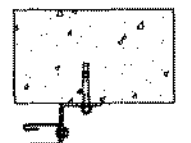
G-GUIDE DETAIL

SCALE = 1:2



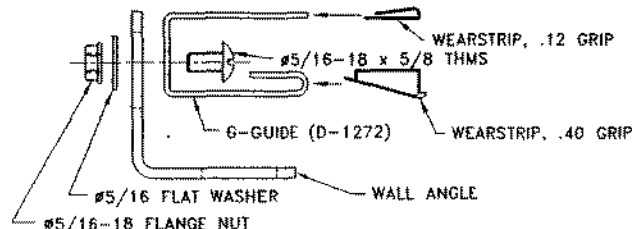
WALL ANGLE DETAIL

SCALE = 1:2


STEEL JAMB
#5/16-12 x 1 SELFDRILLING SCREW

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

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

JAMB DETAIL

SCALE = NONE



GUIDE ASSEMBLY DETAIL

SCALE = 1:2



Architectural Testing

Test sample complies with these details.
Deviations are noted.

Report # **01-46885.03**

Date **10-21-03** Tech **SDK**

WINDLOCK DETAIL

SCALE = FULL

NOTES:

1. UNIFORM STATIC AIR PRESSURE TEST PERFORMED PER ASTM E 330
2. TENSILE TEST PERFORMED PER ASTM E 8
3. TESTED BY ARCHITECTURAL TESTING, INC.
4. SEE 035-0009, -0010, & -0011 FOR TEST DETAILS

TEST	DATE	TEST REPORT NUMBER	RESULTS
UNIFORM STATIC AIR PRESSURE	.	.	.
	.	.	.
TENSILE	.	.	.
	.	.	.

*DENOTES UNTESTED CONFIGURATIONS APPROVED BY COMPARATIVE ANALYSIS

PART NUMBER	WEIGHT (LB.)	TITLE	DRAWN BY	CHECKED BY	APPVD. BY	TOLERANCES (UNLESS OTHERWISE SPECIFIED)	DATE
REFERENCE		WINDLOAD TEST, DS-350, SQUARE PROFILE PANEL, COMPONENT DETAILS	M. DAUS			LINEAR .X ± .060 LINEAR .XX ± .030 LINEAR .XXX ± .010 ANGULAR ± .50° DIMENSIONS IN INCHES	10/15/2003
		MATERIAL AS SHOWN	SCALE -- WHEN THIS BOX IS 50" HIGH AS SHOWN	ORIGINAL RELEASE			

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REV.	REV'D. BY	APPVD. BY	RELEASE	DESCRIPTION
				REVISIONS

SIZE	DRAWING NO.	REVISION
B	035-0012	