

PERFORMANCE TEST REPORT

Rendered to:

**WAYNE-DALTON CORPORATION
Door and Systems Division**

**Model DS-350 Round
16'x 8'**

Report No:	01-46385.06
Test Date:	09/09/03
Report Date:	11/13/03
Expiration Date:	09/09/07

PERFORMANCE TEST REPORT

Rendered to:

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

Report No: 01-46385.06

Test Date: 09/09/03

Report Date: 11/13/03

Project Summary: Architectural Testing, Inc. (ATI) 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 Round commercial roll-up sheet door. The door was 16' wide by 8' high. The door was tested to a +/-28.0 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 Round 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 # 035-0013 and 035-0016 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)			Permanent Set (Inch)		
		Transducer Number			Transducer Number		
		#1	#2	#3	#1	#2	#3
+14.00 psf (1/2 Design)	10 sec	Remove Slack					
+28.00 psf (Design)	10 sec	0.290	8.280	0.400	0.010	0.030	0.010
+42.00 psf (Overload)	10 sec	0.450	10.460	0.590	0.020	0.350	0.170
-14.00 psf (1/2 Design)	10 sec	Remove Slack					
-28.00 psf (Design)	10 sec	0.820	13.560	0.630	0.060	0.820	0.030
-42.00 psf (Overload)	10 sec	1.070	16.400	1.030	0.180	0.160	0.620

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

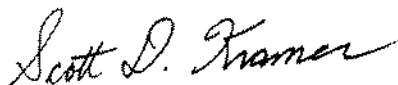
Test Results: The test results are shown on test logs 18870 through 18875 (attached) and summarized in the following table.

Specimen	Yield Strength (psi)	Yield Strain (in/in)	Tensile Load (lbf)	Tensile Strength (psi)	Elongation (%)	Area Reduction (%)
1	41,391	0.0039	518	48,413	30.00	35.50
2	42,804	0.0033	504	49,429	27.50	19.60
3	39,454	0.0034	503	47,003	30.50	37.40
4	42,615	0.0036	518	50,292	30.50	35.00
5	41,175	0.0035	515	48,094	29.00	33.60
6	43,477	0.0036	519	50,918	32.00	35.30
Average	41,819	0.0036	513	49,025	29.90	32.70

The average Tangent Modulus for the tested specimens was 25.5×10^6 psi.

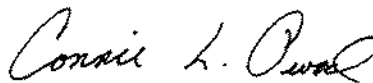
A copy of this report will be retained by ATI for a period of four years. This report is the exclusive property of the client so named herein and is applicable to the samples tested. Results obtained are tested values and do not constitute an opinion or endorsement by this laboratory. This report may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

For ARCHITECTURAL TESTING, INC.:



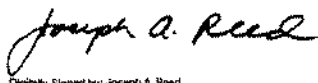
Digitally Signed by: Scott D. Kramer

Scott D. Kramer
Technician



Digitally Signed by: Connie L. Owad

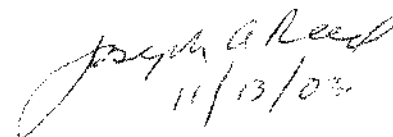
Connie Owad
Technician



Digitally Signed by: Joseph A. Reed

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

SDK:baw
01-46385.06



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 on report.

Report No.: 01-46385.04

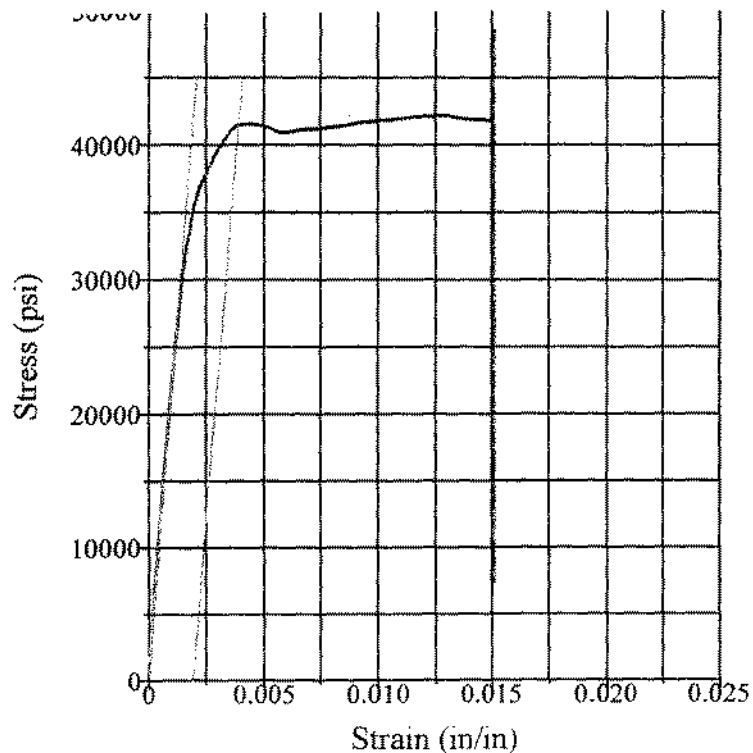
Requested by: Mark Daus, Wayne Dalton Corporation
Purpose: ASTM E 330 testing of Series/Model DS-350 Round, 10' x 8'.
Issued Date: 11/13/03
Comments: Florida P.E. seal required on report.

Report No.: 01-46385.05

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.: 01-46385.06

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 on report.

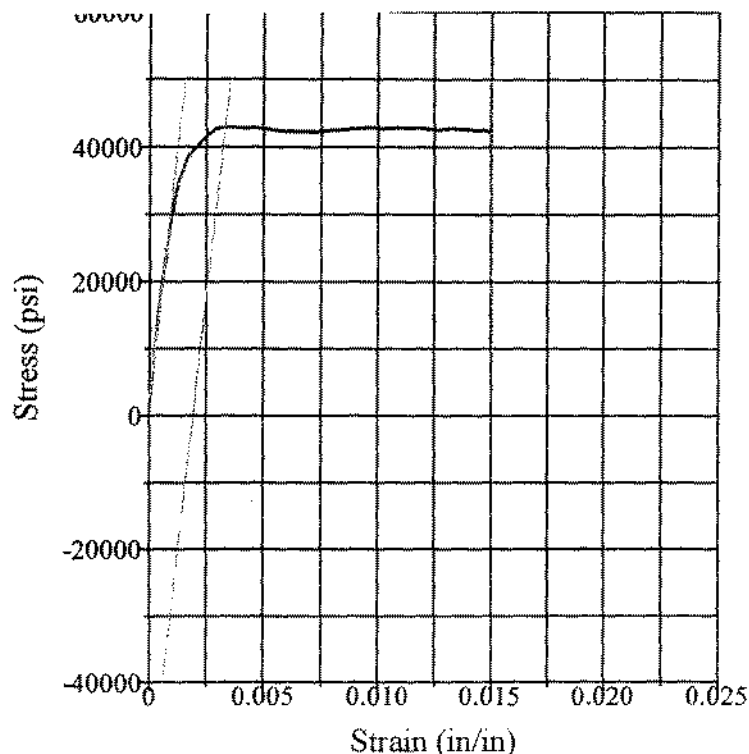


Test Results

Width:	0.5115 in
After Test Width:	0.4160 in
Thickness:	0.0210 in
After Test Thickness:	0.0165 in
Area:	0.0107 in ²
After Test Area:	0.0069 in ²
Tensile Strength:	48413 psi
Peak Load:	518 lbf
Load at Yield:	442.8800 lbf
Position at Yield:	0.0682 in
Time at Yield:	0.3445 min
Strain at Yield:	0.0039 in/in
Stress at Yield:	41390.6600 psi
Elongation at Yield:	0.0078 in
Reduction of Area:	35.5 %
Total Elongation:	30.0000 %
Pretest Punch Length:	2.000 in
Posttest Punch Length:	2.60 in
Modulus of Elasticity:	20904300 psi

Test Summary

Counter:	18870
Elapsed Time:	00:04:10
ATI #:	01-46385
Client:	Wayne Dalton Corporation
Material Type:	Steel Door
Sample #:	1
Comments:	16 x 8 Round 120-32
Procedure Name:	ASTM E 8-01, Tensile Testing of
Start Date:	10/16/03
Start Time:	3:32:31 PM
End Date:	10/16/03
End Time:	3:36:41 PM
Workstation:	Architectural Testing Inc.
Tested By:	Connie

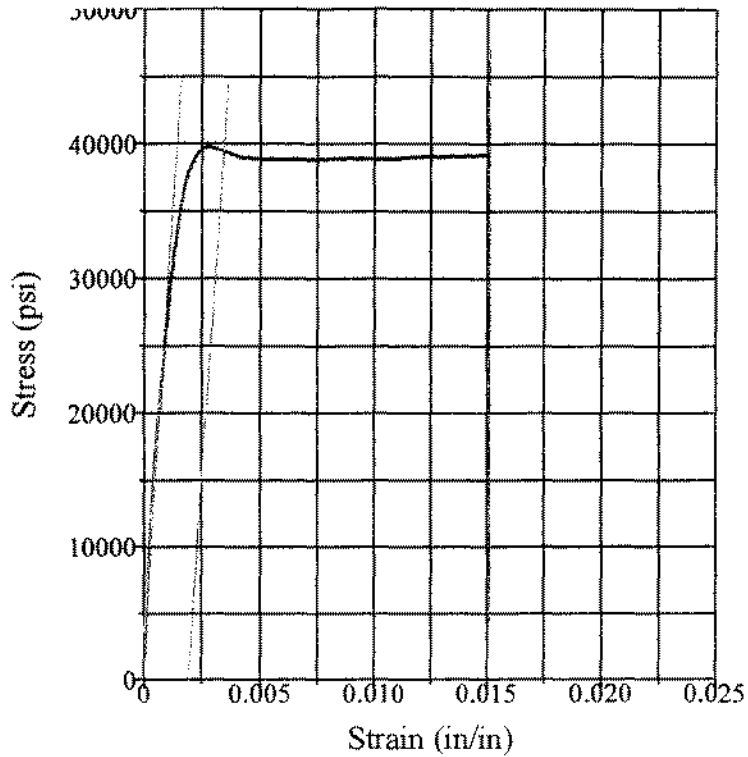


Test Results

Width: 0.5125 in
 After Test Width: 0.5130 in
 Thickness: 0.0200 in
 After Test Thickness: 0.0160 in
 Area: 0.0102 in²
 After Test Area: 0.0082 in²
 Tensile Strength: 49429 psi
 Peak Load: 504 lbf
 Load at Yield: 436.6016 lbf
 Position at Yield: 0.0580 in
 Time at Yield: 0.2932 min
 Strain at Yield: 0.0033 in/in
 Stress at Yield: 42804.0800 psi
 Elongation at Yield: 0.0066 in
 Reduction of Area: 19.6 %
 Total Elongation: 27.5000 %
 Pretest Punch Length: 2.000 in
 Posttest Punch Length: 2.55 in
 Modulus of Elasticity: 30346700 psi

Test Summary

Counter: 18871
 Elapsed Time: 00:03:54
 ATI #: 01-46385
 Client: Wayne Dalton Corporation
 Material Type: Steel Door
 Sample #: 2
 Comments: 16 x 8 Round 120-32
 Procedure Name: ASTM E 8-01, Tensile Testing of
 Start Date: 10/16/03
 Start Time: 3:39:36 PM
 End Date: 10/16/03
 End Time: 3:43:30 PM
 Workstation: Architectural Testing Inc.
 Tested By: Connie

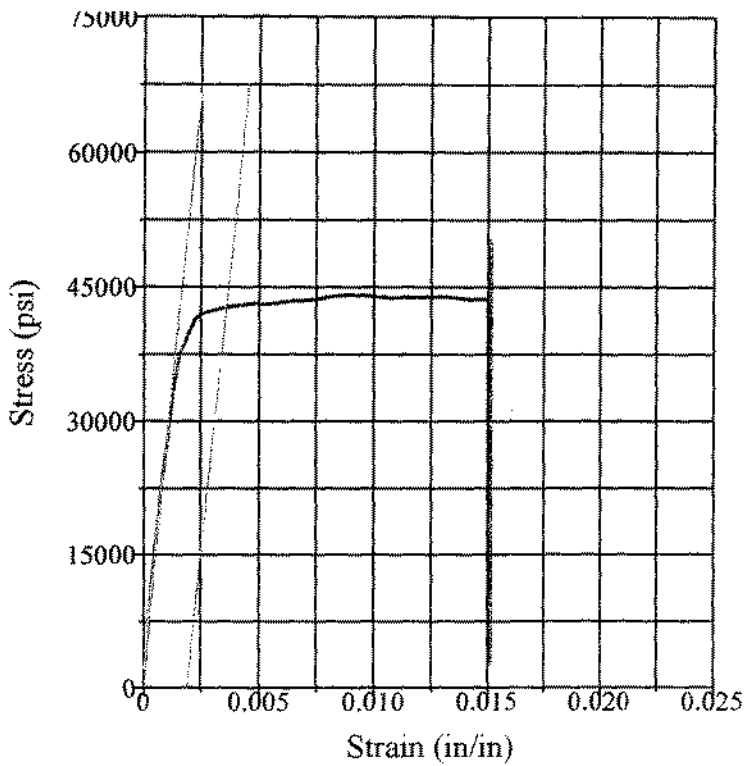


Test Results

Width: 0.5115 in
After Test Width: 0.4210 in
Thickness: 0.0210 in
After Test Thickness: 0.0160 in
Area: 0.0107 in²
After Test Area: 0.0067 in²
Tensile Strength: 47003 psi
Peak Load: 503 lbf
Load at Yield: 422,1572 lbf
Position at Yield: 0.0530 in
Time at Yield: 0.2682 min
Strain at Yield: 0.0034 in/in
Stress at Yield: 39453.9500 psi
Elongation at Yield: 0.0069 in
Reduction of Area: 37.4 %
Total Elongation: 30.5000 %
Pretest Punch Length: 2.000 in
Posttest Punch Length: 2.61 in
Modulus of Elasticity: 25689000 psi

Test Summary

Counter: 18872
Elapsed Time: 00:04:00
ATI #: 01-46385
Client: Wayne Dalton Corporation
Material Type: Steel Door
Sample #: 3
Comments: 16 x 8 Round 120-32
Procedure Name: ASTM E 8-01, Tensile Testing of
Start Date: 10/16/03
Start Time: 3:45:44 PM
End Date: 10/16/03
End Time: 3:49:44 PM
Workstation: Architectural Testing Inc.
Tested By: Connie

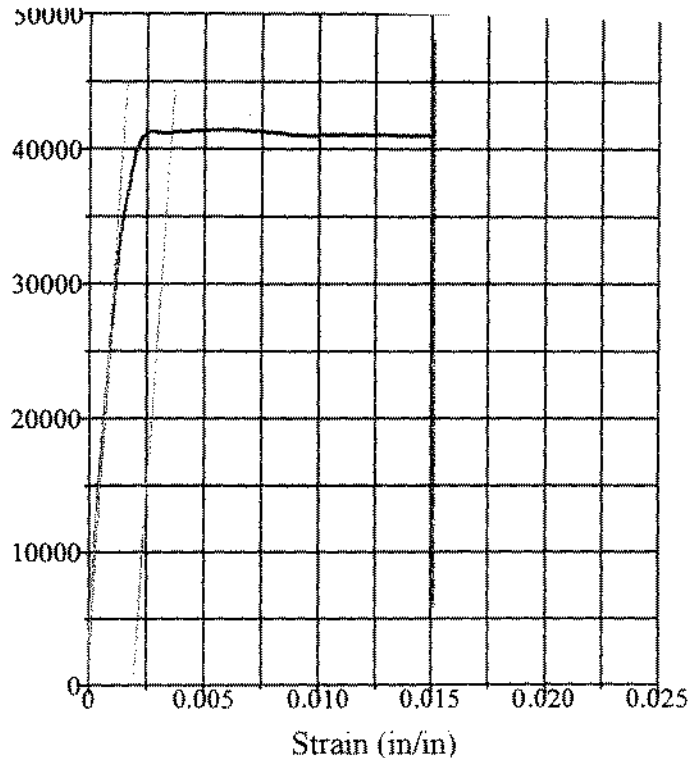


Test Results

Width:	0.5130 in
After Test Width:	0.4190 in
Thickness:	0.0200 in
After Test Thickness:	0.0160 in
Area:	0.0103 in ²
After Test Area:	0.0067 in ²
Tensile Strength:	50292 psi
Peak Load:	518 lbf
Load at Yield:	438.9380 lbf
Position at Yield:	0.0672 in
Time at Yield:	0.3395 min
Strain at Yield:	0.0036 in/in
Stress at Yield:	42615.3400 psi
Elongation at Yield:	0.0071 in
Reduction of Area:	35.0 %
Total Elongation:	30.5000 %
Pretest Punch Length:	2.000 in
Posttest Punch Length:	2.61 in
Modulus of Elasticity:	25660900 psi

Test Summary

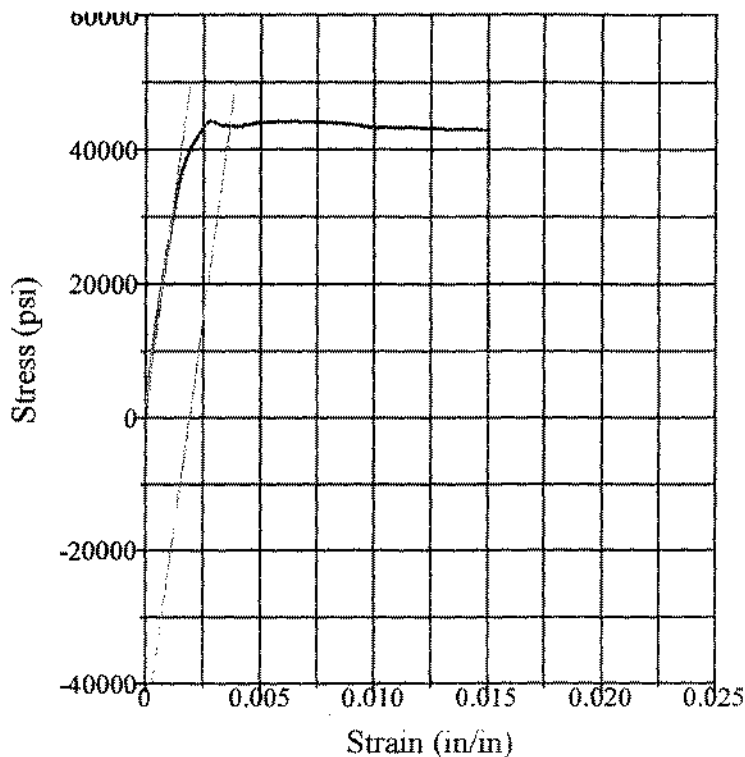
Counter:	18873
Elapsed Time:	00:04:00
ATI #:	01-46385
Client:	Wayne Dalton Corporation
Material Type:	Steel Door
Sample #:	4
Comments:	16 x 8 Round 120-32
Procedure Name:	ASTM E 8-01, Tensile Testing of
Start Date:	10/16/03
Start Time:	3:52:06 PM
End Date:	10/16/03
End Time:	3:56:06 PM
Workstation:	Architectural Testing Inc.
Tested By:	Connie



Width: 0.5105 in
 After Test Width: 0.4190 in
 Thickness: 0.0210 in
 After Test Thickness: 0.0170 in
 Area: 0.0107 in²
 After Test Area: 0.0071 in²
 Tensile Strength: 48094 psi
 Peak Load: 515 lbf
 Load at Yield: 440.5768 lbf
 Position at Yield: 0.0754 in
 Time at Yield: 0.3803 min
 Strain at Yield: 0.0035 in/in
 Stress at Yield: 41175.4000 psi
 Elongation at Yield: 0.0070 in
 Reduction of Area: 33.6 %
 Total Elongation: 29.0000 %
 Pretest Punch Length: 2.000 in
 Posttest Punch Length: 2.58 in
 Modulus of Elasticity: 25199700 psi

Test Summary

Counter: 18874
 Elapsed Time: 00:04:06
 ATI #: 01-46385
 Client: Wayne Dalton Corporation
 Material Type: Steel Door
 Sample #: 5
 Comments: 16 x 8 Round 120-32
 Procedure Name: ASTM E 8-01, Tensile Testing of
 Start Date: 10/16/03
 Start Time: 3:58:38 PM
 End Date: 10/16/03
 End Time: 4:02:44 PM
 Workstation: Architectural Testing Inc.
 Tested By: Connie

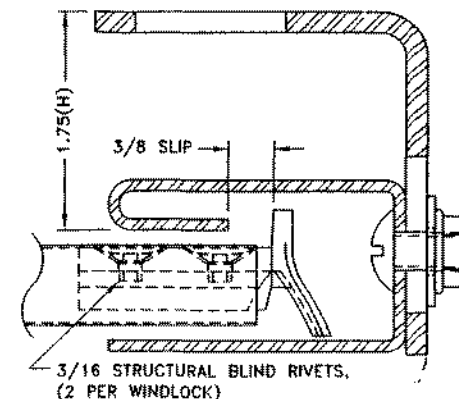
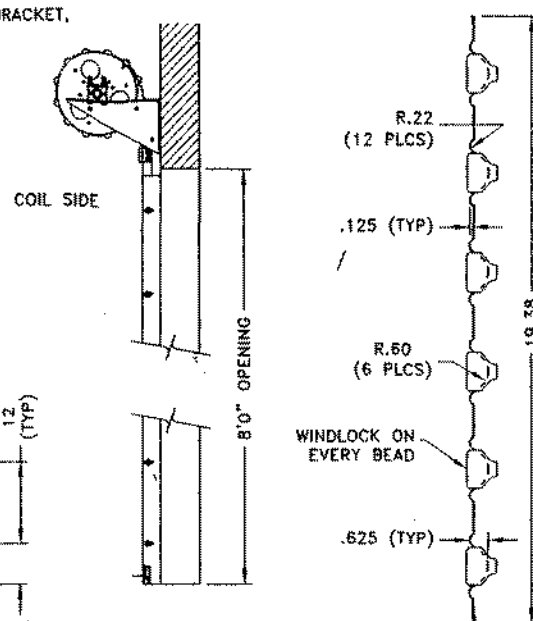
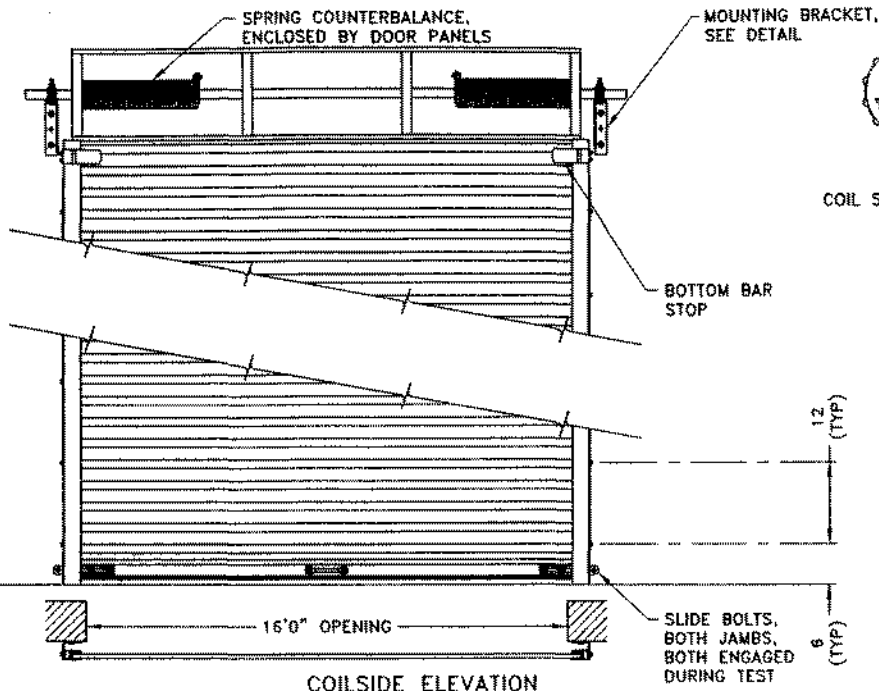


Test Results

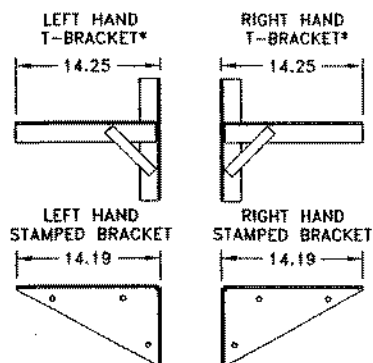
Width:	0.5105 in
After Test Width:	0.4150 in
Thickness:	0.0200 in
After Test Thickness:	0.0160 in
Area:	0.0102 in ²
After Test Area:	0.0066 in ²
Tensile Strength:	50918 psi
Peak Load:	519 lbf
Load at Yield:	443.4646 lbf
Position at Yield:	0.0661 in
Time at Yield:	0.3340 min
Strain at Yield:	0.0036 in/in
Stress at Yield:	43476.9200 psi
Elongation at Yield:	0.0073 in
Reduction of Area:	35.3 %
Total Elongation:	32.0000 %
Pretest Punch Length:	2.000 in
Posttest Punch Length:	2.64 in
Modulus of Elasticity:	25003300 psi

Test Summary

Counter:	18875
Elapsed Time:	00:04:08
ATI #:	01-46385
Client:	Wayne Dalton Corporation
Material Type:	Steel Door
Sample #:	6
Comments:	16 x 8 Round 120-32
Procedure Name:	ASTM E 8-01, Tensile Testing of
Start Date:	10/16/03
Start Time:	4:06:28 PM
End Date:	10/16/03
End Time:	4:10:36 PM
Workstation:	Architectural Testing Inc.
Tested By:	Connie

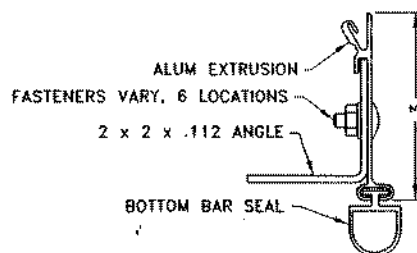


GUIDE DETAIL
SCALE = FULL



BRACKET DETAIL

SCALE = 1:12



BOTTOM BAR DETAIL

SCALE = 1:2

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 035-0016 FOR COMPONENT DETAILS



Test sample complies with these details.
 Deviations are noted.

Report# 01-46385.06
Date 10-31-03 Tech SDK

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

PART NUMBER	WEIGHT (LB.)	TITLE	DRAWN BY	CHECKED BY	APPRD. BY	TOLERANCES (UNLESS OTHERWISE SPECIFIED)
		WINDLOAD TEST, DS-350, 16' x 8', ROUND PROFILE PANEL. ±28 PSF DESIGN (±42 PSF TEST)	M. DAUS 10/15/2003			LINEAR .X ± .060 LINEAR .XX ± .030 LINEAR .XXX ± .010 ANGULAR ± .50°
REFERENCE			SCALE - WHEN THIS BOX IS .50" HIGH	ORIGINAL RELEASE		
		MATERIAL AS SHOWN	AS SHOWN			DIMENSIONS IN INCHES

**Wayne
Dallen**

Wayne Station
Railing Door Electric
74312 Lincoln Way
Darien, Ohio 44011

REV.	REVD. BY	APPVD. BY	RELEASE	DESCRIPTION
REVISIONS				

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SIZE	DRAWING NO.	REVISION
B	035-0013	

MANUAL OPERATION*

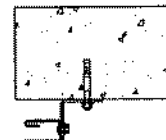
SCALE = NONE



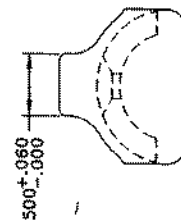
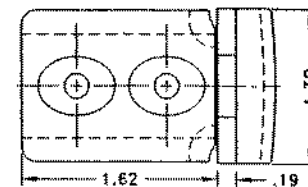
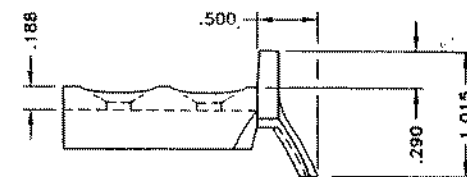
STEEL JAMB
#5/16-12 x 1 SELFDILLING SCREW



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

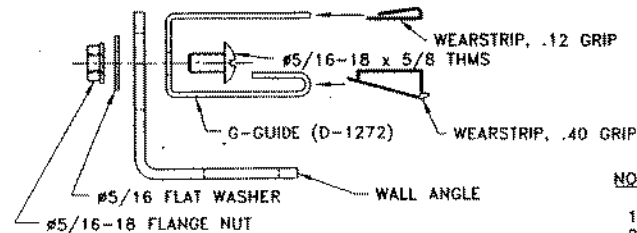


MASONRY JAMB, #2*
CONCRETE, 3000PSI MIN
#3/8 x 3 KINGPIN WEDGE ANCHOR



SCALE = FULL

SCALE = NONE



GUIDE ASSEMBLY DETAIL

SCALE = 1:2

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 035-0013, -0014, -0015 FOR TEST DETAILS



Architectural Testing

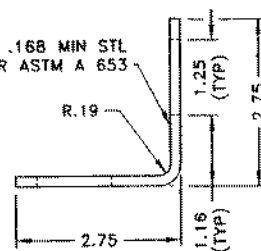
Test sample complies with these details.
Deviations are noted.

Report# 01-46385.06

Date 10-31-03 Tech SOK

G-GUIDE DETAIL

SCALE = 1:2



WALL ANGLE DETAIL

SCALE = 1:2

*DENOTES UNTESTED CONFIGURATIONS APPROVED BY COMPARATIVE ANALYSIS

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

PART NUMBER	WEIGHT (LB.)	TITLE	DRAWN BY	CHECKED BY	APPROV. BY	TOLERANCES (UNLESS OTHERWISE SPECIFIED)	 Wayne Dalton Rolling Door Division 4512 Lincoln Way Bellaire, Ohio 44816	
REFERENCE		WINDLOAD TEST, DS-350, ROUND PROFILE PANEL, COMPONENT DETAILS	M. DAUS 10/15/2003			LINEAR .X ± .060 LINEAR .XX ± .030 LINEAR .XXX ± .010 ANGULAR ± .50°		
	MATERIAL	AS SHOWN	SCALE - WHEN THIS BOX IS .50" HIGH	ORIGINAL RELEASE		DIMENSIONS IN INCHES		
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 REPRODUCING THEREOF, OR FOR THE MAKING OF APPARATUS OR PARTS THEREOF WITHOUT THE PERMISSION OF WAYNE DALTON FIRST OBTAINED AND SPECIFIC AS TO EACH CASE. THE ACCEPTANCE OF THIS DRAWING WILL BE CONSIDERED AS AN ACCEPTANCE OF THE FOREGOING AGREEMENT.							SIZE DRAWING NO. B 035-0016	REVISION .