

TAS 201, TAS 202, AND TAS 203 TEST REPORT

Report No.: D3324.01-602-18

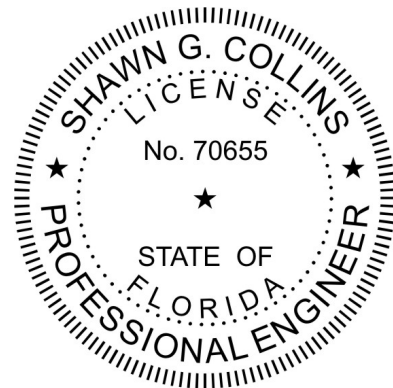
Rendered to:

Hart & Cooley Inc.
Grand Rapids, MI

PRODUCT TYPE: Roof Hatch
SERIES/MODEL: M1 3-0 x 2-6

This report contains in its entirety:

Cover Page: 1 page
Report Body: 12 pages
Sketches: 4 pages
Drawings: 18 pages




Digitally Signed by: Shawn G. Collins

2013.12.19 12:17:07 -05'00'

Test Start Date:	12/5/2013
Test End Date:	12/18/2013
Report Date:	12/19/2013
Test Record Retention End Date:	12/19/2017
Miami-Dade County Notification No.:	ATIWI 13011

1.0 Client Identification:

1.1 Report Issued To: Hart & Cooley Inc
5030 Corporate Exchange Blvd. SE
Grand Rapids, Michigan 49512

1.2 Contact Person: Tom Dykhuis

2.0 Laboratory Identification:

2.1 Test Laboratory: Architectural Testing, Inc.
2906 Saxon Avenue
Schofield, Wisconsin 54476

2.2 Laboratory Phone Number: 715-241-8624

3.0 Project Summary:

3.1 Introduction: Architectural Testing, Inc. was contracted by Hart & Cooley Inc. to conduct TAS 201, TAS 202, and TAS 203 testing on their M1, roof hatch in accordance with Florida Building Code for High Velocity Hurricane Zone and Miami-Dade County requirements. The specimen(s) tested met the performance requirements set forth in the protocols. The results are summarized in Table 1.

Table 1: Summary of Test Results

Specimen #	Test Protocol	Design Pressure
1	TAS 202	+80/-80 psf
2	TAS 201/203 (Large Missile)	+80/-80 psf
3	TAS 201/203 (Large Missile)	+80/-80 psf
4	TAS 201/203 (Large Missile)	+80/-80 psf

3.2 Product Type: Roof Hatch

3.3 Series/Model: M1 3-0 X 2-6

3.4 Miami-Dade County Notification No.: ATIWI 13011

3.5 Test Dates: 12/5/2013 - 12/18/2013

3.6 Test Record Retention End Date: 12/19/2017

3.7 Test Location: Architectural Testing, Inc. test facility in Schofield, Wisconsin.

3.8 Test Specimen Source: The test specimen(s) were provided by the client. Representative samples of the test specimen(s) will be retained by Architectural Testing for a minimum of ten years from the report completion date.

3.0 Project Summary: (Continued)

3.9 Drawing Reference: The test specimen drawings have been reviewed by Architectural Testing and are representative of the test specimen(s) reported herein. Test specimen construction was verified by Architectural Testing per the drawings located in Appendix B. Any deviations are documented herein and on the drawings.

3.10 List of Official Observers:

<u>Name</u>	<u>Company</u>
John Bordagaray	Architectural Testing, Inc.
Eric Jehn	Architectural Testing, Inc.
Jeff Zibton	Architectural Testing, Inc.
Shawn G. Collins, P.E.	Architectural Testing, Inc.

4.0 Test Protocols:

TAS 201-94, *Impact Test Procedures*

TAS 202-94, *Criteria for Testing Impact & Non-Impact Resistant Building Envelope Components Using Uniform Static Air Pressure*

TAS 203-94, *Criteria for Testing Products Subject to Cyclic Wind Pressure Loading*

5.0 Test Specimen Description:

5.1 Product Sizes: Table 2 provides product sizes for the overall test specimen(s) and operable components.

Table 2: Overall Specimen and Operable Component Sizes

Overall Surface Area: 24.1 ft ²	Width (in.)	Height (in.)	Depth (in.)
Overall size	39-1/4	13-7/8	41-1/2
Curb size	30-1/8	12	36-1/8
Interior clear opening	30	N/A	36

5.0 Test Specimen Description: (Continued)

5.2 Frame Construction: The frame was fabricated utilizing the members listed in Table 3.

Table 3: Frame Member Details

Frame Member	Part #	Material	Description
Curb	3 & 4	Galvanized steel	14 gauge
Curb cap	5	Galvanized steel	14 gauge

5.2.1 Frame Corner Construction: The frame corners were constructed as described in Table 4.

Table 4: Frame Corner Construction Details

Location	Joinery Type	Details
All corners	Corner joint	Full length welds on exterior
Curb cap to curb	Lap joint	1" welds spaced approximately 3-1/2" on center. Length of joint was sealed with silicone

5.3 Hatch Leaf Construction: The hatch leaf was fabricated utilizing the members listed in Table 5.

Table 5: Hatch Leaf Member Details

Hatch Leaf Member	Part #	Material	Description
Cover	1	Galvanized steel	14 gauge
Cover liner	2	Galvanized steel	22 gauge

5.3.1 Hatch Leaf Corner Construction: The hatch leaf corners were constructed as described in Table 6.

Table 6: Hatch Leaf Corner Construction Details

Location	Joinery Type	Details
All corners	Corner joint	Full length welds on exterior
Cover to cover liner	NA	The liner was held to the cover via glue on both sides of a 1" thick Styrofoam insulation and #10 x 3/4" long Hex washer self-drilling screws 3/4" from each corner (2 per corner)

5.4 Reinforcement: Reinforcements were utilized. (See table #7).

5.0 Test Specimen Description: (Continued)

Table 7: Reinforcement Details

Part #	Location	Material	Description
H-59	Behind lock	14 gauge galvanized steel	Backer plate tack welded to cover
H-69	Behind hold open arm	14 gauge galvanized steel	Backer plate tack welded to cover

5.5 Weatherstripping: Table 8 provides details of the weatherstripping utilized in each test specimen.

Table 8: Weatherstripping Details

Description	Quantity	Location
Adhesive backed foam leaf with #10 Hex washer self-drilling screws 8"-9" on center	1	Under side or hatch cover liner in contact with curb cap

5.6 Drainage: No drainage was utilized.

5.7 Hardware: Table 12 provides details of hardware utilized for testing.

Table 12: Hardware Details

Description	Quantity	Location
Torsion bar	1	Attached to curb cap with brackets, two #10 Hex washer self-drilling screws per bracket
Hinge	2	Top of curb cap at rear welded to curb cap
Hold open arm	1	Cover angles bolted to inside cover with three 5/16" -18 x 3/4" long self-tapping bolts, curb bracket bolted to curb with two 5/16"-18 x 3/4" long self-tapping bolts,
Spring latch with inside and outside handles	1	Attached to inside cover with four 5/16" -18 x 3/4" long self-tapping bolts

5.8 Installation: Table 14 provides details of the test specimen installation into the Spruce-Pine-Fir wood test buck. The exterior perimeter of the test specimen was sealed with sealant.

Table 14: Installation Details

Location	Anchor Description	Anchor Location
Curb flange	3/8" x 1-1/2" lag bolts	1-1/4" from each corner and one at each center point of flange

6.0 Test Results: The temperature during TAS 202 testing was 67°F. Results are tabulated as follows:

6.1 Protocol TAS 202-94, Static Air Pressure

Table 14 provides the results for the air infiltration test.

Table 14: Test Specimen #1 TAS 202, Air Infiltration Test Results

Test Pressure	Results
Air infiltration at 1.57 psf (25 mph)	0.26 cfm/ft ²

Table 15 provides the results for positive and negative uniform static load test.

Note: As a roof unit, the 1/2 test pressure is equal to the design pressure, only one set of deflection readings are recorded.

Table 15: Test Specimen #1 TAS 202, Design Load Test Results

Load (psf)	Indicator Location	Deflection (in.)	Permanent Set (in.)
		Measured	Measured
+80.00 Design Pressure	Span 1	0.08	0.01
	Span 2	0.22	0.01
-80.00 Design Pressure	Span 1	0.08	0.01
	Span 2	0.26	0.02

6.0 Test Results: (Continued)

6.1 Protocol TAS 202-94, Static Air Pressure

Table 16 provides the results for the water penetration test.

Table 16: Test Specimen #1 TAS 202, Water Penetration Test Results

Title of Test	Pressure	Results
Water Penetration 15% of Positive Design Pressure	12.12 psf	Pass

Table 17 provides the results for the structural overload test.

Table 17: Test Specimen #1 TAS 202, Structural Overload Test Results

Load (psf)	Indicator Location	Deflection (in.)		Permanent Set (in.)	
		Measured	Allowed	Measured	Allowed
+160.00 Test Pressure	Span 1	0.14	N/A	0.01	N/A
	Span 2	0.35		0.02	
-160.00 Test Pressure	Span 1	0.04		0.01	
	Span 2	0.28		0.01	

Table 18 provides the results for the forced entry resistance test.

Table 18: Test Specimen #1 TAS 202, Forced Entry Test Results

Title of Test	Results	Allowed
Forced Entry Resistance in accordance with AAMA 1304	Pass	No Entry

Note: See Architectural Testing Sketch #1 for indicator locations. Deflection/permanent set reported is the overall deflection between three points (longest unsupported span) which accounts for support movement.

Conclusion: Architectural Testing observed no signs of failure in any area of the test specimen during the TAS 202 testing; as such, the test specimen satisfies the requirements of TAS 202.

6.0 Test Results: The temperature during TAS 201 testing was 67°F. Results are tabulated as follows:

6.2 Protocol TAS 201-94, Large Impact Procedures

Tables 19, 20, and 21 provides the results for the large missile impact test.

Table 19: Test Specimen #2 TAS 201, Large Missile Impact Test Results

Impact #	Missile Weight (lbs.)	Missile Length (in.)	Missile Velocity (ft./sec.)
1	8.85	95.5	50.3
2	8.85	95.5	50.8

Table 20: Test Specimen #3 TAS 201, Large Missile Impact Test Results

Impact #	Missile Weight (lbs.)	Missile Length (in.)	Missile Velocity (ft./sec.)
1	8.85	95.5	50.3
2	8.85	95.5	50.3

Table 21: Test Specimen #4 TAS 201, Large Missile Impact Test Results

Impact #	Missile Weight (lbs.)	Missile Length (in.)	Missile Velocity (ft./sec.)
1	8.85	95.5	50.3
2	8.85	95.5	50.8

Note: See Architectural Testing Sketch #2, 3 and 4 for impact locations.

Conclusion: The large missiles impacted each intended target and Architectural Testing carefully inspected each impact location. Architectural Testing observed no signs of penetration, rupture, or opening after the large missile impact test; as such, each test specimen satisfies the large missile requirements of TAS 201.

6.0 Test Results: The temperature during TAS 203 testing was 67°F. Results are tabulated as follows:

6.3 Protocol TAS 203-94, *Cyclic Wind Pressure Loading*

Tables 22 through 30 provide the results for the positive and negative cyclic load test.

Table 22: Test Specimen #2 TAS 203, Cyclic Test Spectrum and Average Cycle Time

Design Pressure	+80.0 / -80.0 psf	Stage		
		1	2	3
Pressure Range (psf)		0 – 40	0 – 48	0 – 104
Average Cycle Time (sec.)		2.35	2.46	N/A
Number of Cycles		600	70	1
Stage		4	5	6
Pressure Range (psf)		0 – 40	0 – 48	0 – 104
Average Cycle Time (sec.)		2.10	2.19	N/A
Number of Cycles		600	70	1

Table 23: Test Specimen #2 TAS 203, Positive Cyclic Load Test Results

Indicator Location	Maximum Deflection	Permanent Set (in.)
Span 1	0.04	0.01
Span 2	0.25	0.03

Table 24: Test Specimen #2 TAS 203, Negative Cyclic Load test results

Indicator Location	Maximum Deflection	Permanent Set (in.)
Span 1	0.07	0.01
Span 2	0.31	0.03

Note: See Architectural Testing Sketch #1 for indicator locations. Deflection/permanent set reported is the overall deflection between three points (longest unsupported span) which accounts for support movement

6.0 Test Results: (Continued)

6.4 Protocol TAS 203-94, *Cyclic Wind Pressure Loading*

Table 25: Test Specimen #3 TAS 203, Cyclic Test Spectrum and Average Cycle Time

Design Pressure	+80.0 / -80.0 psf	Stage		
		1	2	3
Pressure Range (psf)		0 – 40	0 – 48	0 – 104
Average Cycle Time (sec.)		2.31	2.55	N/A
Number of Cycles		600	70	1
Stage		4	5	6
Pressure Range (psf)		0 – 40	0 – 48	0 – 104
Average Cycle Time (sec.)		2.31	2.07	N/A
Number of Cycles		600	70	1

Table 26: Test Specimen #3 TAS 203, Positive Cyclic Load Test Results

Indicator Location	Maximum Deflection	Permanent Set (in.)
Span 1	0.06	0.01
Span 2	0.30	0.05

Table 27: Test Specimen #3 TAS 203, Negative Cyclic Load Test Results

Indicator Location	Maximum Deflection	Permanent Set (in.)
Span 1	0.04	0.01
Span 2	0.32	0.06

Note: See Architectural Testing Sketch #1 for indicator locations. Deflection/permanent set reported is the overall deflection between three points (longest unsupported span) which accounts for support movement.

6.0 Test Results: (Continued)

6.4 Protocol TAS 203-94, *Cyclic Wind Pressure Loading*

Table 28: Test Specimen #4 TAS 203, Cyclic Test Spectrum and Average Cycle Time

Design Pressure	+80.0 / -80.0 psf	Stage		
		1	2	3
Pressure Range (psf)		0 – 40	0 – 48	0 – 104
Average Cycle Time (sec.)		1.7	2.3	N/A
Number of Cycles		600	70	1
Stage		4	5	6
Pressure Range (psf)		0 – 40	0 – 48	0 – 104
Average Cycle Time (sec.)		2.0	2.1	N/A
Number of Cycles		600	70	1

Table 29: Test Specimen #4 TAS 203, Positive Cyclic Load Test Results

Indicator Location	Maximum Deflection	Permanent Set (in.)
Span 1	0.10	0.01
Span 2	0.40	0.03

Table 30: Test Specimen #4 TAS 203, Negative Cyclic Load Test Results

Indicator Location	Maximum Deflection	Permanent Set (in.)
Span 1	0.12	0.01
Span 2	0.31	0.03

Note: See Architectural Testing Sketch #1 for indicator locations. Deflection/permanent set reported is the overall deflection between three points (longest unsupported span) which accounts for support movement

Conclusion: Architectural Testing observed no signs of failure in any area of the test specimens during the cyclic load test; as such, the test specimens satisfy the cyclic load requirements of TAS 203.

7.0 Test Equipment:

Cannon: Constructed from steel piping utilizing compressed air to propel the missile

Missile: 2x4 Southern Pine

Timing Device: Electronic beam type

Cycling Mechanism: Computer controlled centrifugal blower with electronic pressure measuring device

Deflection Measuring Device: Linear transducers,

8.0 Laboratory Compliance Statements: The following are provided as required by the protocols for the testing reported herein.

Upon completion of testing, specimens tested for TAS 201-94 met the requirements of Section 1626 of the Florida Building Code, Building.

Upon completion of testing, specimens tested for TAS 202-94 met the requirements of Section 1620 of the Florida Building Code, Building.

Upon completion of testing, specimens tested for TAS 203-94 met the requirements of Section 1625 of the Florida Building Code, Building.

Tape and film were not used to seal against air leakage during structural testing.



Architectural Testing will service this report for the entire test record retention period. Test records that are retained such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation will be retained by Architectural Testing, Inc. for the entire test record retention period.

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimen(s) tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, Inc.

Digitally Signed by: John Bordagaray

John R. Bordagaray
Director – Regional Operations

Digitally Signed by: Shawn G. Collins

Shawn G. Collins, P.E.
Laboratory Support Engineer

JRB:sgc/asm

Attachments (pages): This report is complete only when all attachments listed are included.

Appendix A: Sketches (4)

Appendix B: Drawings (18)



Architectural Testing

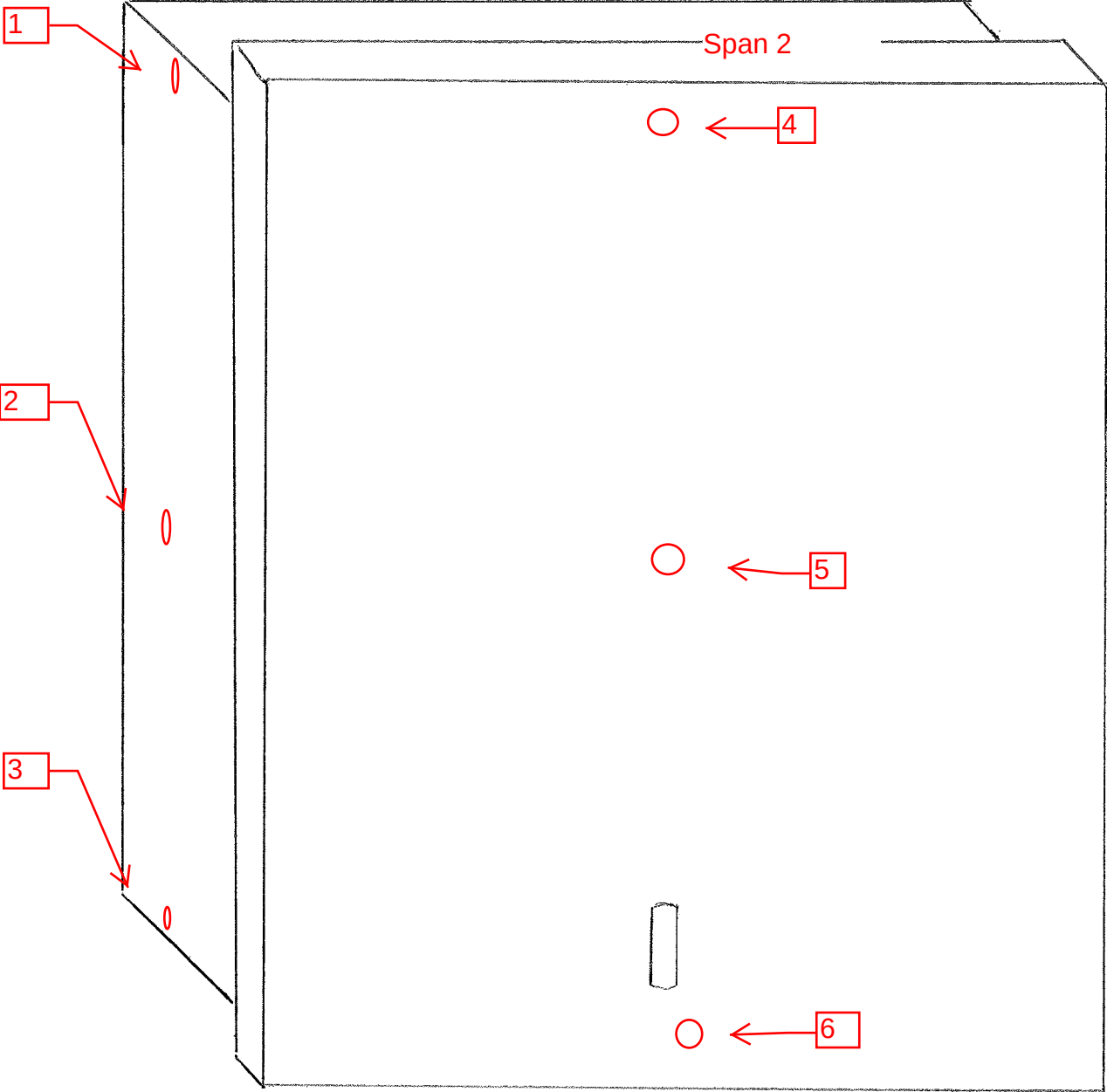
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Report Date: 12/19/2013

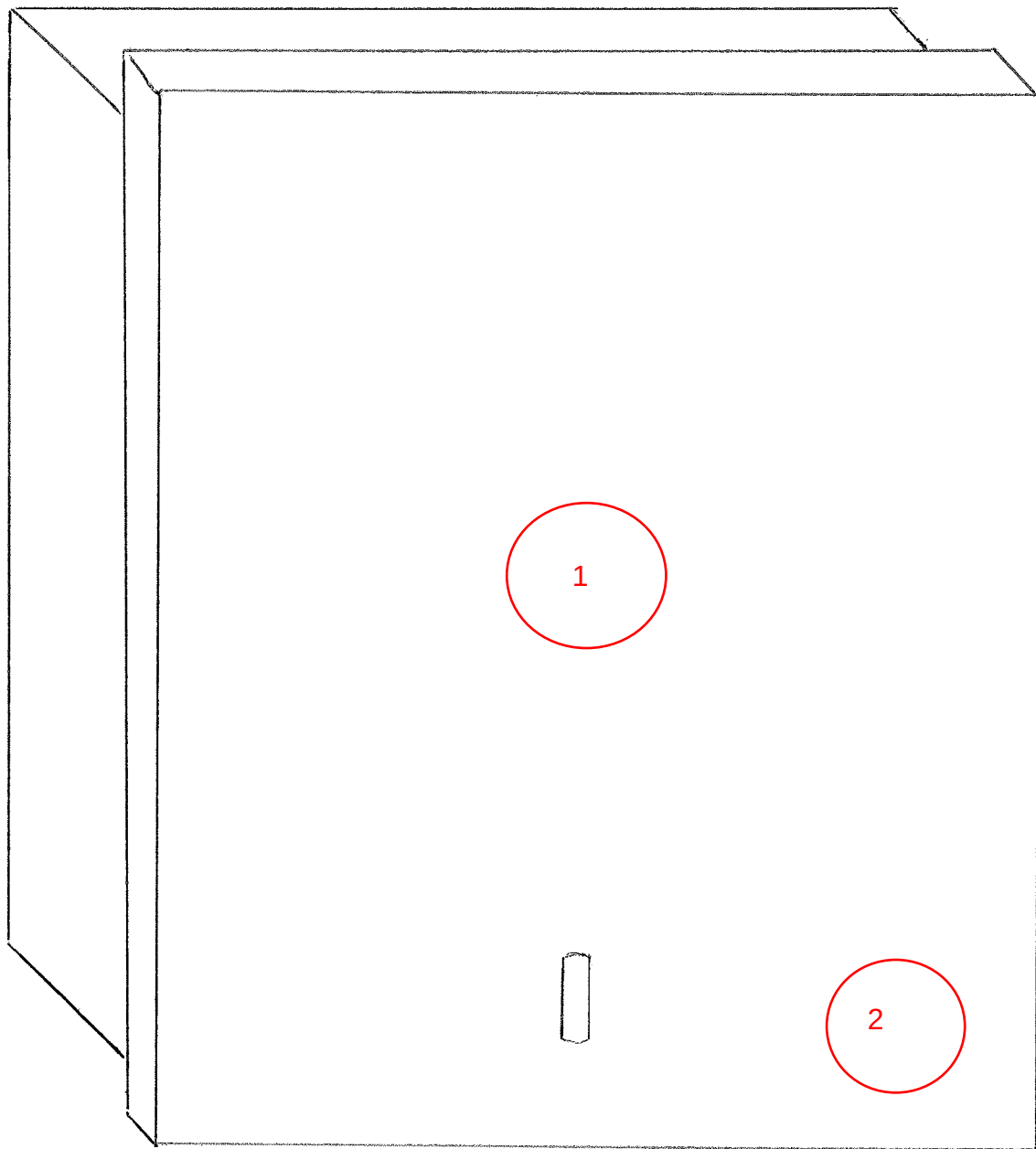
Appendix A

Sketches

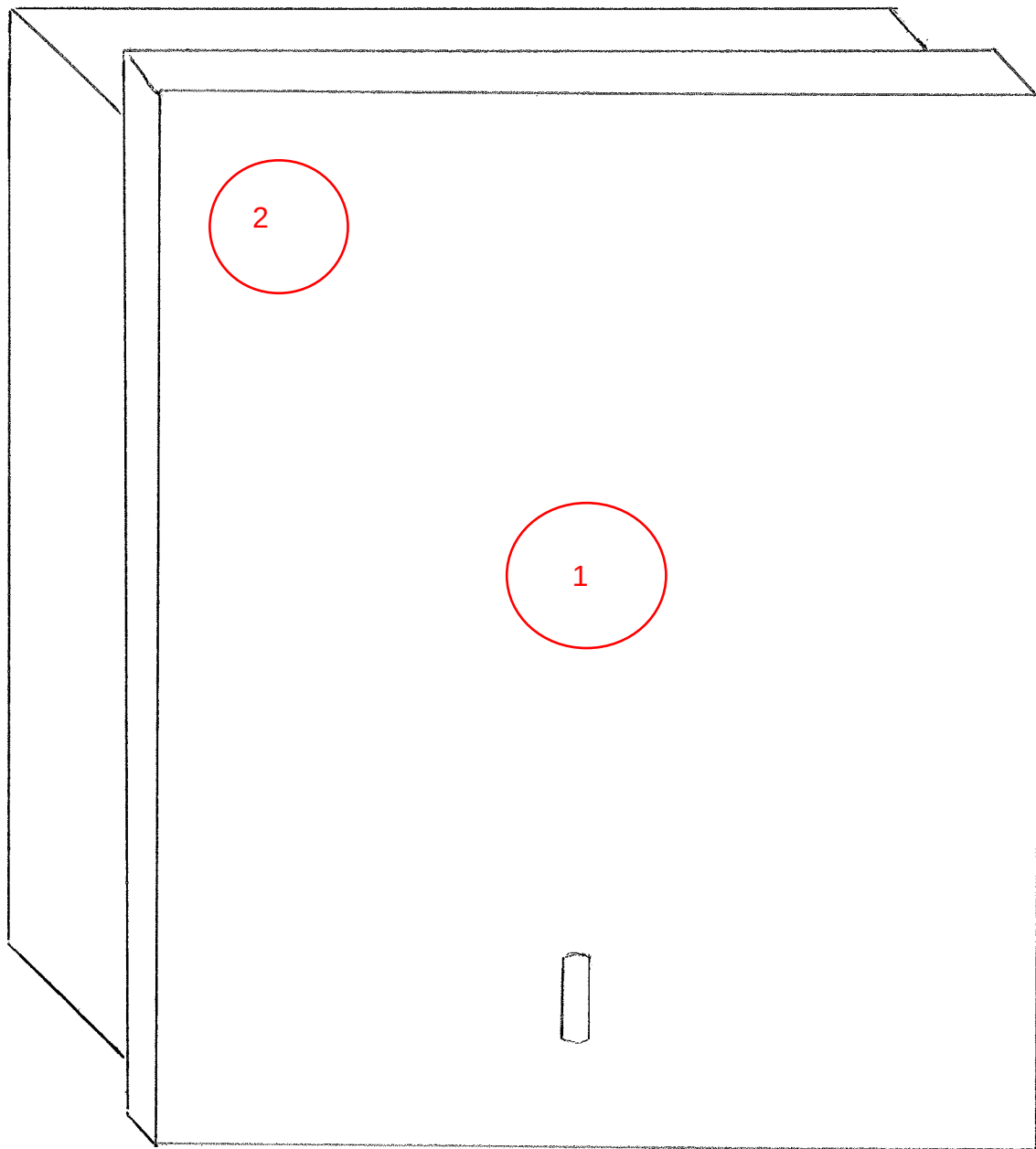
Span 1



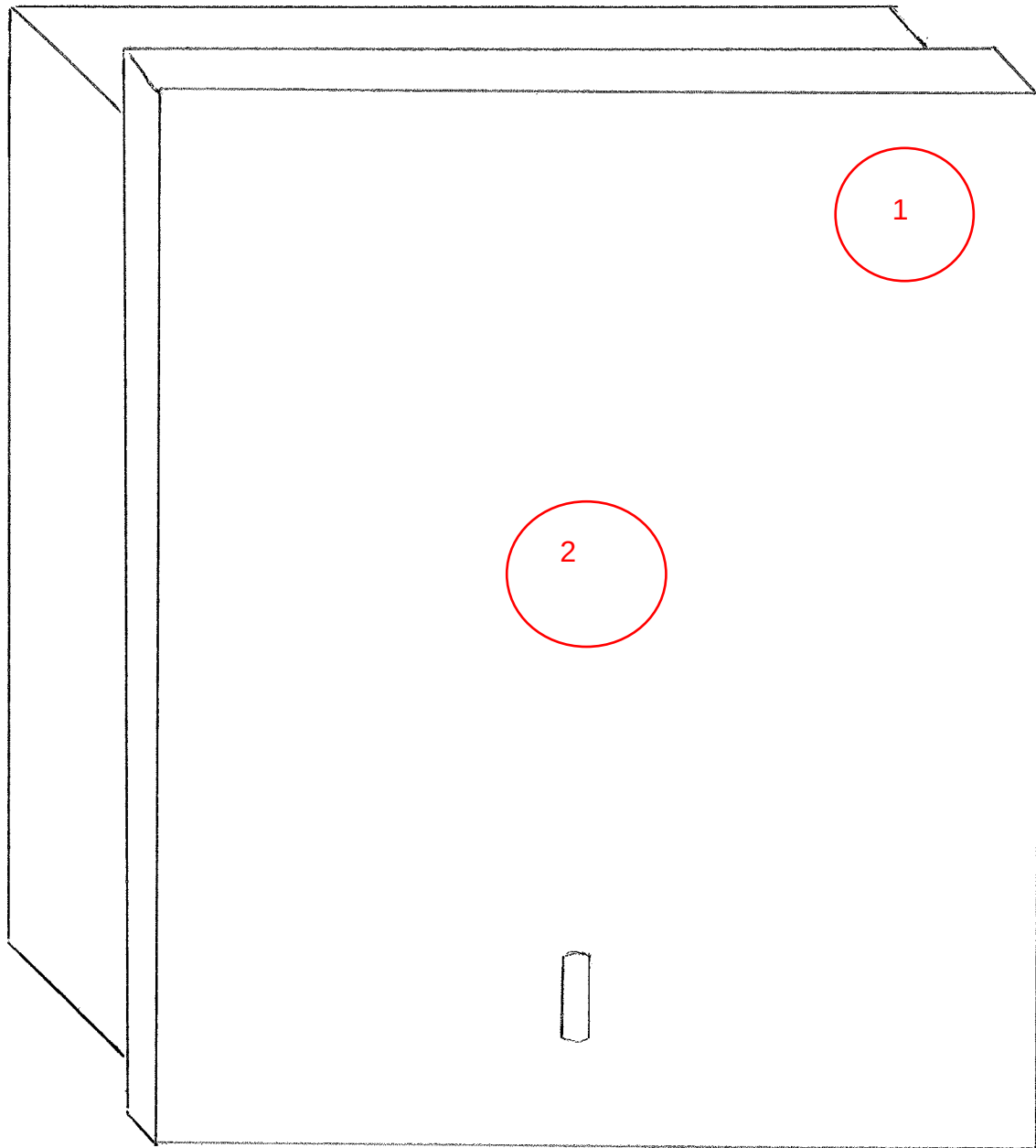
Transducer locations



Impacts unit #2



Impacts unit #3



Impacts unit #4



Architectural Testing

Test Report No.: D3324.01-602-18

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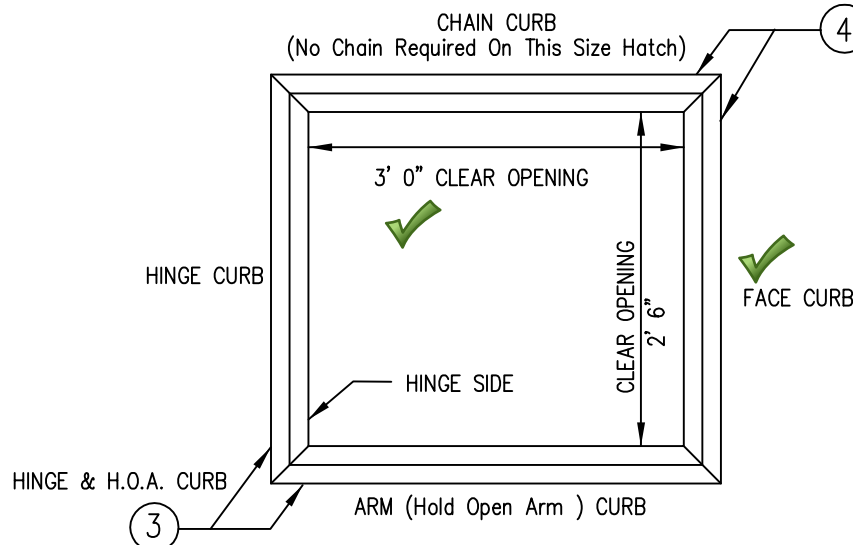
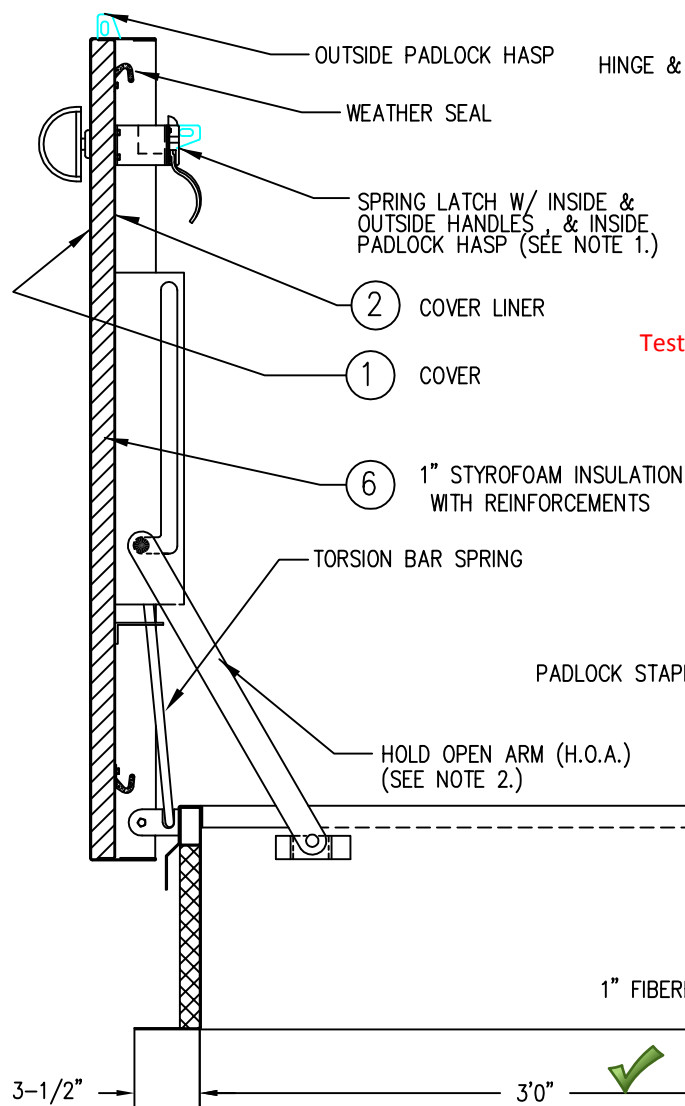
Appendix B

Drawings

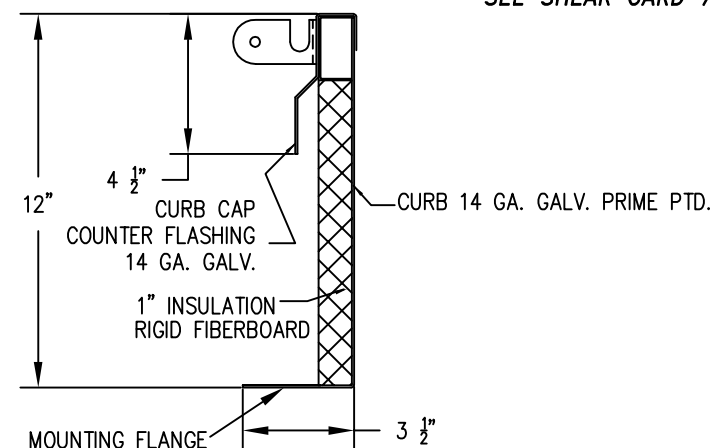
COVER	CURB	CURB	MATERIAL SCHEDULE
			PRIMED STEEL
X	X	X	GALV. PRIMED STEEL
			ALUMINUM

NOTES:

1. LOCATE LATCH & LATCH LOCK SUPPORT UNDER COVER. DRILL (4) LETTER "F" HOLES, ATTACH BRACKET, PRE-DRILL HANDLE GUIDE HOLE FROM OUTSIDE.
2. LINE UP HOLD OPEN ARM AND MECHANISM ON UNIT. MARK AND ATTACH.
3. FOR COVER REINFORCEMENT, SEE SHEAR CARD 7.



Test sample complies with these details
Deviations are noted
Report #D3324.01-602-18
Date: December 18, 2013 Tech JRB



SECTIONAL VIEW OF M-1 ROOF HATCH CURB

M-1 ROOF HATCH			
MATERIAL SCHEDULE			
QUANTITY	SIZE	COVER	FRAME
	3'0" X 2'6"	14 GA.	14 GA.
MILCOR COMMERCIAL PRODUCTS GROUP 848 Thomas Drive Bensenville, IL 60106 phone: (800) 624-8642 fax: 1-630-766-5259			
DEALER			
PROJECT			
LOCATION			
ARCH.			
CONT'D			
DATE:		DRAWN BY: LEK	
REV		JOB NO.	
DWG # M-1 36X30 ASSEMBLY		SHEET	

ORDER WILL NOT BE RELEASED FOR FABRICATION UNTIL SIGNED COPY IS RECEIVED.

VERIFICATION AND APPROVAL OF GENERAL ARRANGEMENT AND OVERALL DIMENSIONS OF THIS DOCUMENT ARE REQUIRED BEFORE THE ORDER IS ENTERED FOR MANUFACTURING.

APPROVAL SIGNATURE _____
TITLE HELD _____
DATE OF APPROVAL _____

M-1 ROOF HATCH FASTENER SCHEDULE

Description of Parts/Location	Fastener type and qty.	Spacing of fasteners
Cover liner to exterior cover	SCRW, HX WASH HD TEK 10-16X3/4 Qty. 8	2 each outside corner
Latch support to cover interior	BOLT, HEX HD 5/16-18X3/4 S-TAP Qty. 4	N/A
Latch to latch support	SCRW, HX WASH HD TEK 10-16X3/4 Qty. 4	N/A
Exterior latch handle to cover	SCRW, HX WASH HD TEK 10-16X3/4 Qty. 4	N/A
Torsion bar to curb & cover	SCRW, HX WASH HD TEK 10-16X3/4 Qty. 12	N/A
Gasket to cover liner	SCRW, HX WASH HD TEK 10-16X3/4 Qty. 15	8"-12"
Hold open arm bracket to curb	BOLT, HEX HD 5/16-18X3/4 S-TAP Qty. 2	N/A
Hold open arm bracket to cover	BOLT, HEX HD 5/16-18X3/4 S-TAP Qty. 3	N/A
Hold open arm to curb bracket	BOLT, HEX HD 5/16-18 X 1 Qty. 1	N/A
Hold open arm to curb bracket	NUT, ESNA HEX 5/16-18 Qty. 1	N/A
Cover to hinge	BOLT, HEX HD 5/16-18 X 1 Qty. 2	N/A
Cover to hinge	WASHER, FLAT 5/16 Qty. 2	N/A
Cover to hinge	NUT, ESNA HEX 5/16-18 Qty. 2	N/A
Padlock staple to curb	SCRW, HX WASH HD TEK 10-16X3/4 Qty. 3	N/A



Architectural Testing

Test sample complies with these details

Deviations are noted

Report # D3324.01-602-18

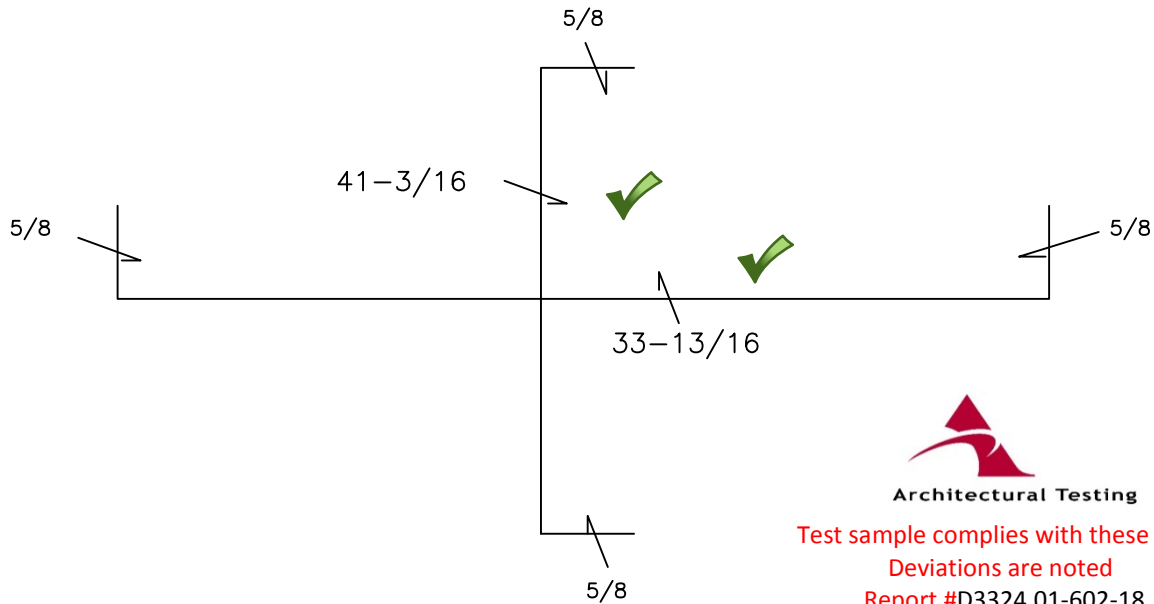
Date: December 18, 2013 Tech JRB

COVER LINER

M-3'x2'6"

HATCH

2



Architectural Testing

Test sample complies with these details

Deviations are noted

Report #D3324.01-602-18

Date: December 18, 2013 Tech JRB

GAGE

22

GALV.

PCS.
REQ'D.

SHEAR

ORDER
NUMBER

NOTES

WIDTH

HEIGHT

1

35-1/16

42-7/16

TYP. (4) 5/8"

5/8"

90 UP

90 UP

-30

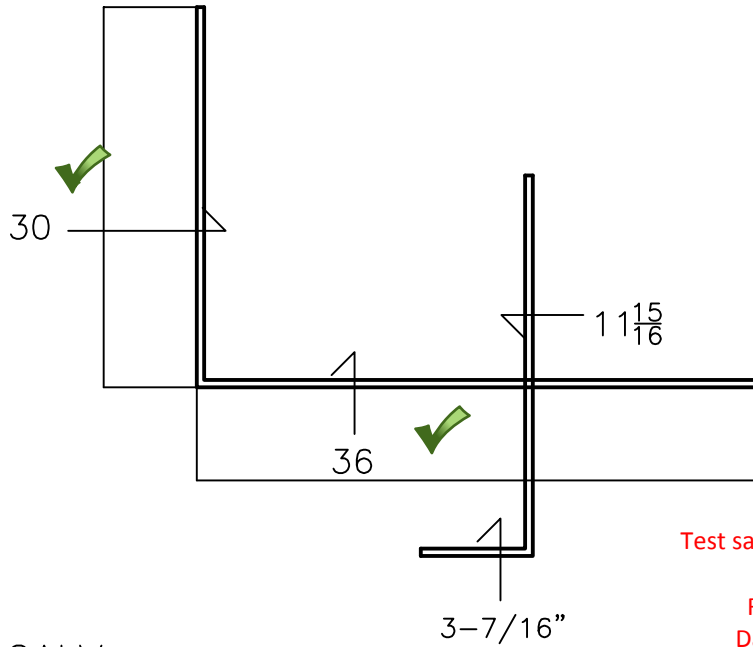
FACE CURB

M1-3'X2'6"

HATCH

w/Side Curb

4



Architectural Testing

Test sample complies with these details
Deviations are noted

Report #D3324.01-602-18

Date: December 18, 2013 Tech JRB

GAGE

14

GALV.

PCS.
REQ'D.

SHEAR

WIDTH

HEIGHT

ORDER
NUMBER

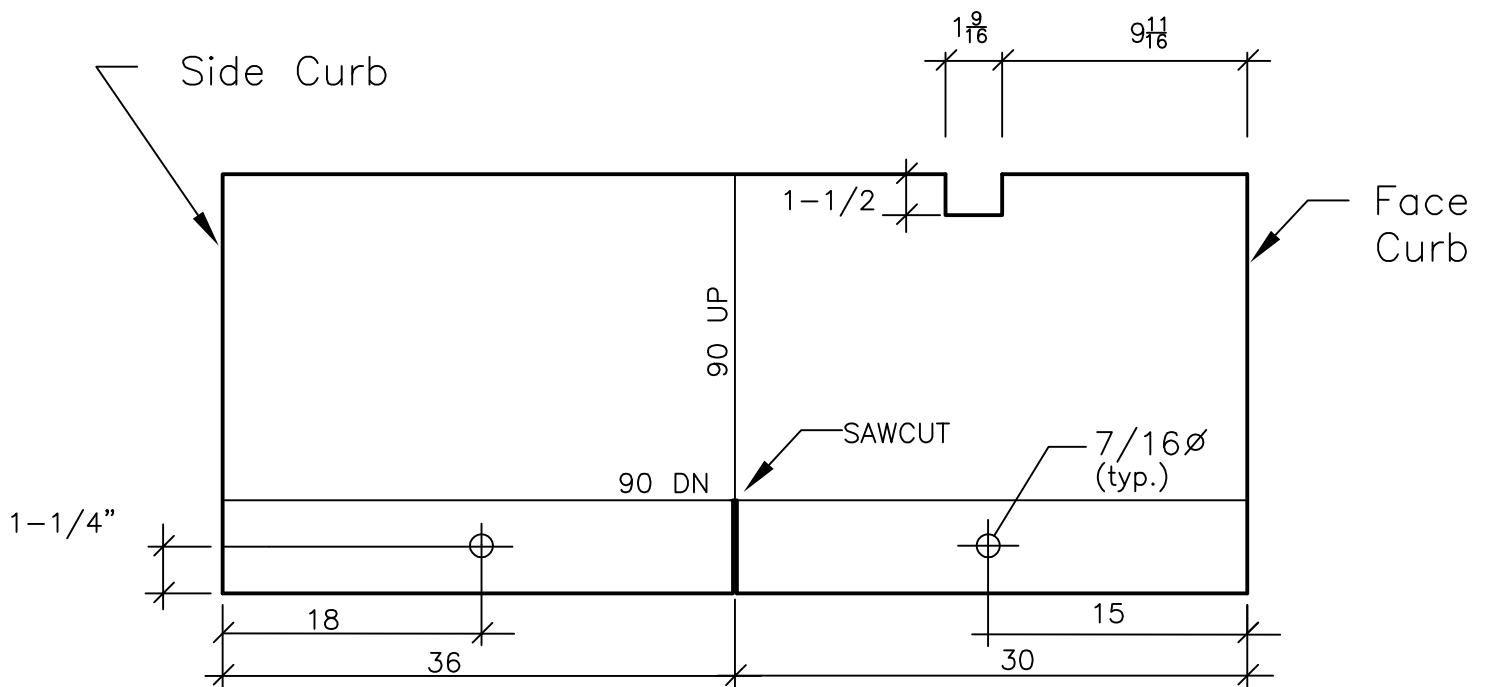
NOTES

1

66

15-3/8

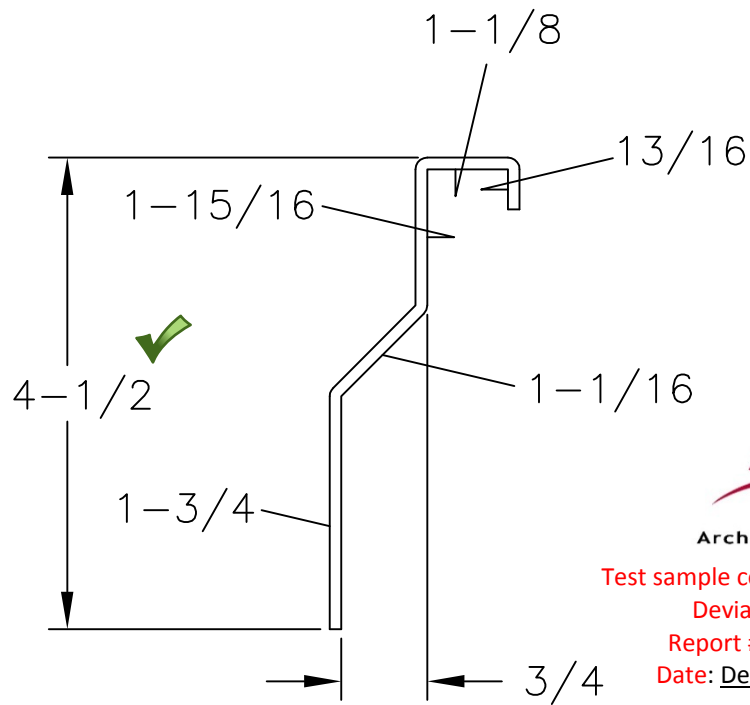
Side Curb

Face
Curb

CURB CAP

M1-3'x2'6"

HATCH



5



Test sample complies with these details
 Deviations are noted
 Report #D3324.01-602-18
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GAGE

14

GALV.

PCS.
REQ'D.

SHEAR

WIDTH

HEIGHT

ORDER
NUMBER

NOTES

2

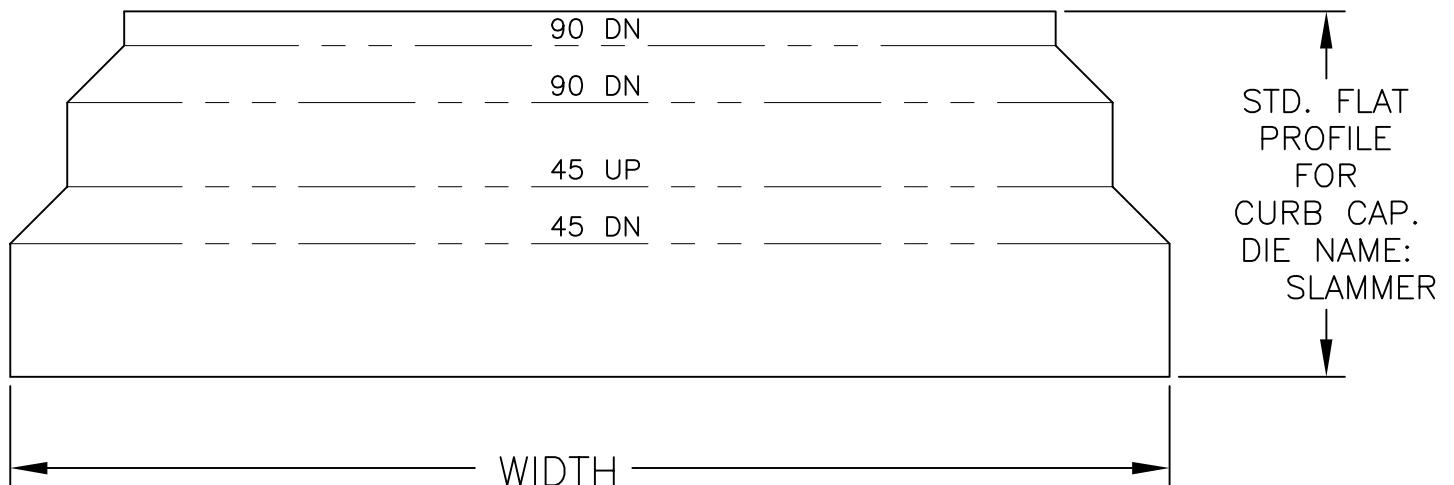
39-11/16

6-5/8

2

33-11/16

6-5/8



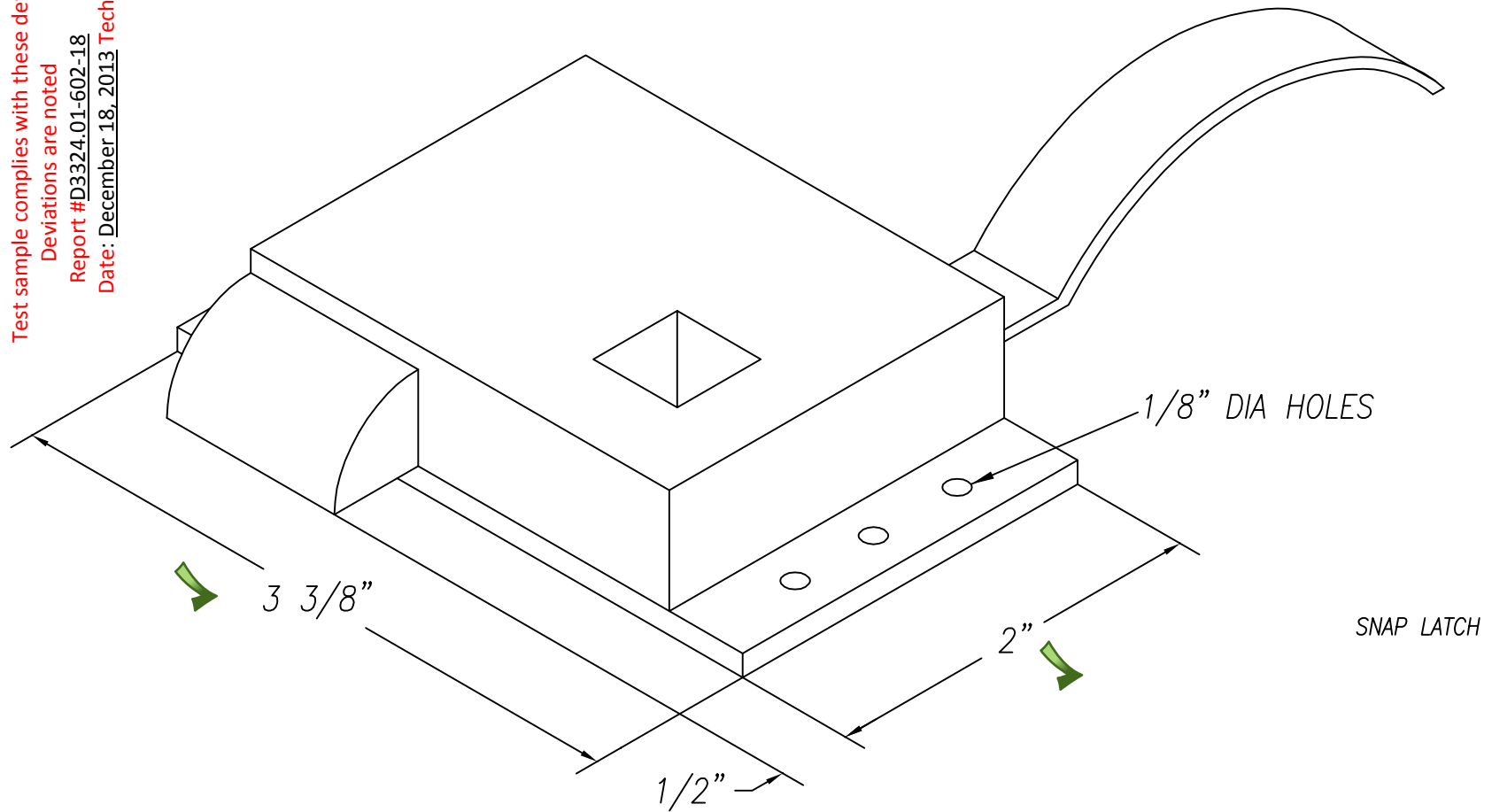


Architectural Testing

Test sample complies with these details
Deviations are noted

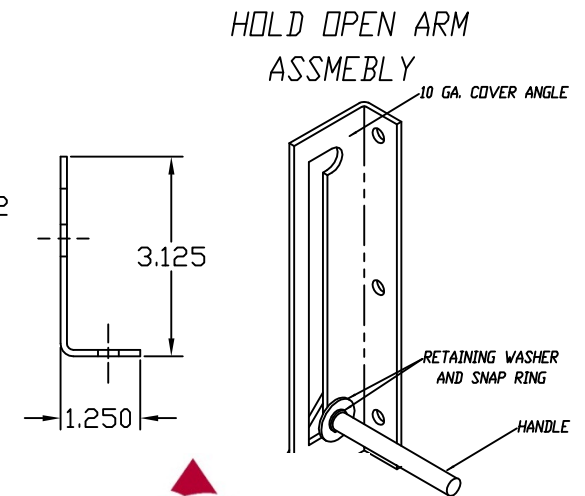
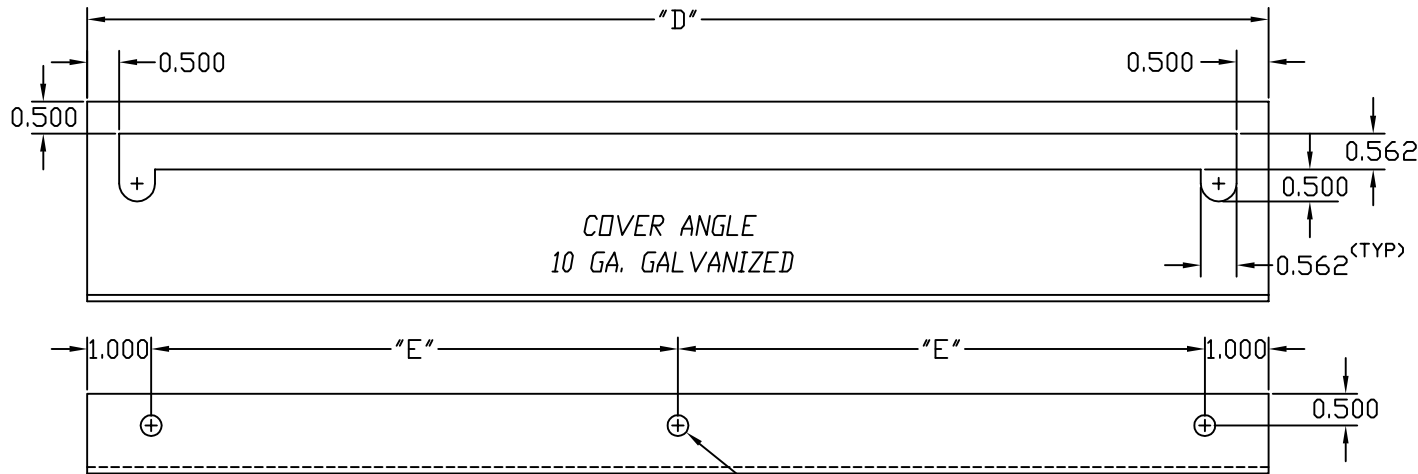
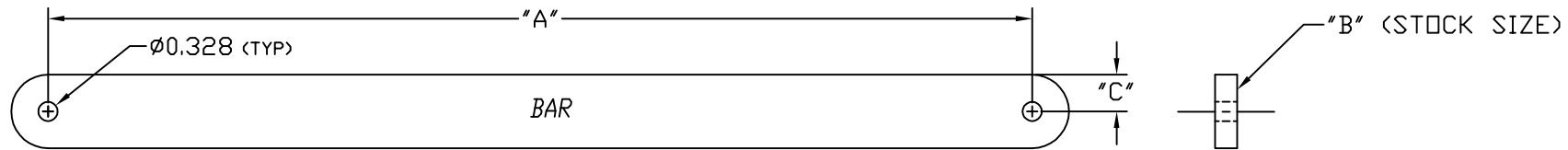
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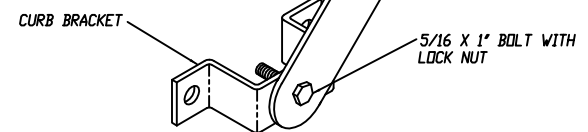
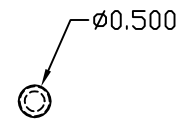
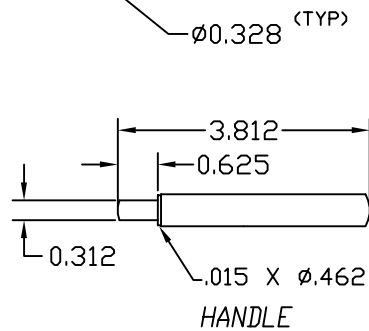
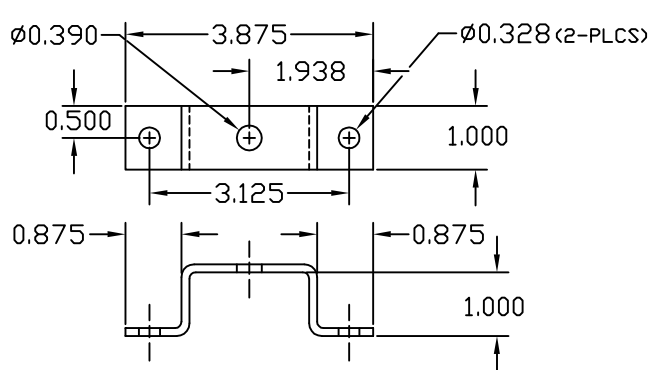


Xref A-MILCOR

31-11-15-040



Test sample complies with these details
 Deviations are noted
 Report # D3324-01-602-18
 Date: December 18, 2013 Tech JRB

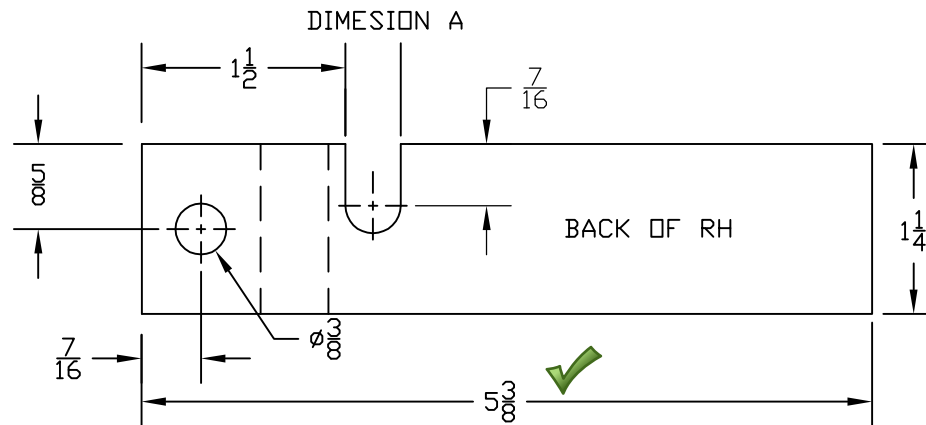


NOTE: ASSEMBLE HANDLE TO BAR AND CHROME PLATE.

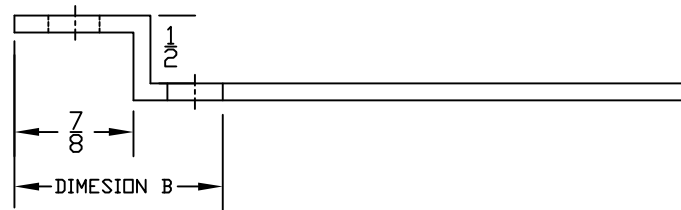
PART NUMBER	UNIT WIDTH	BAR			COVER ANGLE		
		DIM "A"	"B" (S.S.)	DIM "C"	DIM "D"	DIM "E"	
31-11-04-025	29"	14 7/8	1/4 X 1"	1/2	13 1/8	5 9/16	SMALL
31-11-04-030	29"-42"	16 3/4	1/4 X 1"	1/2	13 1/8	5 9/16	STANDARD
31-11-04-035	>42"	23 1/4	3/8X1 1/4	5/8	18 1/2	8 1/4	LONG

DESIGNER: B.D.W.	DATE: 12-11-00	MILCOR Lima	
CHECKED: [Signature]	AUTOCAD REL. 1.1	HATCH HOLD OPEN ARM	
DATE PLOTTED: [Date]	MATERIAL: [Material]	PART NO.:	DWG. NO.:
FILE: [File Name]	SCALE: [Scale]	FILE: VACADILLVACHVIL30PARH	SHEET 1 OF 1

REV.	ECN	DESCRIPTION	BY	DATE
A		REMOVED 5/8" RAD. AT HINGE PIVOT END.	JMF	6/17/09



FLAT DETAIL: SIDE ELEVATION VIEW



FORMED DETAIL: PLAN VIEW



Architectural Testing

Test sample complies with these details

Deviations are noted

Report #D3324.01-602-18

Date: December 18, 2013 Tech JRB



NOTES:

1. MAT'L: 0.125' LOW CARBON STEEL, HOT ROLLED, PICKLED & OILED, CADMIUM PLATED OR HOT DIP GALVANIZED AFTER FABRICATION.
2. NO CRACKING OR SPLITTING ALLOWED ON OUTSIDE OF 90 DEG. BENDS.

MilcoR

COMMERCIAL PRODUCTS GROUP
848 Thomas Drive
Bensenville, IL. 60106
phone: (800) 624-8642
fax: 1-630-766-5259

TITLE:
4000-105 RH END HINGE

MATERIAL
1/8" X 1 1/4" STEEL BAR

DRAWN: DATE	CHK'D:	DATE:
PART NO: 31-12-07-021 219695	REV: A	SHEET 1 of 1

MODEL NO.	DIMENSION A	DIMENSION B
M-1	1/2" +1/32"	1 5/8" +1/32"
	13/32" +1/32"	1 17/32" +1/32"

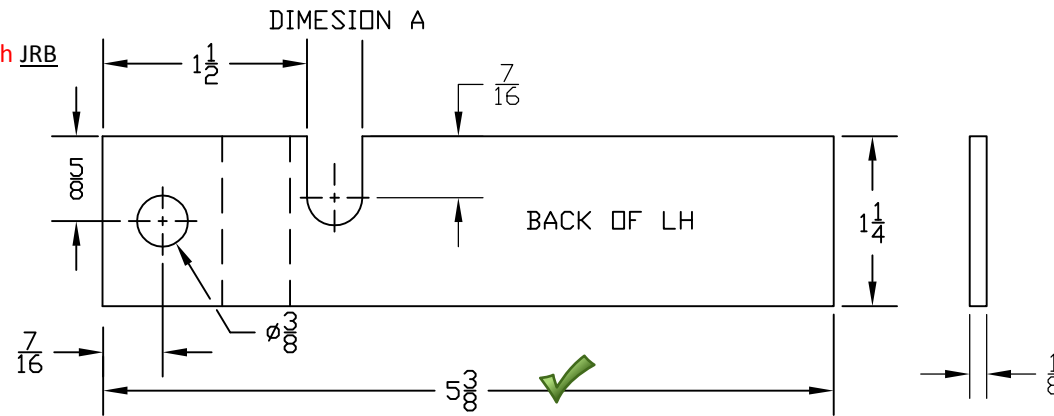


Test sample complies with these details

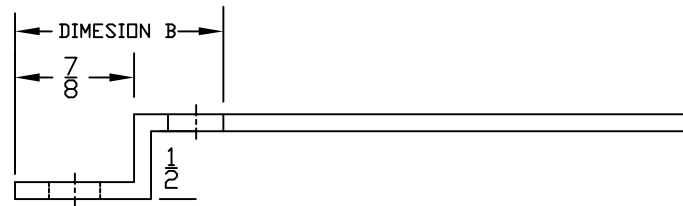
Deviations are noted

Report #D3324.01-602-18

Date: December 18, 2013 Tech JRB



FLAT DETAIL: SIDE ELEVATION VIEW



FORMED DETAIL: PLAN VIEW



NOTES:

1. MAT'L: 0.125' LOW CARBON STEEL, HOT ROLLED, PICKLED & OILED, CADMIUM PLATED OR HOT DIP GALVANIZED AFTER FABRICATION.
2. NO CRACKING OR SPLITTING ALLOWED ON OUTSIDE OF 90 DEG. BENDS.

REV.	ECN	DESCRIPTION	BY	DATE
A		REMOVED 5/8" RAD. AT HINGE PIVOT END.	JMF	6/17/09

MilcoR

COMMERCIAL PRODUCTS GROUP
848 Thomas Drive
Bensenville, IL. 60106
phone: (800) 624-8642
fax: 1-630-766-5259

TITLE: 4000-105 LH END HINGE			
MATERIAL 1/8" X 1 1/4" STEEL BAR			
DRAWN: DATE	CHK'D:	DATE:	
PART NO: 31-12-07-020 219694		REV: A	SHEET 1 of 1

MODEL NO.	DIMENSION A	DIMENSION B
M-1	1/2" +1/32"	1 5/8" +1/32"
	13/32" +1/32"	1 17/32" +1/32"

PROPRIETARY NOTICE

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DWG NO.
12092 R-3



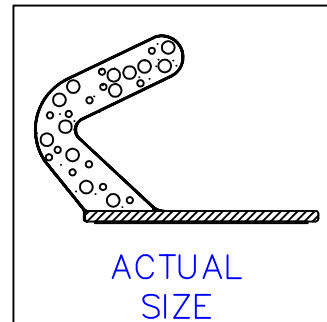
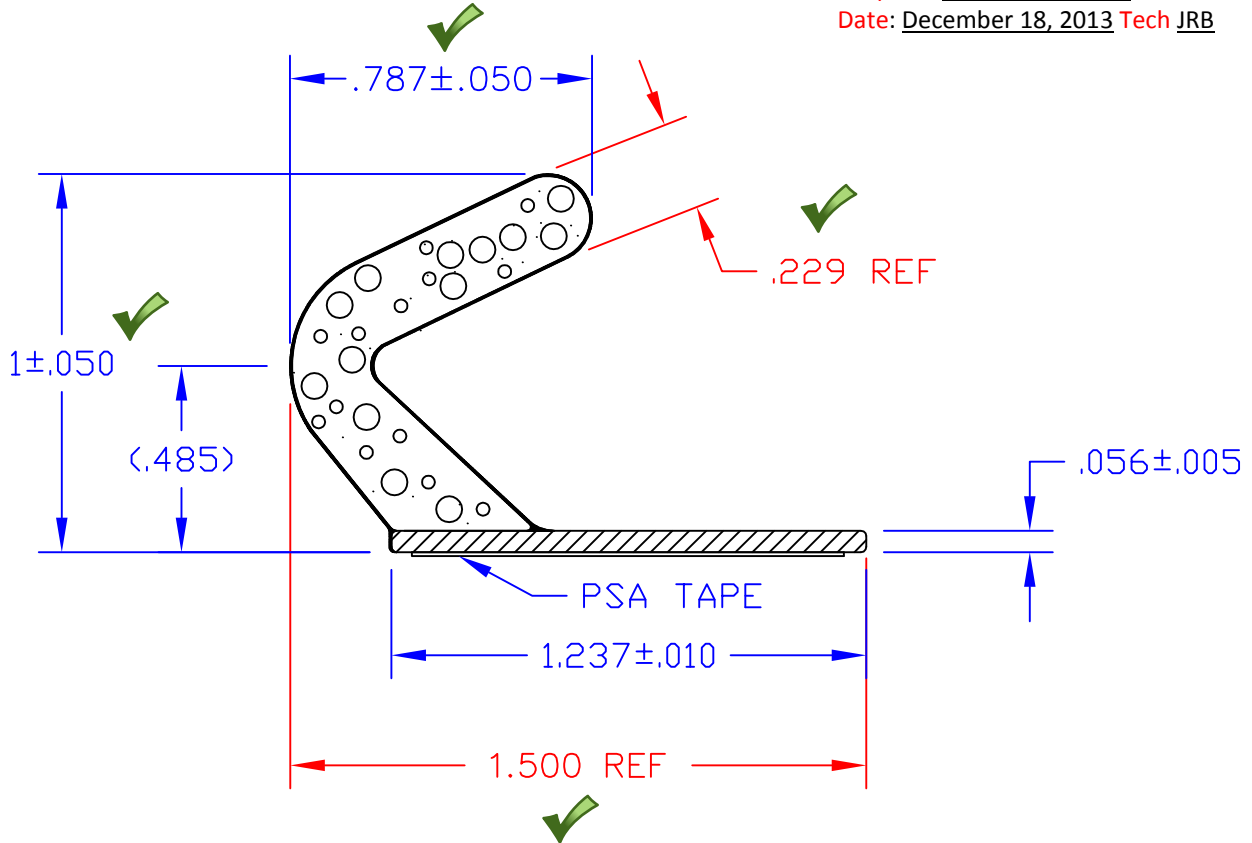
Architectural Testing

Test sample complies with these details

Deviations are noted

Report #D3324.01-602-18

Date: December 18, 2013 Tech JRB



CUSTOMER APPROVAL

DATE

FD104 R-1 SD074 CD123 R-1

REVISIONS

1.Changed Overall Width to Ref Dim	RCH	2/9/95
2.SEE ECN 034-08	AA	9/26/08
3.SEE ECN #090-10 Up Die Info	AA	08/30/10
4.		
5.		
6.		

DRAWN

RCH

DATE

01/13/94

CHK'D

PM

SCALE:

2:1

NOTES:

TITLE:

MILCOR Roof Hatch Seal



FOAM-TITE
AMESBURY GROUP

57 South Hunt Rd.
Amesbury, MA 01913

Dwg. or Part No.

12092

REV.

3

ECN	DESCRIPTION	BY	DATE
	REDRAWN	JEG	8/15/00
A	CHG'D RADIUS TO 1/2"	JEG	2/4/03



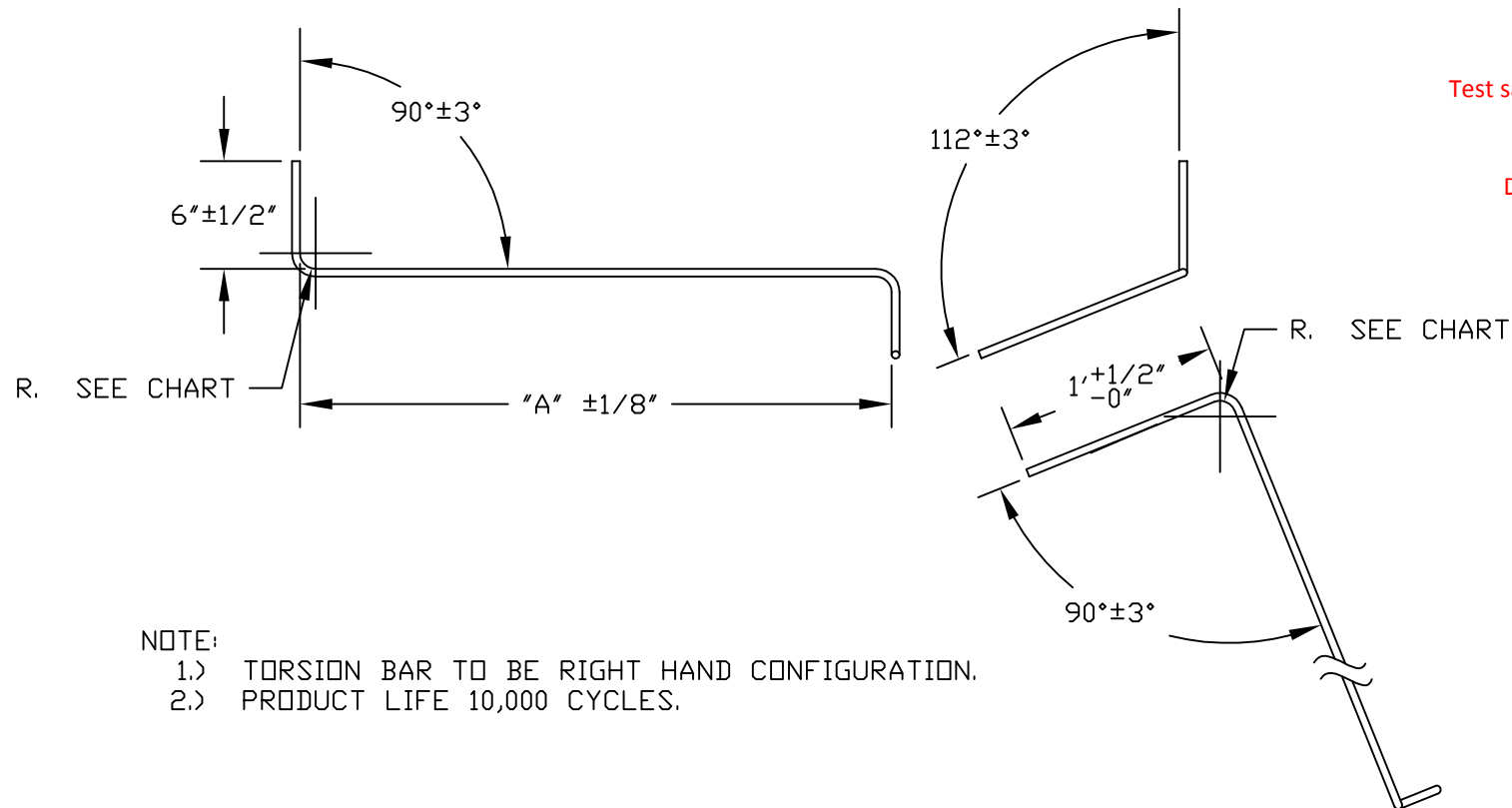
Architectural Testing

Test sample complies with these details

Deviations are noted

Report #D3324.01-602-18

Date: December 18, 2013 Tech JRB



NOTE:

- 1.) TORSION BAR TO BE RIGHT HAND CONFIGURATION.
- 2.) PRODUCT LIFE 10,000 CYCLES.

31-18-14-150	T7	.500	2245 IN. LB.	000,000 PSI	1/2"	3'-3"	M HATCH
31-18-14-145	T6	.400	0000 IN. LB.	000,000 PSI	1/2"	3'-3"	RCS & RDS HATCH
31-18-14-130	T5	.435	1850 IN. LB.	000,000 PSI	1/2"	2'-9"	M-1 HATCH
31-18-14-125	T4	.400	1410 IN. LB.	000,000 PSI	1/2"	2'-9"	RAS-1 & RBS-1 HATCH
31-18-14-120	T3	.362	1048 IN. LB.	112,500 PSI	1/2"	2'-9"	RAS-1 & RBS-1 HATCH
31-18-14-075	T2	.343	790 IN. LB.	99,700 PSI	1/2"	2'-9"	RCS-1 & RDS-1 HATCH
PART NO.	WIRE DIA.	TORQUE @ 112°	CALC. MAX. STRESS	RADIUS	DIM. "A"	IDENTIFICATION COLOR	WHERE USED

 $\overline{MILCoR}$

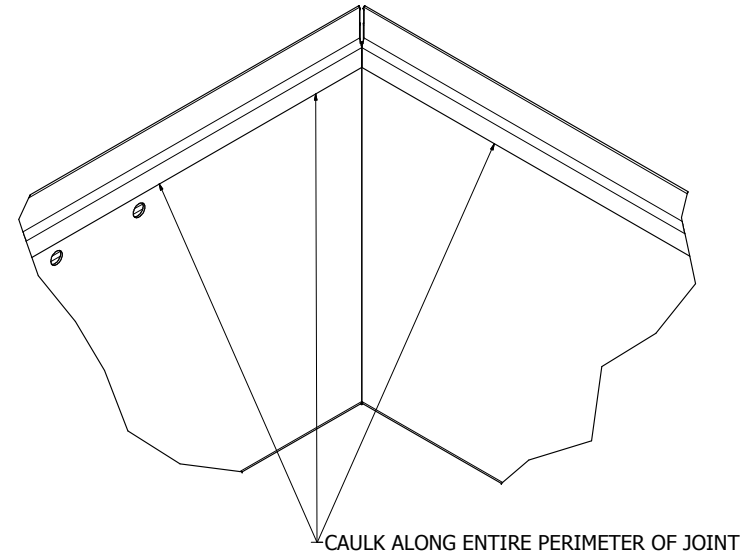
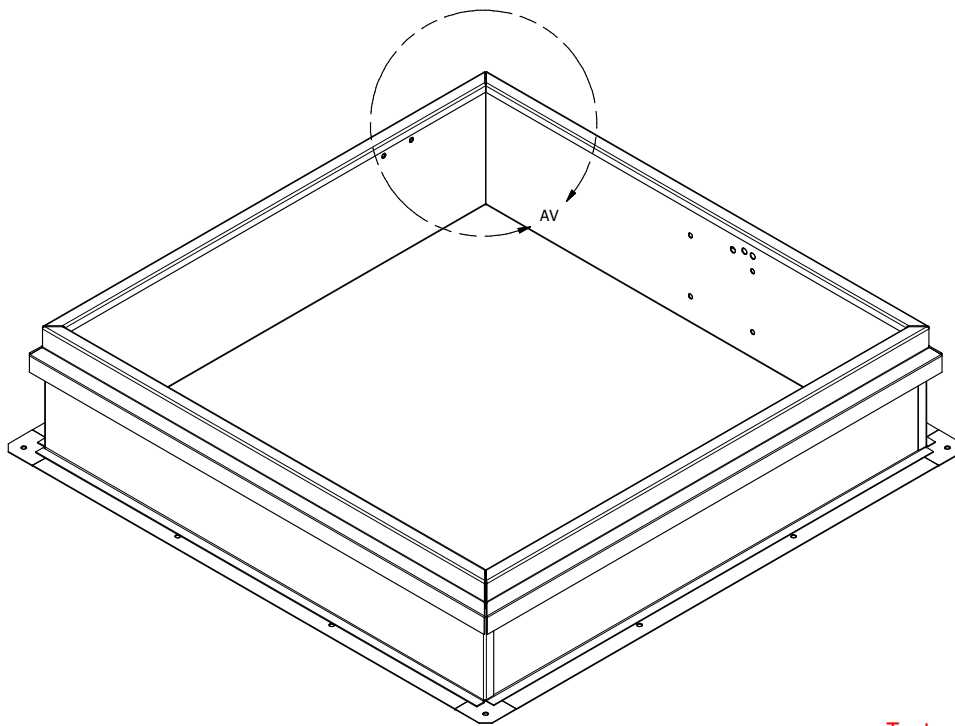
COMMERCIAL PRODUCTS GROUP
484 Thomas Drive
Bensenville, IL. 60106
phone: (800) 624-8642
fax: 1-630-766-5259

TITLE:	SPRING, TORSION BAR ROOF HATCH
--------	-----------------------------------

MATERIAL:
OIL-TEMPERED MECHANICAL SPRING WIRE
PER ASTM A229

DRAWN: JEG	CHK'D:	DATE: 8/15/00
------------	--------	---------------

PART NO:	REV:	SHEET
31-18-14-075 thru 31-18-14-150		1 of 1



DETAIL AV
SCALE 0.6 : 1

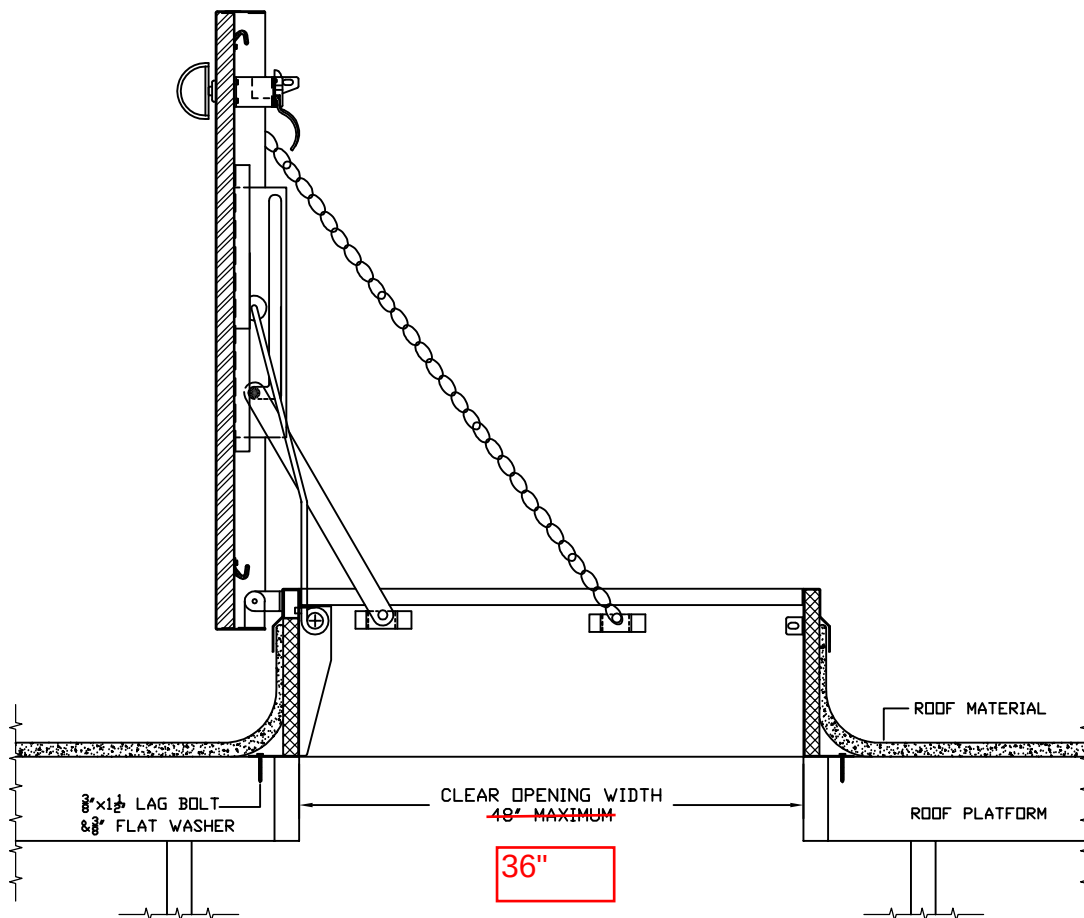


Architectural Testing

Test sample complies with these details
Deviations are noted
Report #D3324.01-602-18
Date: December 18, 2013 Tech JRB

DRAWN	10/23/2013	COMMERCIAL PRODUCTS GROUP	
CHECKED	MilcoR	Fax: 972-943-6138 www.commercialproductsgroup.com	
QA		815 Kimberly Drive Carol Stream, IL 60188 Ph: 800-624-8642	
RFPG		TITLE	
	TOLERANCE		
	UNLESS SPECIFIED		
	.XXX ± 0.005"		
APPROVED	.XX ± 0.01"		
	FRACT. ± 1/16"		
	ANGLES ± 1°		
	SIZE	DWG NO	REV
	SCALE	FLORIDA HATCH	---
		SHEET 15 OF 15	

SINGLE LEAF ROOF HATCH



Architectural Testing

Test sample complies with these details

Deviations are noted

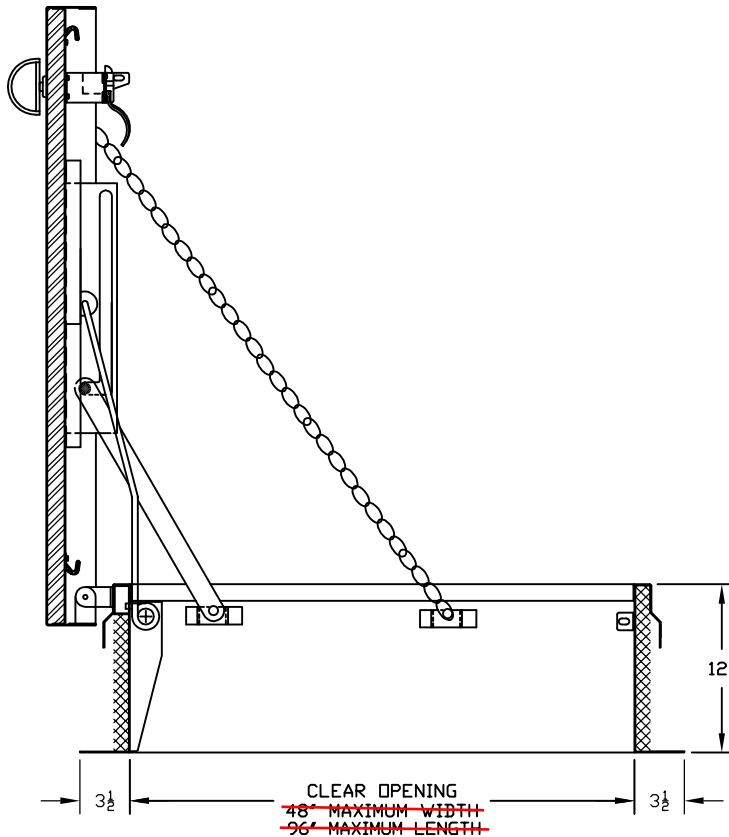
Report #D3324.01-602-18

Date: December 18, 2013 Tech JRB

0	ORIGINAL	MM-DD-YY
NO.	ECN NO.	REVISION
    		DATE
DRAWN BY: JM DATE: 12-4-13 SCALE: NONE AUTOCAD 2013		
 COMMERCIAL PRODUCTS GROUP 815 KIMBERLY DR. CAROL STREAM, IL 60188 PH. 800-624-8642 FAX: 866/466-9335 www.commercialproductsgroup.com		
TITLE: SINGLE LEAF ROOF HATCH		
JOB NO.	SUBMITTAL	DWG. NO. XXXX-XXX-XXX-XXX
FILE:		
CHECKED BY: X.X.X.	DATE: MM-DD-YY	SHEET: 1 OF 3

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SINGLE LEAF ROOF HATCH



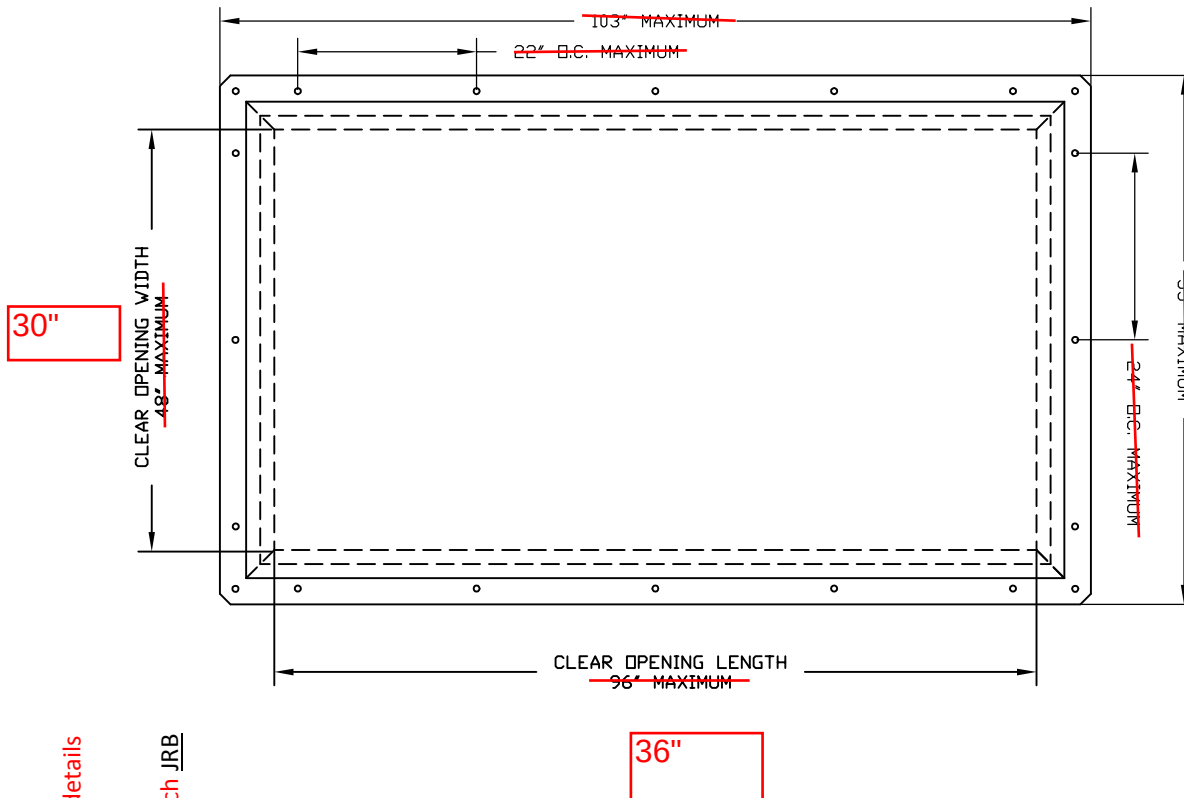
30" x 36"

Architectural Testing
Test sample complies with these details
Deviations are noted
Report #D3324.01-602-18
Date: December 18, 2013 Tech JRB

0	ORIGINAL	MM-DD-YY
NO.	ECN NO.	REVISION
    		DATE
DRAWN BY: JM DATE: 12-4-13 SCALE: NONE AUTOCAD 2013		
COMMERCIAL PRODUCTS GROUP 815 KIMBERLY DR. CAROL STREAM, IL 60188 PH. 800-624-8642 FAX: 866/466-9335 www.commercialproductsgroup.com		
TITLE: SINGLE LEAF ROOF HATCH		
JOB NO. SUBMITTAL		DWG. NO. XXXX-XXX-XXX-XXX
FILE:		
CHECKED BY: X.X.X.	DATE: MM-DD-YY	SHEET: 2 OF 3

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SINGLE LEAF ROOF HATCH



Unit tested fasteners:
1-1/2" Lag bolts.
measure 15" o.c.
maximum



Architectural Testing
Test sample complies with these details
Deviations are noted
Report #D3324.01-602-18
Date: December 18, 2013 Tech JRB

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0	ECN NO.	ORIGINAL	MM-DD-YY
NO.	ECN NO.	REVISION	DATE







DRAWN BY: JM		 COMMERCIAL PRODUCTS GROUP 815 KIMBERLY DR. CAROL STREAM, IL 60188 PH. 800-624-8642 FAX: 866/466-9335 www.commercialproductsgroup.com
DATE: 12-4-13	SCALE: NONE	
AUTOCAD 2013		

TOLERANCE UNLESS SPECIFIED	
.XXX	± 0.005"
.XX	± 0.01"
FRACT.	± 1/16"
ANGLES	± 0°

TITLE: SINGLE LEAF ROOF HATCH	
JOB NO. SUBMITTAL	DWG. NO. XXXX-XXX-XXX-XXX
FILE:	
CHECKED BY: X.X.X.	DATE: MM-DD-YY
SHEET: 3 OF 3	