

RANGER ARCHITECTURAL PRODUCTS, INC. TEST REPORT

SCOPE OF WORK

ANSI/AMCA 540 TESTING ON 4" RAIN-RESISTANT, HORIZONTAL LOUVER

REPORT NUMBER

M5994.01-109-44

TEST DATE(S)

07/08/21 - 07/09/21

ISSUE DATE

02/07/22

PAGES

22

DOCUMENT CONTROL NUMBER

RT-R-AMER-Test-2806 (06/15/21) © 2017 INTERTEK





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TEST REPORT FOR RANGER ARCHITECTURAL PRODUCTS, INC.

Report No.: M5994.01-109-44

Date: 02/07/22

REPORT ISSUED TO

RANGER ARCHITECTURAL PRODUCTS, INC. 19031 Aldine Westfield Road Houston, Texas 77073

SECTION 1

SCOPE

Architectural Testing, Inc. (an Intertek company), dba Intertek Building & Construction (B&C) was contracted by Ranger Architectural Products, Inc. to perform testing in accordance with ANSI/AMCA 540 on their 4" Rain-Resistant, horizontal louver. Results obtained are tested values and were secured by using the designated test method(s). Testing was conducted at Intertek B&C test facility in York, Pennsylvania.

For INTERTEK B&C:

COMPLETED BY: Vicki L. McElwain **REVIEWED BY:** Timothy J. McGill Manager -Senior Project Engineer -TITLE: **Product Testing Product Testing** TITLE: **SIGNATURE: SIGNATURE:** 02/07/22 02/07/22 DATE: DATE:

APM:nls

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SECTION 2

TEST METHOD(S)

The specimens were evaluated in accordance with the following:

ANSI/AMCA Standard 540-13, Test Method for Louvers Impacted by Wind Borne Debris

ASTM E1996-20, Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes

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

SECTION 3

MATERIAL SOURCE/INSTALLATION

Test specimens were provided by the client. Representative samples of the test specimen(s) will be retained by Intertek B&C for a minimum of five years from the test completion date.

The specimens were installed into a Spruce-Pine-Fir wood buck. The rough opening allowed for a 1/8" shim space. The exterior perimeter of the louver was not sealed.

LOCATION	ANCHOR DESCRIPTION	ANCHOR LOCATION
Head, sill, and jambs	8" wide by 3" deep by 1-1/2" high by $3/16$ " thick aluminum clips with three $1/4$ " x 2" self-tapping hex head screws through the clips and into the louver. Three #10 x 1-1/2" pan head screws were through the clips and into the wood buck.	

Tape and film were used to seal against air leakage during structural testing. In our opinion, the tape and film did not influence the results of the test.

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SECTION 4

EQUIPMENT

Cannon: Constructed from steel piping utilizing compressed air to propel the missile, A1207

Missile: 2x4 Southern Pine

Timing Device: Electronic Beam Type

Cycling Mechanism: Computer controlled centrifugal blower with electronic pressure measuring

device

Tape Measure Verification: 63788

Weather Station: 63316 **Control Panel**: 003921

Linear Transducers: 62182, 003625, 003420, 64460, 64368, Y003056, 003439, 62187, 62185

SECTION 5

LIST OF OFFICIAL OBSERVERS

NAME	COMPANY
Robert J. Beatty	Intertek B&C
John A. Shanabrook	Intertek B&C
Timothy J. McGill	Intertek B&C
Andrew P. Mehalick	Intertek B&C

SECTION 6

TEST SPECIMEN DESCRIPTION

Product Type: Horizontal Louver **Series/Model**: 4" Rain-Resistant

Product Size(s):

Test Specimens #1 - #3:

OVERALL AREA:	WIDTH		HEIGHT		DEPTH	
1.5 m² (16.0 ft²)	millimeters	inches	millimeters	inches	millimeters	inches
Overall size	1219	48	1219	48	102	4
Louver core size	1105	43-1/2	1092	43	102	4

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The following descriptions apply to all specimens.

Louver Construction:

LOUVER MEMBER	MATERIAL	DESCRIPTION	
Head	Aluminum	Extruded, 0.075" thick, secured to the jamb using two #10 x 1-1/2" pan head screws at each end, through the jambs and into the screw bosse	
Sill	Aluminum	Extruded, 0.075" thick, sloped to the exterior, secured to the jambs using two #10 x 1-1/2" pan head screws at each end, through the jambs and into the screw bosses	
Jambs	Aluminum	Extruded, 0.075" thick	
Head, sill, and jamb covers	Aluminum	Extruded, 0.075" thick, clipped upon one side to the head, sill, and jambs and secured to the other with silicone sealant	
Louver core	Aluminum	Extruded, 0.075" thick, set into the jambs without securing	
Blades	Aluminum	Extruded, 0.075" thick, spaced at 1" and secured to the louver core, with two #8 x 3/4" pan head screws per member end, into the screw bosses	

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SECTION 7

TEST RESULTS

The temperature range during testing was 26°C - 27°C (79°F - 81°F). The results are tabulated as follows:

ASTM E1996, LARGE MISSILE IMPACT

Conditioning Temperature: 26°C - 27°C (79°F - 81°F)

Missile Weight: 4191 g (9.24 lbs) Missile Length: 2.5 m (8' 4")

Muzzle Distance from Test Specimen: 5.2 m (17' 0")

Test Specimen #1: Orientation within ±5° of horizontal

IMPACT	#1	#2	#3
MISSILE VELOCITY	15.3 m/s (50.3 fps)	15.3 m/s (50.3 fps)	15.2 m/s (49.9 fps)
IMPACT AREA	Top right corner of	Center of louver	Lower left corner of
IIVIFACT ARLA	louver	Center of louver	louver
	Missile hit target area,	Missile hit target area,	Missile hit target area,
OBSERVATIONS	dented blades, no dented b		dented blades, no
OBSERVATIONS	breakage, missile was	breakage, missile was	breakage, missile was
	rejected	rejected	rejected
RESULTS	Pass	Pass	Pass

Note: See Intertek B&C Sketch #1 for impact locations.

Test Specimen #2: Orientation within ±5° of horizontal

IMPACT	#1	#2	#3
MISSILE VELOCITY	15.2 m/s (49.8 fps)	15.2 m/s (49.9 fps)	15.4 m/s (50.4 fps)
IMPACT AREA	Lower left corner of louver	Center of louver	Top right corner of louver
OBSERVATIONS	Missile hit target area, missile was rejected, bent blades, no further damage observed	Missile hit target area, missile was rejected, bent blades, no further damage observed	Missile hit target area, missile was rejected, bent blades, no further damage observed
RESULTS	Pass	Pass	Pass

Note: See Intertek B&C Sketch #1 for impact locations.

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Test Specimen #3: Orientation within ±5° of horizontal

IMPACT	#1	#2	#3
MISSILE VELOCITY	15.2 m/s (49.7 fps)	15.3 m/s (50.3 fps)	15.2 m/s (49.8 fps)
IMPACT AREA	Lower right corner of louver	Center of louver	Top left corner of louver
OBSERVATIONS	Missile hit target area, missile was rejected, dented blades, no further damage observed		Missile hit target area, missile was rejected, dented blades, no further damage observed
RESULTS	Pass	Pass	Pass

Note: See Intertek B&C Sketch #1 for impact locations.

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TAS 203, Cyclic Wind Pressure Loading

Test Specimen #1:

Test Specimen #1: Cyclic Test Spectrum and Average Cycle Time per TAS 203

DESIGN PRESSURE	STAGE		
±60.0 psf	1	2	3
POSITIVE PRESSURE RANGE (psf)	0 – 30.0	0 – 36.0	0 – 78.0
AVERAGE CYCLE TIME (sec.)	2.77	2.89	N/A
NUMBER OF CYCLES	600	70	1
	4	5	6
NEGATIVE PRESSURE RANGE (psf)	0 – 30.0	0 – 36.0	0 – 78.0
AVERAGE CYCLE TIME (sec.)	2.25	2.74	N/A
NUMBER OF CYCLES	600	70	1

Test Specimen #1: Positive Cyclic Load per TAS 203

INDICATOR LOCATION	MAXIMUM DEFLECTION (in.)	PERMANENT SET (in.)
1	0.08	0.01
2	0.15	0.01
3	0.04	<0.01

Test Specimen #1: Negative Cyclic Load per TAS 203

INDICATOR LOCATION	MAXIMUM DEFLECTION (in.)	PERMANENT SET (in.)
1	0.21	0.02
2	0.15	0.01
3	0.05	0.01

Result: Pass

Note: See Intertek B&C Sketch #2 for indicator locations.

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TAS 203, Cyclic Wind Pressure Loading

Test Specimen #2:

Test Specimen #2: Cyclic Test Spectrum and Average Cycle Time per TAS 203

rest specimen #2. Cyclic rest spectrum and Average Cycle rime per 1A3 203			
DESIGN PRESSURE	STAGE		
±60.0 psf	1	2	3
POSITIVE PRESSURE RANGE (psf)	0 – 30.0	0 – 36.0	0 – 78.0
AVERAGE CYCLE TIME (sec.)	2.77	2.89	N/A
NUMBER OF CYCLES	600	70	1
	4	5	6
NEGATIVE PRESSURE RANGE (psf)	0 – 30.0	0 – 36.0	0 – 78.0
AVERAGE CYCLE TIME (sec.)	2.25	2.74	N/A
NUMBER OF CYCLES	600	70	1

Test Specimen #2: Positive Cyclic Load per TAS 203

INDICATOR LOCATION	MAXIMUM DEFLECTION (in.)	PERMANENT SET (in.)
1	0.02	<0.01
2	0.09	0.01
3	0.01	<0.01

Test Specimen #2: Negative Cyclic Load per TAS 203

INDICATOR LOCATION	MAXIMUM DEFLECTION (in.)	PERMANENT SET (in.)
1	0.09	0.03
2	0.19	0.02
3	0.09	0.02

Result: Pass

Note: See Intertek B&C Sketch #2 for indicator locations.

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TAS 203, Cyclic Wind Pressure Loading

Test Specimen #3:

Test Specimen #3: Cyclic Test Spectrum and Average Cycle Time per TAS 203

DESIGN PRESSURE	STAGE		
±60.0 psf	1	2	3
POSITIVE PRESSURE RANGE (psf)	0 – 30.0	0 – 36.0	0 – 78.0
AVERAGE CYCLE TIME (sec.)	2.77	2.89	N/A
NUMBER OF CYCLES	600	70	1
	4	5	6
NEGATIVE PRESSURE RANGE (psf)	0 – 30.0	0 – 36.0	0 – 78.0
AVERAGE CYCLE TIME (sec.)	2.25	2.74	N/A
NUMBER OF CYCLES	600	70	1

Test Specimen #3: Positive Cyclic Load per TAS 203

INDICATOR LOCATION	MAXIMUM DEFLECTION (in.)	PERMANENT SET (in.)
1	0.06	<0.01
2	0.14	0.01
3	0.05	<0.01

Test Specimen #3: Negative Cyclic Load per TAS 203

INDICATOR LOCATION	MAXIMUM DEFLECTION (in.)	PERMANENT SET (in.)
1	0.07	0.01
2	0.17	0.01
3	0.07	0.02

Result: Pass

Note: See Intertek B&C Sketch #2 for indicator locations.

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SECTION 8

CONCLUSION

The specimen(s) tested met the performance requirements set forth in the referenced test procedures for a ±60.0 psf Design Pressure with missile impacts corresponding to Missile Level D.

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. Intertek B&C will service this report for the entire test record retention period. The test record retention period ends five years after the test date. Test records, such as detailed drawings, datasheets, representative samples of test specimens (where required by Certification or Accreditation bodies), or other pertinent project documentation, will be retained for the entire test record retention period.

Unless differently required, Intertek reports apply the "Simple Acceptance" rule also called "Shared Risk approach," of ILAC-G8:09/2019, Guidelines on Decision Rules and Statements of Conformity.

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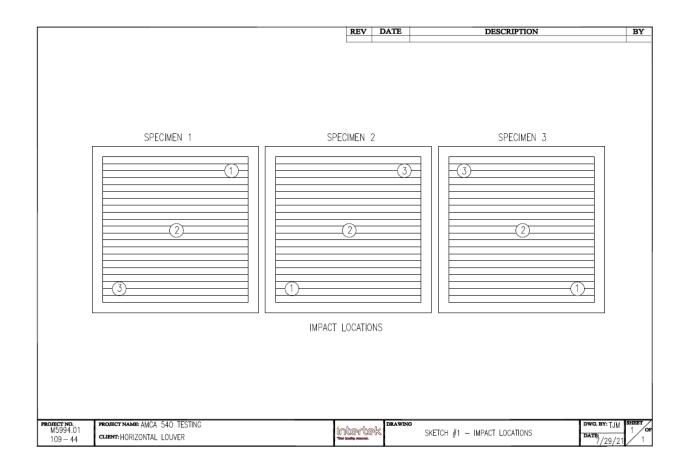
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SECTION 9
SKETCHES



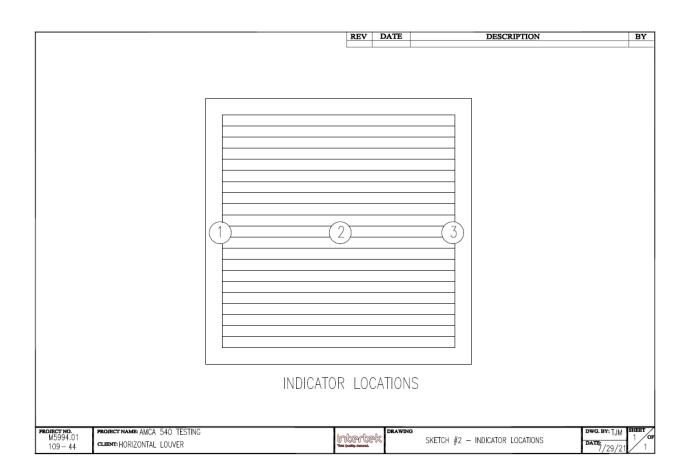


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SECTION 10

PHOTOGRAPH



Photo No. 1
4" Rain-Resistant, Horizontal Louver Prior to Testing



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SECTION 11

DRAWINGS

The test specimen drawings have been reviewed by Intertek B&C and are representative of the test specimen(s) reported herein. Test specimen construction was verified by Intertek B&C per the drawings included in this report. Any deviations are documented herein or on the drawings.

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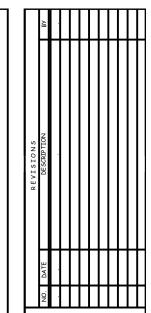
Verified by: Report #: M5994.01

1/22/22

JOB: 400 SERIES - LOUVER TESTING INTERTEK LAB

GLAZING CONTRACTOR: RANGER ARCHITECTURAL PRODUCTS, INC. HOUSTON, Texas

GLASS MARKS	TYPE	DESCRIPTION	ABBREVIATIONS	DESCRIPTION	DRAWING INDEX		GENE	TRAL NOTES
⟨GL−1⟩			CL D.L.O. D.O. F.D.	CENTER LINE DAY LIGHT OPENING DOOR OPENING FRAME DIMENSION FLAT HEAD SCREW MACHINE SCREW	SHEET NUMBERS 1.01	DESCRIPTION - COVER SHEET	1. Do We	not order glass or glazing materials except from the final erection drawings. will assume no responsibility for errors resulting from the use of these wings by other trades.
⟨GL−2⟩			F.H. M.S. O/C O.D. P.H.	FLAT HEAD SCREW MACHINE SCREW ON CENTER OPENING DIMENSION PAN HEAD SCREW	1.02 3.01	- BILL OF MATERIALS - ELEVATIONS	2. Find	al approval constitutes acceptance of all finishes, connections, dimensions and riations detailed on these drawings.
GL-?			P.H. P.S. R.O. R.D. REF.	PAN HEAD SCREW PANEL SIZE ROUGH OPENING REFERENCE DIMENSION REFERENCE	5.01 6.01	- SECTION DETAILS - PLAN DETAILS	Revi	Must verify all dimension. isions must be submitted in writing before any action will be taken.
GL-?			SMS STS HEX	REFERENCE SHET METAL SCREW SELF TAPPING SCREW HEX HEAD SCREW BY OTHERS NOT BY GLAZING CONTRACTOR WORKING POINT	7.01	- SECTION VIEWS	Prod drav	ese drawings represent our interpretation of the architectural drawings. ducts for this project are in functional compliance with the architects wings and specifications. it is important that this interpretation be reviewed
GL-?			B.O. N.B.G. W.P.	BY OTHERS NOT BY GLAZING CONTRACTOR WORKING POINT	6	TOTAL SHEETS	dim con	nensionally and fuctionally with respect to actural Architects intent, interfacing additions and materials, and job site conditions.
⟨GL−?⟩			LEGEND	DETAIL NUMBER		YSTEM / SERIES		quest for revisions after we have been authorized to fabricate will be subject a handling charge plus cost of any additional materials.
⟨GL−?⟩			_	-DETAIL NUMBER -SHEET NUMBER	400 SERIES 2 LOUVERS	1/4" X 4 1/4"		Architects/GC notes: must be responded to before we can proceed. wood blocking and supports for wood blocking by others.
⟨GL-?⟩				-GLASS MARK			7. The	e General Contractor shall provide surrounding conditions ficient to withstand loads imposed by our framing system.
(GL-?)			◀	-DEADLOAD ANCHOR				PPROVAL STAMPS
GL-?				-WINDLOAD ANCHOR				
NOTES / COMMEN	ITS		•	-WORK POINT			-	
				-COLUMN MARK				
			REFE	ERENCE # CRIPTION I RE:				
			MANUFACTURE	SEALANT TYPES	FINISH TYP (COLOR		
			DOW DOW	795 SILICONE COLOR TO BE	THAISH FIF	OLUN		
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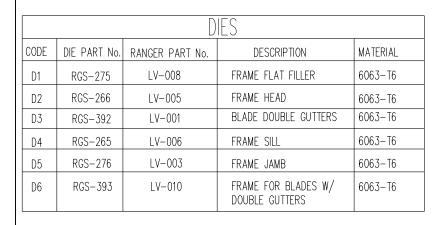


PROJECT:
LOUVER TESTING INTERTEK LAB
RANGER ARCHITECTURAL PRODUCTS
400 SERIES LOUVERS
& 500 SERIES LOUVERS

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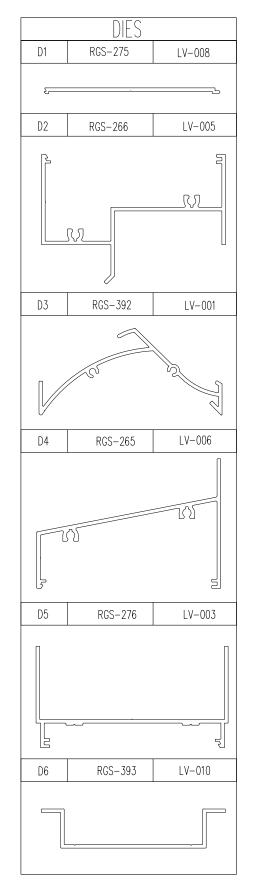
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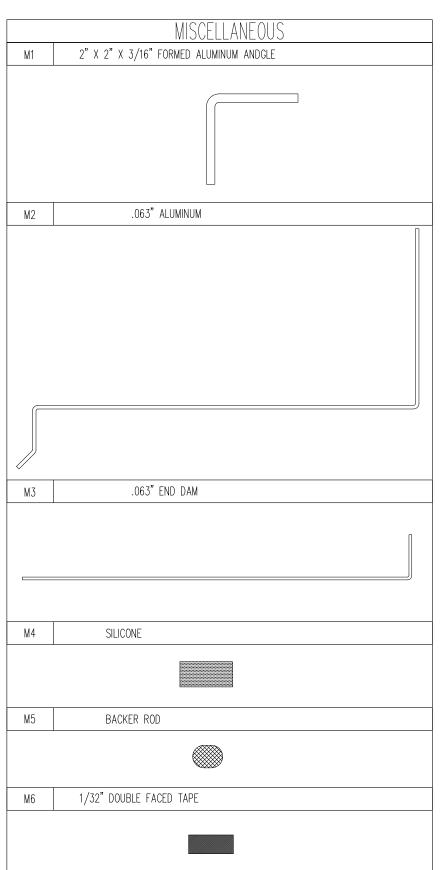


	MISCELLANEOUS					
CODE	DIE PART No.	RANGER PART No.	DESCRIPTION	MATERIAL		
M1	_	FORMED ALUMINUM ANGLE	2" X 2" X 3/16" FORMED ALUMINUM ANGLE	ALUMINUM		
M2	-	FORMED ALUMINUM ANGLE	.063 ALUMINUM	ALUMINUM		
М3	_	FORMED ALUMINUM ANGLE	.063 END DAM	ALUMINUM		
M4	_	_	SILICONE	SILICONE		
M5	_	_	BACKER ROD			
М6	_	_	1/32" DOUBLE FACED TAPE			

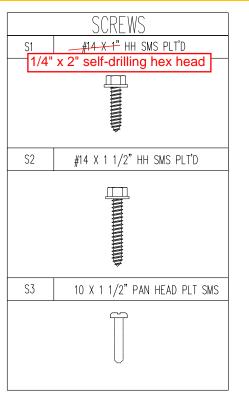
1/4" x 2" self-drilling hex

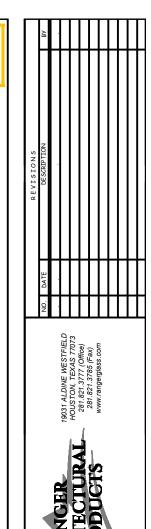
	SCREWS					
CODE	DIE PART No.	RANGER PART	No.	DESCRIPTION	MATERIAL	
S1	_	-	_	#14 X 1" HH SMS PLT'D		
S2	_	_		#14 X 1 1/2" HH SMS PLT'D		
S3	_	-		10 X 1 1/2" PAN HEAD PLT SMS		







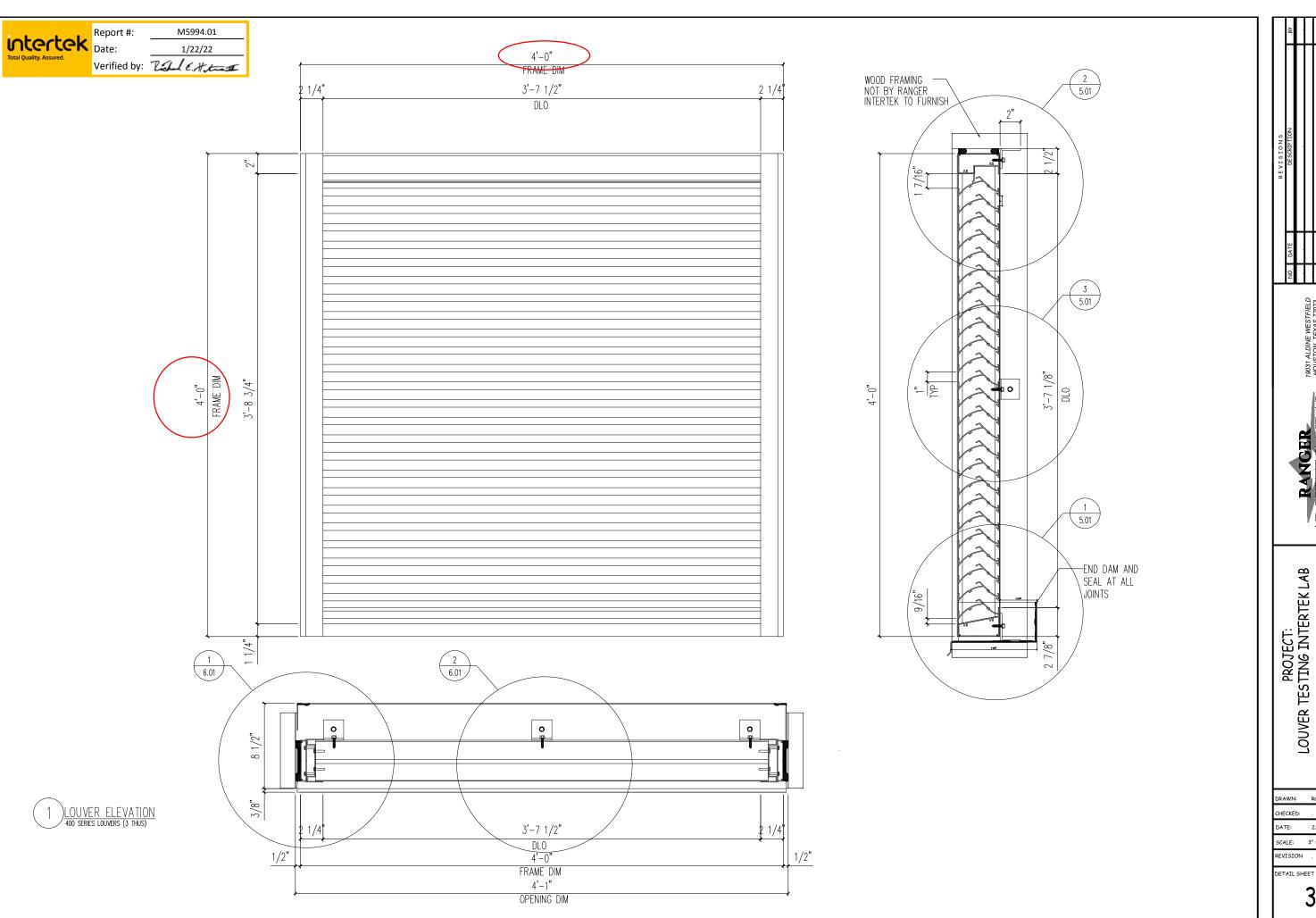


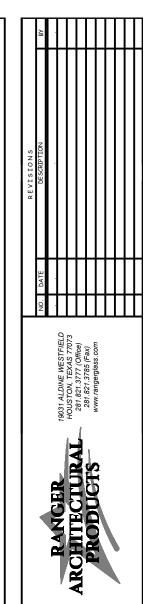


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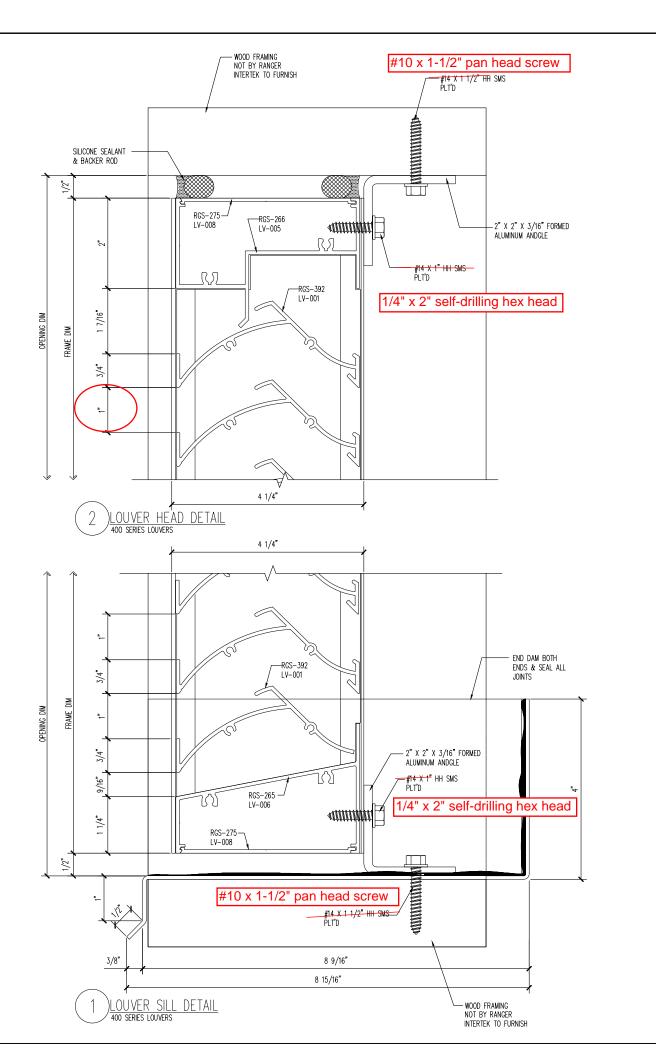
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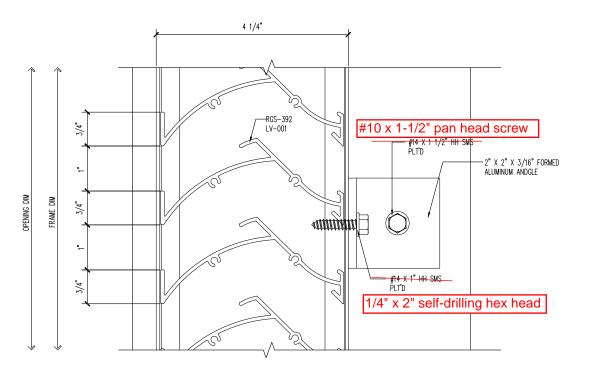


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3 LOUVER MID SPAN ANVHOR DETAIL 400 SERIES LOUVERS

ARCHITECTURAL PRODUCTS

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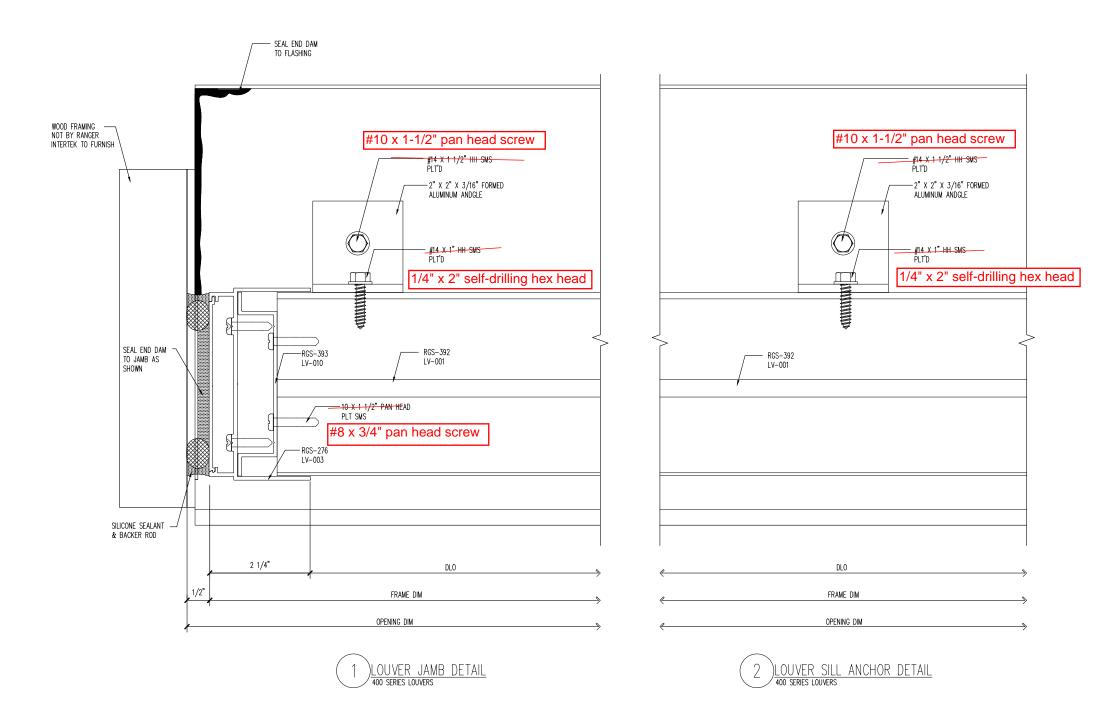
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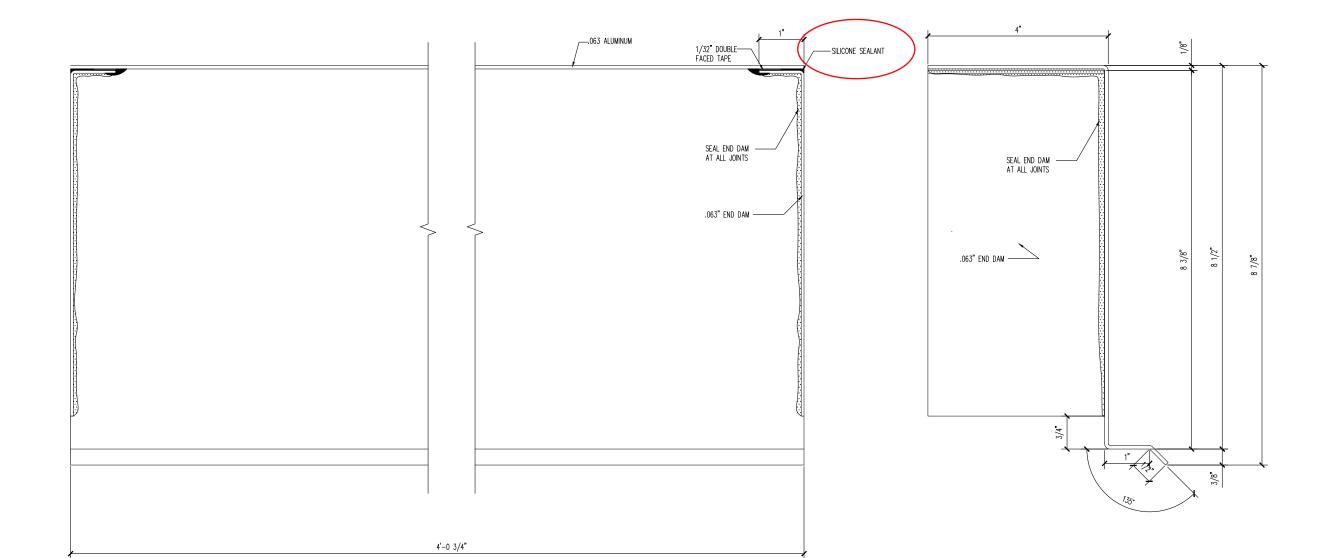
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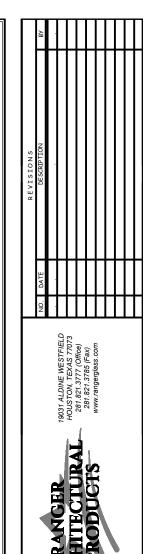
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400 SERIES LOUVER FLASHING (3 EACH)



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RANGER ARCHITECTURAL PRODUCTS
400 SERIES LOUVERS
& 500 SERIES LOUVERS

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TEST REPORT FOR RANGER ARCHITECTURAL PRODUCTS, INC.

Report No.: M5994.01-109-44

Date: 02/07/22

SECTION 12

REVISION LOG

REVISION #	DATE	PAGES	REVISION
0	02/07/22	N/A	Original Report Issue